

CONFEDERATED TRIBES AND BANDS

*Yakima Indian Nation*

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WRITTEN COMMENTS ON PROPOSED GENERAL GUIDELINES  
FOR THE RECOMMENDATION OF SITES FOR  
NUCLEAR WASTE REPOSITORIES,  
PURSUANT TO THE  
NUCLEAR WASTE POLICY ACT OF 1982  
BEFORE THE  
UNITED STATES DEPARTMENT OF ENERGY  
BY THE CONFEDERATED TRIBES AND BANDS  
OF THE YAKIMA INDIAN NATION  
SUBMITTED APRIL 7, 1983

## Introduction

On January 7, 1983, the President signed into law the Nuclear Waste Policy Act of 1982, Public Law 97-425 ("the Act"). The Act established a comprehensive program for the temporary management and ultimate disposal of high-level nuclear wastes in deep geologic repositories. Section 112 of the Act, "Recommendation of Candidate Sites for Site Characterization," establishes the basic framework by which candidate sites are to be chosen for detailed study and a site for a repository chosen from those studied. Section 112(a), "Guidelines," provides that candidate sites be selected following the review of environmental assessments prepared pursuant to guidelines adopted by DOE.

On February 7, 1983, DOE published in the Federal Register "Proposed General Guidelines for Recommendation of Sites for Nuclear Waste Repositories," 48 Fed. Reg. 5670. ("Proposed Guidelines"). The Federal Register notice established a deadline of March 24, 1983 to submit written comments on the proposed guidelines. On February 14, 1983, DOE published in the Federal Register an announcement of regional public hearings on the proposed guidelines to be held between March 2 and March 14, 1983, 48 Fed. Reg. 6549. On February 28, 1983, DOE announced in the Federal Register that the Seattle regional hearing was changed from March 2 to March 21, 1983, and that the deadline for written comments was extended to April 7, 1983, 48 Fed. Reg. 8289.

On March 21, at Seattle, Washington, Mel Sampson, Chairman of the Legislative Committee of the Yakima Tribal Council, Confederated Tribes and Bands of the Yakima Indian Nation ("Yakima Nation") presented testimony objecting to (1) procedure in adopting the guidelines, (2) time constraints, and (3) the contents of the proposed guidelines. At the Seattle hearing attention was called to the fact that the Yakima Nation was an "affected Indian tribe" under the provisions of the Act. Subsequently, the Secretary of Interior has found that the Yakima Nation is an affected Indian tribe under the provisions of Section 2(2)(B) of the Act and has so informed the Department of Energy ("DOE"). The status of the Yakima Nation has changed since the March 21, 1983 Seattle hearings from its potential status to a recognized affected Indian tribe under the Act and is entitled to the benefit of all of the participation and consultation provisions contained in the Act.

## Procedural Comments

We must continue to express our concern that, due to several major deficiencies in DOE's implementation of the Act, meaningful comment on these guidelines is at best difficult and probably

futile. The timing of the process contemplated by DOE in the proposed guidelines runs afoul of both the spirit and the letter of the Act. The schedule for site selection reflected in the background statement accompanying the guidelines is drastically telescoped from that set out by Congress. While the Act sets a deadline of January 1, 1985 for the selection of 3 sites for characterization, DOE proposes to promulgate final guidelines, release environmental assessments for and nominate five potential sites, and recommend three of those sites for further site characterization by the end of the Summer of 1983. 48 Fed. Reg. 5670-71.

This shortening of time for choosing three sites for characterization from two years to 8 months makes a rational screening process impossible. Moreover, it results in multiple violations of the Act. Instead of preparing environmental assessments of the five nominated sites after promulgation of these guidelines, as the Act requires (Sec. 112(b)), DOE is already drafting assessments -- prior to any public comment on the proposed guidelines. (See, e.g., "Draft Environmental Assessment for Characterization of the Hanford Site Pursuant to the Nuclear Waste Policy Act of 1982, DOE/EA-0210.)

DOE states in the preamble to the guidelines that it "may not be possible in preparing the environmental assessment to provide a complete evaluation of the site against all siting guidelines." 48 Fed. Reg. 5670. To a significant extent, this "impossibility" is due to DOE's deliberate attempt to subvert the rational decision-making process established by Congress by rushing headlong to nominate sites prior to thorough review under final guidelines. DOE has already published announcements that it proposes to nominate the Hanford Site in Washington state and the Nevada Test Site. 48 Fed. Reg. 9332, 9578. DOE's schedule makes a mockery of these guidelines, and only confirms the belief that DOE has no intention of utilizing them in choosing sites, but rather plans to give pro forma approval to those sites it has already selected.

The minimal importance which DOE's schedule gives to the guidelines is confirmed by review of the proposed guidelines themselves. It is most apparent that the provisions in the proposed guidelines that relate to site geometry, geohydrology, geochemistry, rock characteristics, tectonic environment, human intrusion, surface characteristics, environmental protection and socioeconomic impacts were lifted - without reflection - from the NWTS site performance criteria contained in the DOE national plan for Siting High Level Radioactive Waste Repositories and Environment Assessment DOE/NWTS-4 prepared without reference to

the Act, proposed Environmental Protection Agency ("EPA") Standards at 40 CFR Part 191 and the latest version of the Nuclear Regulatory Commission's ("NRC") technical criteria for waste repositories at 10 CFR Part 60. Further, the proposed guidelines fail to contain the noted required evaluations contained in the NWTSS Site performance criteria.

Where the provisions of the Act, proposed EPA Standards or NRC criteria are now considered in DOE's proposed guidelines they are merely lifted - without reflection - from these documents. This mosaic composed of these bits and pieces of these only noticed items and often only proposed, presents an open ended and vague product that can give a different picture depending on viewpoint. Such a product is useless to serve the purpose of the guidelines required by the Act. While it is self-evident that all related work should be utilized in formulating the required guidelines, mere citation to and lifting of general subject listing and proposed rules hardly satisfies DOE's obligation in these rules to explain its rationale for adopting them.

The Nuclear Waste Policy Act does not direct DOE to adopt EPA's standards or NRC's criteria for repository siting as its own guidelines. Rather, it directs DOE to consult with EPA, among other agencies, and to obtain the concurrence of NRC, but to issue its own guidelines for choosing repository sites. Neither EPA's standards nor NRC's criteria were developed pursuant to the Act, as both pre-dated its enactment. To the extent DOE chooses to adopt the proposed standards or criteria of other agencies, it must explain that choice so that comment on it can be meaningful. Such adoption is not self-justifying, and the possibility of commenting on the other agencies' issuances cannot substitute for a meaningful opportunity to comment on DOE's guidelines.

The wholesale adoption of other agencies' proposed rules raises another problem. What will happen when those rules are altered upon final promulgation? The proposed guidelines under review here contain only the cryptic comment that "changes in the NRC criteria or the EPA standards will be reflected in these guidelines, if warranted." 48 Fed. Reg. 5672. Does this mean that notice and comment on all three rulemakings are essentially merged, or that DOE will selectively change these guidelines based on its judgment that the final rules in the other agencies are preferable to the proposed rules? Commenters are placed in the untenable position of either having to comment simultaneously on all three sets of rules, or foregoing meaningful comment on the substance of the proposed DOE guidelines (i.e., the EPA standards and NRC criteria). Of course, if these rules are

finally promulgated prior to the other agencies' rules, any changes in these rules must be by formal amendment, after notice and comment, pursuant to the Administrative Procedure Act.

Moreover, the proposed guidelines contain a series of "qualifying", "favorable", "potentially adverse", and "disqualifying" factors which are generally so nebulous as to be incapable of rational comment or implementation. How is the public to comment on the adequacy of conditions which rely on such open-ended qualifying phrases as "extreme erosion" (960.5-1-1(b)), "sufficient extent" (960.5-1-2(a)), "low ... moisture content" (960.5-2-1(a)(3)), and "small percentage" (Id.)? All these terms can have an extremely broad range of meanings, and the continued use of such terms essentially grants untethered, unreviewable discretion to DOE.

We note with concern the March 21, 1983 comments of the State of Washington that the Act's required consultation has not taken place. We likewise note that, although the Yakima Nation is now an affected tribe, DOE has not made any efforts to consult with the Yakima Nation regarding the proposed guidelines. The legislative history of the Act makes it clear that as regards consultation accorded states, that affected Indian tribes must be treated equally with states all during the procedure.

We further note that although request was made by letter dated March 15, 1983 to J. William Bennett, certain DOE-referenced materials were requested by the Yakima Nation that particularly relate to siting criteria. These were:

Brunton, C.D., and McClain, W.C., 1977, "Geological Criteria for Radioactive Waste Repositories", YIOWI/TM-47, Office of Waste Isolation, Union Carbide Corporation, November 29, 1977.

DOE - DOE "Site Performance Criteria", NWTS-33(2), National Waste Terminal Storage Program.

International Atomic Energy Agency, "Site Selection Factors for Repository of Solid High-Level and Alpha-Bearing Wastes in Geological Formations. Technical Report No. 177, October 1977.

National Research Council - National Academy of Sciences, "Geological Criteria for Repositories for High-Level Radioactive Waste", August 1978.

Request was again made on March 29, 1983 for said materials. Receipt at this late date will of course not allow consideration of these relevant materials to guidelines for site characterization. Again, the rush and failure to consult by DOE limits comments on the proposed guidelines.

Further, NRC's Site Characterization Analysis (SCA) was just received at the close of business on April 5, 1983. Again this material could assist in preparing comments on the proposed guidelines. DOE's submission to NRC to form the basis for the SCA review was not until November 12, 1982. Since our submission had to be forwarded on April 6, 1983 to meet your deadline it was not possible to read the SCA. The failure to receive and have adequate time to review the SCA will limit comments on these proposed guidelines.

We did note with interest that even NRC is having difficulty receiving prompt and ready access to your information and data. Letter transmitting NUREG-0960.

#### Substantive Comments - General

DOE describes three starting points that "may be used" for the site selection process. (These--not coincidentally--are the procedures which DOE has in fact used to select its first-round nominees.): 1) focusing on specific geologic media that appear to have the right characteristics for waste isolation, 2) focusing on particular hydrogeologic settings, or 3) focusing on federal lands already dedicated to nuclear activities. There is absolutely no indication as to the relationship between these very dissimilar site screening procedures and the guidelines which follow.

In fact, the third method (focusing on federal lands already dedicated to nuclear activities) is completely at odds with the statutory directive that the guidelines "shall specify detailed geologic considerations that shall be primary criteria for the selection of sites in various geologic media". Nowhere in the Act is there any hint that existing federal nuclear reservations should be primary criteria for site selection or considered "favorable conditions" in screening sites. Non-geologic considerations (i.e., federal nuclear reservations) are therefore improperly treated as primary criteria in the guidelines (and in DOE's pre-guideline process of choosing the Hanford and Nevada sites for nomination). Thus, DOE attempts to perpetuate or grandfather its previous approach to siting a nuclear waste repository, in derogation of the explicit requirements of section

112(a) and the congressional finding that "[f]ederal efforts during the past 30 years to devise a permanent solution to the problems of civilian radioactive waste disposal have not been adequate." Act section 111(a)(3).

Moreover, there are no quantitative limits or values, no weighting, or rank ordering, or other prioritization of the various factors. This maximizes the likelihood of subjectivity and choices based primarily on non-relevant factors. Indeed, the guidelines seem to have been designed so that no sites can be excluded on the basis of them. The fact of federal ownership and existing nuclear activities may be administratively convenient to DOE, but they certainly cannot be allowed to assume as much importance in the site selection process as geology and hydrology, the "primary criteria". Yet precisely such a result is possible under these guidelines, and is apparently occurring in the ongoing site selection process.

To avoid a repeat of past abortive federal repository siting efforts, these guidelines should at least be rank ordered so it is clear that geologic and hydrologic considerations are to receive the most emphasis in the process. Numerical weighting values for each of the parameters would be even more helpful, and would help engender confidence that siting decisions were not being made on the basis of political or other non-relevant considerations.

The guidelines also do not clearly distinguish between criteria which are to be used in choosing sites as candidates for characterization and those which are to be used in selecting a repository site from those which have been characterized. Given the significance of this distinction, it should be clearly indicated in the guidelines. In addition, it should be made clear that at each level of review, DOE must consider all available information pertinent to all of the factors.

The guidelines do not specify qualifying or disqualifying factors for each of the parameters, as required by section 112(a) of the Act. In its enthusiasm to mimic the NRC regulations at 10 CFR Part 60, which do not include any qualifying or disqualifying factors, DOE has often failed to obey this key congressional directive. Many of the "potentially adverse conditions" which DOE copied from the NRC regulations should be considered "disqualifying factors" under the Act. The guidelines contain virtually no conditions which are worded as qualifying factors. Specific examples of these failures are outlined below in detail.

Secondly, treaty-reserved rights pertaining to lands and waters at or near the proposed repository site must be determined to make a proposed site unacceptable under the Act. We have discussed this matter in our presentation on March 21, 1983. It takes no further citation to emphasize that under the United States Constitution (Article VI, Section 2) that these rights are established by the "supreme Law of the Land". However, unless it be overlooked, it is clear that the Fifth Amendment to the United States Constitution prohibition against uncompensated taking, which these proposed guidelines assume, extends to protect the property interests of Indian tribes and individual tribal Indians, without regard to the nature of the property interest involved - e.g., treaty right, statutory grant, common law property interest, or recognized aboriginal land rights. See Tribe, Lawrence H., American Constitutional Law, Foundation Press 1978, p. 1018, n. 34, and the cases cited therein; Northern Cheyenne Tribe v. Hollowbreast, 425 U.S. 649, 655 (1976), Tee-Hit-ton Indians v. United States, 348 U.S. 272, 277-78 and n. 9 (1955), and Delaware Tribal Business Community v. Weeks, 430 U.S. 73, 81 (1974). The legislative history of the Act makes it clear that in acquiring Indian interests either the consent of the tribe involved or an explicit act of Congress must be obtained. (Comments of Chairman Udall at 128 Congressional Record, H-8165. Though Chairman Udall said "lands", other interests are of the same status and it follows that similar consent or specific legislation is required).

DOE has previously asserted (Skagit/Hanford NRC licensing proceedings) that executive action had previously extinguished the grazing, gathering and right of travel of the Yakima Indians within the restricted Hanford Reservation. We disputed that position in a brief filed in those proceedings and no NRC determination was made. However, subsequent to those proceedings the Court of Appeals for the Ninth Circuit has determined that treaty- or agreement-reserved grazing rights within lands owned by the United States cannot be extinguished by any subsequent executive action, and that such reserved rights have "priority". Swim v. Bergland, 676 F.2d 712 (1983).

Therefore, it is clear that DOE should not consider any site for a repository where any effect on these reserved rights is contemplated until such time as either tribal consent or specific legislation has been obtained. Proceeding with site characterization at a site in the face of these treaty-reserved rights and their constitutional and congressional protection without legislation or consent would be foolhardy and would most certainly subject DOE to condemnation. These proposed guidelines



must consider the law of the land and specify these consent or specific legislation requirements.

Thirdly, as we have previously specified, the Act has directed that the burden relating to waste disposal shall be borne by the persons responsible for generating such waste or spent fuel. Section 111.

The Yakima Nation takes serious exception to the failure of these guidelines to provide that no risk or burden shall be passed on to later generations. The Act and morality require that no risk or burden should be placed on later generations. Guidelines should provide that the radionuclides shall be retained away from the environment until such time as they have lost their radioactive propensity. This of course should vary with the life of the radionuclides stored. Merely to set a date in years long enough to salve the conscience of those here today, is perfidious. The Yakima Nation cannot and will not be a part of that perfidy. The radioactive life of radionuclides is within at least scientific estimation. To set a date for radioactive materials to reach the environment before said radioactivity expires is to pass the greatest of the burdens of radioactive waste on to those who come many years after the benefits were enjoyed.

Finally, the guidelines place entirely too much emphasis on the capabilities of engineered systems to compensate for less than favorable geologic conditions. Pursuant to the proposed EPA standards, the guidelines should strive to reduce radiological releases from a repository to a level that is as low as reasonably achievable through the site selection process alone. Engineered systems then provide an additional layer of safety, consistent with the traditional "defense-in-depth" approach to protection against radioactive hazards, and reflecting the degree of conservatism which the uncertainty of isolation over such long periods demands.

#### Specific Comments

1. 960.3-0 leaves open the period of such protection. We suggest the insertion of the word "perpetual" before protection. We note all our comments regarding the intergenerational risk factor.

2. 960.3-1, "Performance before permanent closure", states that a favorable condition is the absence of contributing radioactive releases from other nuclear facilities governed by 40 CFR Part 190, or the proposed 40 CFR 191, Part A. This provision is wise. It should be further expanded to include the absence of

contributing radioactive releases from all nuclear facilities. Radioactive releases are just as radioactive whether they come from Department of Defense facilities, low-level waste storage, reprocessing, nuclear generating facilities or facilities governed by 40 CFR Part 190 and Part 191. Does DOE suggest that radioactive releases from facilities outside of these particular regulations do not relate to the protection of public health safety and the quality of the environment merely because they are not within the purview of the cited regulations? Of course not. Such a position would be absurd.

We note this provision conflicts with the notion that a favorable condition is siting on lands already dedicated to nuclear activities of the federal government. 960.5-7-4(a), 960.4-1. Since this DOE-proposed favorable condition (i.e. location within a nuclear reservation) is so far removed from the health, safety and environmental protection considerations of the Act and particularly the Act's basic geologic considerations, we merely note this inconsistency and presume that the noted improper favorable considerations in 960.5-7-4(c) and 960.4-1 will not survive uniform criticism on this point.

3. 960.3-1(b)(1) states that a potentially adverse condition is the presence of other nuclear facilities governed by the proposed 40 CFR Part 191 with actual or projected releases at or near the maximum value permissible under those standards. This provision should include facilities governed by 40 CFR Part 190 and all other nuclear facilities per our comments in the preceding paragraph.

4. 960.3-2, "Performance after permanent closure", states that "[a] site shall be disqualified if the characteristics that influence radionuclide transport are too complex to allow reasonable confidence of compliance with the proposed 40 CFR Part 191.13 when considered in conjunction with state-of-the-art engineered systems...." Engineered systems cannot reduce the complexity of site-specific characteristics that influence radionuclide transport, and should not be used as an excuse to belittle or ignore the uncertainty that results from complexity.

The characteristics that influence radionuclide transport are complex at all sites, as the state of the art is still in a very rudimentary stage of development. Little is known about transport phenomena under field conditions. Reasonable confidence in modeling radioactive transport at the field scale is pushing the state of the art, making conformance difficult at best.

5. 960.3-2(a)(1) states that a favorable condition is groundwater travel times to the accessible environment of more than 10,000 years. The calculation of groundwater travel time can be made using a variety of methods, which might yield very different results. Since groundwater travel time is a critical test, the method by which this travel time is to be calculated should be clearly stated. To more accurately represent the fundamental issue, this favorable condition should be an explicit qualifying factor and should be rephrased to read: "Contaminant travel times to the accessible environment should be more than 10,000 years". This makes it clear that performance assessment models which incorporate numerical transport equations must be used.

However, we continue to take issue with any provision that would allow any radionuclides to reach the environment regardless of the time period. Certainly 10,000 years is not sufficient.

6. 960.3-2(b) states that a potentially adverse condition is "[g]eologic setting, site geometrics and characteristics, and radionuclide-transport characteristics that are extremely difficult to characterize and model". Either the word "extremely" should be deleted from this sentence, or this consideration should be a disqualifying factor. If characterization and modeling are extremely difficult due to natural conditions, obviously there can be little confidence that the proper degree of isolation will be achieved at the repository, a circumstance which should disqualify the site.

7. 960.4-1 incorrectly provides that consideration will be given to lands already dedicated to the nuclear activities of the federal government. Such consideration is without the purview of the Act and certainly flies in the face of the necessary consideration of contributing radioactive releases from other nuclear facilities which must be a part of the key objective of the Act, i.e. the protection of public health and safety, and the quality of the environment.

Consideration of the previous federal dedication to nuclear activities should be removed from this section and the Act's underlying key objectives of public health and safety and protection of the environment inserted in its place.

8. 960.4-2, "Consultation with states and affected Indian tribes", should be amended to include the following provision:

DOE will take no actions with respect to evaluation, investigation, and characterization of a site, or

development of a geologic repository at a site, between the time that an Indian tribe first informs DOE and the Secretary of Interior that it is seeking "affected Indian tribe" status pursuant to Section 2(2) of the Act, and the time that the Interior Secretary's determination of affected tribe status becomes effective; unless during that interim DOE treats the Indian tribe as if it were "affected" under the Act.

DOE should not be permitted to make substantial progress or irretrievable commitments of resources to characterization or development of a site while excluding potentially affected Indian tribes from the special participation procedures of the Act. DOE should either provisionally treat an interested tribe as "affected" and accord it all corresponding rights and privileges under the Act, or it should not proceed with actual work at the site pending the Interior Secretary's decision.

Moreover, this section should be amended so that each mention of "Indian tribe" reads "affected Indian tribe". The Act defines "affected Indian tribe" in Section 2(2) as either one on whose reservation a proposed repository is located, or one whose off-reservation usage or possessory rights pursuant to Congressionally-ratified treaties may be substantially and adversely affected by a repository. Consequently, the right to enter into a binding agreement for consultation and cooperation should not be limited to Indian tribes as to whom there are sites within tribal land. Section 117(c) of the Act clearly gives that right to all "affected Indian tribes".

9. 960.5-0. While we pass this section in frustration, we do want to again relate that we consider the technical guidelines much less than proper "standards".

10. 960.5-1-1, "Depth of underground facilities", states that a favorable condition is "conditions permitting the emplacement of waste at a minimum depth of 300 meters...." The U.S. DOE Final Environmental Impact Statement on the Management of Commercially Generated Radioactive Waste, Section 5.1.1, states that a range of from 600 to 1,000 meters of earth material will exist between the repository and the land surface. The favorable condition should not exist unless the repository would be at least 600 meters below the surface.

11. 960.5-1-2, "Thickness and lateral extent of the host rock", provides no qualifying or disqualifying factors for these parameters. There is sufficient information currently available

regarding the physical characteristics of various candidate host rocks to quantify disqualifying factors for these parameters as a function of host rock. The disqualifying factors should be conservatively chosen to insure that the requirements of Section 960.3-2 are likely to be met taking into account uncertainties based on information that can reasonably be obtained through borehole data. Also, there should be a potentially adverse condition for rock which is less than twice the disqualifying thickness.

Subsection (b) states that a potentially adverse condition is a volume of rock "laterally restricted to a small portion of the site". "A small portion" should be quantified as a percentage of the site area to give this guideline substantive meaning.

12. 960.5-2-1, "Present and future hydrologic conditions", states that a disqualifying factor is "average pre-waste emplacement groundwater travel time along the path of likely radionuclide travel from the disturbed zone to the accessible environment [of] less than 1,000 years". "Accessible environment" is defined in Section 960.2-0 as

the atmosphere, the land surface, surface waters, oceans, and the parts of the lithosphere that are more than 10 kilometers in any direction from the original location of any of the radioactive waste in the disposal system.

This definition of "accessible environment", which excludes aquifers within 10 kilometers of the repository, is consistent with the currently proposed EPA standards at 40 CFR Section 191.12. However, we understand that relaxation of EPA's previously proposed one mile lithosphere boundary was the result of pressure from DOE and NRC.

EPA's original rule (carried at least through draft 19, March 19, 1981) placed the subsurface boundary of the accessible environment at one mile, the proximate outer boundary of the underground facility. The older definition was consistent with NRC's original definition of accessible environment as "those portions of the environment directly in contact with or readily available for use by human beings". (10 CFR Section 60.2, 46 Fed. Reg. 35285, July 8, 1981). Any freshwater aquifer, a present or potential future source of water for drinking or irrigation, would clearly fit that definition and thus be protected. This relaxation of the protected environment leaves

unprotected huge areas of groundwater supply (nearly 40 times the area that was excluded under the earlier definition). This definition change thus constitutes an unjustified relaxation by a factor of 6.2 of the 1000-year groundwater travel time disqualification threshold. These relaxations are imprudent and do not account for the enormous complexities and uncertainties involved.

Again we object to the short time period. One thousand years is clearly not acceptable and places the burden of waste disposal on those who are yet unborn, contrary to the intent of the Act.

13. 960.5-2-1(b) specifies no potentially adverse conditions. The potentially adverse conditions specified in Section 960.5-2-2(2) for "Hydrologic modeling", properly belong under Section 960.5-2-1(b), "Present and future hydrologic conditions". These considerations describe physical hydrologic conditions rather than factors which might hinder proper modeling.

There should be additional potentially adverse conditions for the converses of the listed favorable conditions in 960.5-2-1(a). For example, for sites in the saturated zone, high horizontal and vertical permeability or a predominantly upward hydraulic gradient should explicitly be considered potentially adverse conditions. If they are not explicitly listed as potentially adverse conditions, they might be treated as if they were neutral.

14. 960.5-2-2, "Hydrologic modeling" (See Paragraph 13 above). Because of the importance of groundwater to a repository's ability to isolate waste, this section should certainly have qualifying and disqualifying factors. If the geohydrologic regime at a proposed site is very complex, so that characterization results are very uncertain, a site should be disqualified. Instead of the present potentially adverse conditions, which should be in the preceding section, the converses of the listed favorable conditions should be the potentially adverse conditions for hydrologic modeling. Any significant geohydrologic condition which cannot be modeled with reasonable certainty should be treated as a potentially adverse condition.

15. 960.5-2-3. The existence of large highly transmissive aquifers between the host rock and the land surface should be a disqualifying factor.

16. 960.5-2-4. Again, the time period problem. A site should be disqualified if there is evidence that dissolution would cause interconnection of the underground facility to the site hydrogeologic system. The use of the word "significant" should not be used without definition.

17. 960.5-4-2, "Operational safety", states that a disqualifying factor is "if the applicable safety requirements of the DOE and the NRC could not be met". The safety requirements of the Occupational Safety and Health Administration and the Mining Safety and Health Administration should be added to this provision. In addition, the second potentially adverse condition listed, "[g]eomechanical properties that would not permit underground openings to remain stable until permanent closure", should be a disqualifying factor.

18. 960.5-5-1, "Faulting and seismicity", has no qualifying or disqualifying factors. Thus, DOE suggests that there is no seismic condition which would necessarily disqualify a site. This is ridiculous on its face. In fact, most or all of the potentially adverse conditions listed in subsection (b) should be considered instead as disqualifying factors. If there are "faults in the geologic setting that may adversely affect the regional groundwater flow system", or evidence of active faulting in geologically recent time frames, the site should be disqualified. We also suggest that "reasonable certainty" rather than sufficient certainty should be used.

Potentially adverse condition (5) would single out a site as having a potentially adverse condition only if it had earthquakes which were atypical of the region. This suggests that the site of frequent, large earthquakes would be potentially acceptable if the whole region experienced frequent, large earthquakes.

19. 960.5-5-2, "Igneous activity", has no qualifying or disqualifying factors. This suggests that a site on Mt. St. Helens would not necessarily be disqualified, an obviously ridiculous result. The potentially adverse conditions listed, presence of intrusive dikes, sills, or stocks that may adversely affect the regional groundwater flow system, and evidence of igneous activity within the geologic setting during the past million years, should both be considered disqualifying factors. Appropriate potentially adverse conditions would be the converses of the listed favorable conditions.

20. 960.5-5-3, "Uplift, subsidence, and folding", once again has no qualifying or disqualifying factors. Once again, the listed potentially adverse conditions should be considered

disqualifying factors, and the proper potentially adverse conditions should be the converses of the listed favorable conditions. If there are folds in the geologic setting that may adversely affect the regional groundwater flow system, or evidence of active uplift, subsidence, or folding within the past million years, the uncertainties implied by these conditions should result in the disqualification of the site. The existence of capable faults within ten miles of the site should be a disqualifying factor.

21. 960.5-6-1, "Natural resources", has no qualifying or disqualifying factors. Once again, the listed potentially adverse conditions should be considered disqualifying factors. These guidelines do not rely on institutional controls to guarantee isolation for the required periods. Even the appearance that economically exploitable resources might be present at or near the site should disqualify it.

The following recommendations made recently by the National Academy of Sciences should be heeded by DOE:

No area with a present or past record of resource extraction other than for bulk materials won by surface quarrying should be considered as a geological site for radioactive wastes. This restriction rests on one or more of three possible considerations: (a) present or predictable future importance as a potential source of needed raw materials; (b) disturbance of the natural hydrologic regime in consequence of present or past underground development and exploration such as tunneling, hydrologic fracturing, etc., resulting in greater uncertainty as to the paths and volumes of fluid flow; and (c) potential attractiveness to future developers and explorers for natural resources who may be drawn to the area by evidence of past activities of resource extraction.

Geological Criteria for Repositories for High-Level Radioactive Wastes, National Academy of Sciences, Committee on Radioactive Management, 1978.

As other authorities have stated with respect to the subject of human intrusion and natural resources:

Based on historic longevity of past civilizations, and considering the great instability of present human institutions, I doubt that any specific event, in particular one that is as unglamorous as waste



disposal, will be remembered for more than a hundred years, or at best a few hundred years. Thereafter, we must suppose that our enterprising descendants would resume their drilling activities.

Based on [historical] facts, a human intrusion into the general area of a nuclear waste repository within a few hundred years must be considered a near certainty, if this repository is located in a geological medium containing salt or any resources that humans may want to make use of.

K.S. Johnson and S. Gonzales, "Salt Deposits in the United States and Regional Geologic Characteristics Important for Storage of Radioactive Waste", Y-OWI-SUB-7414/1, DOE Office of Waste Isolation, 1978.

The listed favorable condition, "[n]atural resource concentrations that are not significantly greater than the average condition for the region", makes no sense. If the entire region is rich in exploitable natural resources, the entire region is subject to future exploitation. The fact that the area of the proposed site is not relatively richer in resources than its immediate surroundings can hardly be considered a favorable condition. Drilling for oil and gas and extensive leasing for exploration and production within the geologic province should be an adverse condition.

Finally, the natural resources section should explicitly recognize that groundwater is a potentially exploitable natural resource which must be considered.

22. 960.5-6-2, "Site ownership and control", states that a potentially adverse condition is "[l]and-use conflicts involving land dedicated by the federal government for potentially incompatible purposes". The kinds of purposes which might be potentially incompatible should be spelled out in the guidelines. Certainly the existence of treaty-reserved possessory or usage rights in the area should be an adverse if not disqualifying condition. Congress in the Act has shown its interest in protecting this reserved use.

23. 960.5-7-1, "Surface-water systems", has no qualifying or disqualifying factors. The listed potentially adverse conditions should be disqualifying factors when the potentials they identify reach a certain point. If the potential for foreseeable human activities to adversely affect the groundwater flow system or the

potential for flooding the underground facility is significant, the site should be disqualified.

24. 960.5-7-2, "Terrain", has no qualifying or disqualifying factors. The potentially adverse condition, "[r]oad and rail access routes that encounter steep grades, sharp switchbacks, slope instability, or other potential sources of hazard to incoming waste shipments", should be a disqualifying factor. Likewise, road or rail routes that traverse flood plains or cross rivers should be a disqualifying factor.

25. 960.5-7-4, "Offsite hazards", states:

The site shall be such that present and projected effects from nearby industrial, transportation, and military installations and operations, including atomic energy defense activities, can be accommodated by engineering measures and can be shown to have no unacceptable impacts on repository operation.

Obviously, such activities nearby have the potential for unacceptable impacts on repository operation. In light of that, it is difficult to discern the logic of including, as a favorable condition, "[s]iting on lands already committed for DOE nuclear reservations". Such siting guarantees that the repository will be subject to potential effects from nearby industrial or atomic energy defense activities. While there may be advantages to siting on DOE nuclear reservations, the avoidance of offsite hazards is not one of them. Clearly this so-called favorable condition conflicts with the listed potentially adverse conditions: "[t]he presence of nearby potentially hazardous facilities", and "[s]iting close enough to an atomic energy defense facility to compromise or interfere with the use of that facility for defense purposes". The cumulative effect of radionuclides entering the environment because of other nearby nuclear facilities should be listed as a disqualifying factor.

Once again, this section has no qualifying or disqualifying factors. If the site is close enough to potentially hazardous facilities, nuclear facilities, or atomic energy defense facilities, it should be disqualified.

26. 960.5-8-2, "Transportation", states that a potentially adverse condition is "[sites] requiring the concentration of transportation routes through highly populated areas". To the end of this sentence should be added: "... or over poor quality roads or rail or road transportation that traverses flood plains or rivers".

27. 960.5-9, "Environmental protection", requires the site to be located so as to reduce the likelihood and consequences of potential environmental impacts, and requires these impacts to be mitigated to the extent "reasonably achievable". The "as low as reasonably achievable", or "ALARA" principle, is well understood in regulation of radioactive hazards. By its emphasis on engineered systems and mitigation throughout these guidelines and especially in the favorable conditions and potentially adverse conditions listed in this section, DOE seems to apply this principle primarily to the design of a repository and waste form, rather than to the selection of its site. Such an interpretation is inconsistent with the explicit EPA requirement that "[d]isposal systems shall be selected and designed to keep releases to the accessible environment as small as reasonably achievable, taking into account technical, social and economic considerations" (47 Fed. Reg. 58205, December 29, 1982) (emphasis added). Engineering systems should not be used to compensate for less than favorable geology. By maintaining the ALARA principle for both engineered measures and siting decisions, DOE would preserve the necessary "defense-in-depth" approach to radioactive hazards which has long been the stated goal of federal regulation of those hazards, and which is especially needed to have confidence in waste isolation over the time periods in question. DOE should rewrite this section to ensure that, for the host rock type under consideration, all reasonably achievable steps have been taken to locate the site with the smallest potential radiological releases.

To the list of potentially adverse conditions should be added:

(4) proximity to, or direct adverse impacts of the repository or its support systems, on rivers or streams.

28. 960.5-10, "Socioeconomic impacts", in fact deals almost entirely with economics--primarily labor availability. To the list of potentially adverse conditions should be added:

(4) proximity to important historical or American Indian religious sites.

(5) proximity to Indian reservations where members of tribes or their predecessors reserving said reservations have lived for more than 100 years.

(6) proximity to treaty-reserved possessory or usage rights.