

POLICY ISSUES IN THE ENERGY RESEARCH AND DEVELOPMENT
ADMINISTRATION'S RADIOACTIVE WASTE MANAGEMENT PROGRAM

by:

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Slightly less than a year ago Dr. Frank Pittman, Director of the Division of Waste Management and Transportation, addressed this forum and outlined the Government's program for managing the commercial radioactive waste earmarked for Federal custody under existing or proposed regulations. At that time, he also acknowledged the considerable influence that public acceptance would have on this program and pointed to the importance of the programmatic environmental statement then in preparation.

Since then, we have seen the issuance of the draft environmental statement with the resulting public hearings and receipt of other comments, and the passage of the Energy Reorganization Act of 1974 which, among other things, abolished the Atomic Energy Commission and created the Energy Research and Development Administration and the Nuclear Regulatory Commission. It is appropriate then that a Waste Management and Transportation spokesman should come back here today to review where we stand in the light of these developments. I propose to minimize in this review the discussion of the technology

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concerning repository concepts and sites, because this remains relatively unchanged except for a redirection of emphasis. Instead I propose to discuss the somewhat less technical but very important issues of the reorganization's effect on waste management responsibilities, the major reactions to the draft environmental statement and our current appraisal of public acceptance issues.

As has been widely publicized, the Energy Reorganization Act of 1974 abolished the Atomic Energy Commission. The Atomic Energy Act, however, was amended only slightly and the so-called operating and promotional functions, executed by the General Manager's side of the former AEC, are now to be carried on by ERDA. ERDA will not have any direct regulatory functions, although it may carry out research and development requested by NRC as being helpful in the drafting or enforcement of NRC regulations. Information and experience gained by ERDA in its own activities will be made available for NRC to use at its discretion, continuing a policy of long standing between the operating and regulatory arms of the old AEC.

One of the operating functions of the old AEC inherited by ERDA (and within ERDA by the Division of Waste Management and Transportation) is the development and eventual operation of repositories for both the interim storage and permanent disposal of those commercial radioactive wastes identified by regulations of the NRC as having to be transferred to Federal custody. In this connection, it is very important to note that for two specific radioactive waste activities,

ERDA will be a licensee of NRC. These activities are: (1) the operation of repositories for the interim storage of commercial high-level waste, and (2) the operation of repositories for the final disposal of any high-level waste. Preliminary discussions between WMT staff and NRC staff on repository licensing have begun.

The Energy Reorganization Act of 1974 was signed by the President on October 11, 1974. The draft environmental statement (WASH-1539) on the program for developing high-level waste repositories and receiving commercial transuranium-contaminated waste, was issued in September 1974. In other words, during most of the preparation of WASH-1539 we were well aware of the strong probability of reorganization and of its general nature. We were also aware that a good deal of the impetus for the reorganization came from groups protesting what they considered an undesirable conflict of interest between the promotional and the regulatory interests both vested in the AEC. Because of this growing concern with the dual interest situation, the staff preparing WASH-1539 attempted to restrict its scope to the operational aspects under the control of the General Manager -- that is, the engineering and planning aspects of the repositories themselves -- and avoid discussion of rulemaking, compliance and other matters under the control of the Director of Regulation.

This attempt to observe the jurisdictional line between operations and regulations was not recognized or agreed with by many comments on WASH-1539. The statutory placement of these functions in separate

agencies did not appear to change this and we are still being urged to include a discussion of regulatory issues in the revision of WASH-1539. A summary of major regulatory issues raised by commenters on the statement is as follows:

1. The issue of amending the regulations to require Federal custody and eventual permanent geological disposal for additional types of radioactive waste such as those contaminated with iodine-129, tritium and the noble gases.
2. The issue of amending the present ten-year limit for onsite retention of high-level waste by the generator to permit life-of-the-plant retention and thus permit Federal effort to be concentrated on permanent disposal.
3. The issue of delaying action on central Federal retrievable storage pending completion of the NRC study on nuclear energy centers, followed by revision of the policy to reflect recommendations of the study.
4. The issue of amending the proposed five-year onsite retention limit for transuranium-contaminated waste parallel to the action in Item 2 above.
5. The issue of amending the proposed transuranium rulemaking to be responsive to the comments received as to interpretation, enforcement and cost-benefits justification.
6. The issue of the environmental impact of waste management at the generating site, particularly high-level liquid storage and solidification.

7. The issue of a nuclear moratorium pending availability of a proven permanent disposal, with the variations of: (a) a moratorium on reactor operation; (b) a throwaway fuel cycle; and (c) storage of spent fuel.

For the NRC to provide reasonably comprehensive text on these issues for inclusion in a revised WASH-1539 would obviously be a major effort and result in a corresponding delay. The NRC text would also make up an important part of the resultant document. No matter what caveats might be inserted about ERDA being the lead agency, it would still amount to NRC, presumably an independent regulatory agency, taking a major role in preparation of a programmatic defense of activities which NRC would later be called upon to license or not license in an impartial and unprejudiced manner. On the other hand, without such additional text we cannot be sure that the revised statement might not be vulnerable to challenges and delays on ground of procedural inadequacies. I am sorry that I must cite this problem only to show we are aware of it but without being able to describe its resolution.

To continue with a summary of comments on WASH-1539 which are unquestionably within ERDA's jurisdiction and which we are planning to handle in the revision, one broad class of comments concerns the safety of various details of the three engineering concepts under consideration for the Retrievable Surface Storage Facility (RSSF). Most of these can be easily treated by supplementing the original

text with detail. One exception, however, promises to be troublesome in this and future statements and, therefore, I should like to discuss it briefly. This exception is the issue of sabotage.

This issue may be simpler to consider if we keep a nonnuclear analogy in mind. If a group of men were to walk into a bank or write a letter to the bank president and demand to know exactly how the bank was most vulnerable to robbers and how much money would be lost, there would not be too many likely results. One result might be that the authorities would consider this the one overt act required for a charge of conspiracy to rob the bank. If not, they would certainly keep the men under close surveillance for a long time. In case this seems an unlikely hypothesis, let me point out that we have on record a letter from an environmental group demanding that an environmental statement include a description of exactly how a breeder reactor would be most vulnerable to sabotage, and exactly how much radioactivity would be released to the environment. My point is that we must assume saboteurs will read environmental statements and we simply cannot let those statements provide a free blueprint to those saboteurs. Even if we say nothing about where the vulnerability is, but merely describe the consequences of the maximum credible sabotage, we are still in danger of extending a helping hand. If we say that an undescribed but maximum credible sabotage of a specific facility will have results which are much more serious than anything the saboteur believed

possible, this tells him he missed something and he should take another look. Conversely, if he believes us when we tell him the consequences of the maximum credible sabotage are negligible, he need invest no further time at that facility and can turn his attention to another target. Prevention of sabotage is an important subject and is being included in our repository planning but its very seriousness is leading to greater concern with protecting vital information which will prevent all but the most general types of discussion from being included in environmental statements.

Another broad area of comments on WASH-1539 concerned the identification of three states (Washington, Idaho or Nevada) as leading alternative sites for the RSSF. The reactions of individual citizens in all three states ranged from strongly favorable to strongly opposed; a number raised questions on the specific ERDA sites, which can be handled. The official comment from the State of Washington primarily requested additional information, which can also be handled. The major concern in the report of the "blue ribbon" panel of the Governor of Idaho concerned the progress toward removal of transuranium solid waste buried in soil in past years, which relates to the permanent disposal program rather than to the interim storage program. The report of the comparable panel of the Governor of Nevada makes a strong plea for more information and makes very specific recommendations for close State participation in planning

of the repository, if Nevada turns out to be the tentative choice. There are none of these recommendations which ERDA could not readily go along with.

As indicated previously, there are present doubts as to the scope and timing of the revised issuance of WASH-1539. In any event, we plan to work toward its issue in final form, with an interim intermediate draft if appropriate, as fast as possible. The next step will be to make a tentative selection of an engineering concept and a site and prepare the specific environmental statement for that repository, working closely with the State people during the preparation and comment period. I should note at this point that in the Fiscal Year 1976 budget proposal now before the Congress, we have proposed authorization of the estimated full amount for a Retrievable Surface Storage Facility at an undesignated site. This has caused some concern. However, in the budget justification text we have made a very clear commitment to spend any appropriated funds only for completion of conceptual design, safety studies, environmental statement preparation and similar work and not to let any construction contracts before completion of the site-specific environmental statement.

I should now like to take up the last and probably the most important of the major problem areas within the stated scope of the draft environmental statement on our repository program. Because the next impending major decisions in the program were the choice of a

concept and of a site for the retrievable surface storage repository, we devoted most of the text to that phase of the program. Although we also attempted to make the point that there was still a permanent disposal phase, we devoted much less space to it. With the advantage of hindsight, we know that this was a major error; the readers were, and are, interested in both phases of the program. We are accordingly attempting to describe the permanent disposal effort much better in the revisions now underway, and I would like to take a few moments to point out the highlights of the program as it appears in the Fiscal Year 1976 budget proposal.

This activity includes a specific identified program to place us in a position where a request for authorization and funding for a project to construct a "pilot" alpha (transuranium-contaminated waste) disposal facility in bedded salt could be included in the FY 1978 budget submission. This effort was a part of our overall plan two years ago, but was taken out in order that we could thoroughly study formations other than bedded salt before making a decision on the specific geologic formation to carry through the "pilot" stage. Since we have developed the technology of disposal in bedded salt to the point where the next step must be in situ demonstration in an actual formation, since we have no evidence from previous work that bedded salt is not perfectly capable of safely accepting and containing radioactive waste, and

since we have no evidence from studies of other formations that they might be any better, in the overall sense, than bedded salt, we have decided to initiate a program leading to early demonstration of bedded salt disposal of alpha radioactive waste. We plan to use FY 1975 funds to initiate this effort; there is \$1 million for bedded salt pilot plant effort on an alpha waste repository in the FY 1976 budget. This reemphasis on salt should not be interpreted to mean that we will not continue to study and evaluate other formations. We will certainly need more than one disposal facility, and work on other formations could have an important bearing on future disposal methods.

The objective is to provide the facilities and capabilities to permanently dispose of commercial and ERDA alpha radioactive waste. This objective is achievable with proven existing analytical capabilities and technology. The philosophy we intend to implement in the early stages of this disposal program includes a significant pilot plant activity in bedded salt wherein limited quantities of waste will be received and placed in the salt bed in a fully retrievable condition. Pilot plant operations will be continued until the observations and measurements made have demonstrated the safety and acceptability of the disposal mode, after which the pilot plant will be converted to a full capacity disposal operation wherein the waste will no longer be readily retrievable.

The principal effort in FY 1976 will be aimed at the development

and accumulation of the data needed to support a budget request for a FY 1978 construction project. In order to accomplish this goal, site selection investigations will be completed and a site selected. The principal site work remaining is the drilling of additional test holes to verify the geologic structure and more accurately define the subsurface hydrologic regime of a specific site. Associated work will involve a complete mineralogic evaluation of the resultant test hole core material, a characterization and evaluation of subsurface hydrology, an update of earlier predictions of the oil and gas potential beneath the study area, an update of the potash and other mineral assessment based on the data from the new test holes, and the preparation of a final site evaluation report. The necessary procedure for withdrawing from the Federal land reserve of the land and mineral rights within the area encompassed by the disposal site and a two-mile buffer zone will be initiated in the next few months. An architect engineer will be selected and work initiated on the development of a conceptual mine arrangement and facility layout that can be used as the basis for the project cost estimate to be included in the budget documents. Rock mechanic evaluations of alternative mine arrangements will be continued until a specific concept is selected for inclusion in the A/E prepared conceptual design report. Work will be carried out on the analyses and accumulation of data needed for inclusion in an Environmental Impact Statement. A bore hole/mine shaft plugging

program which utilizes existing plug materials and plug emplacement techniques will be expanded and an instrumented plugging demonstration performed in the field.

As mentioned earlier, in addition to the development effort on bedded salt, we plan to continue the investigation of other geologic formations that can potentially be used for permanent disposal of radioactive waste materials. This program, conducted by the Holifield National Laboratory and the U.S. Geologic Survey, will continue the investigation of the occurrence and properties of formations against groundwater intrusion and movement. The program will also evaluate and investigate possible techniques of cavity formation such as mining, tunneling, drilling, explosive fracturing or sluicing suitable storage cavities, methods of waste emplacement within the cavity and finally, design experiments and tests that will provide the confirmatory data and engineering basis for assuring that permanent disposal can indeed be conducted in a selected system. This work, of course, will not be considered complete until it yields a recommendation on an optimum site for permanent disposal of the commercial high-level waste in addition to transuranium waste.

I should like to conclude this presentation with some comments on the major current controversies which involve radioactive waste - and

I use the term "major" here not to belittle the importance of any of the questions I have touched on previously, but only to denote that the following issues are very broad and independent of any specific repository issue. The first of these involves the attack on the basic radiation protection standards.

Critics of nuclear power sometimes make the claim that radiation in general is much more dangerous than previously believed, and that the international radiation protection standards should, therefore, be made drastically more restrictive. There is also a current attack on the adequacy of standards specific to plutonium-239. One advocate of more restrictive general standards has repeatedly claimed evidence of increased death rates in the vicinity of nuclear facilities, presumably from the low concentrations of radioactive materials which are in the air and water effluents, and within present standards. These attacks on the standards appear to be concerned only with man-made radiation.

Since this controversy involves all aspects of the use of radiation and radioactive materials, it is much broader than the scope of this talk and is mentioned here only because radioactive waste management would be affected by changes in the general standards. Within ERDA, the primary activity of evaluating these claims, which has generally led to their rebuttal, is the responsibility of the Division of Biomedical and Environmental Research. An important

point to remember in connection with this controversy is that modern well-designed and well-operated nuclear facilities -- including, we believe, the prospective waste repositories -- can control the radioactivity in their effluents to the point where people moving into the immediate vicinity will incur an annual incremental radiation exposure which is only a few percent of the annual increment which would be incurred by moving from a typical U.S. low-altitude state. Some people may object to this type of comparison but I do not see any basis for such an objection except possibly the thesis that natural radiation is neutral and may be tolerated but man-made radiation is evil and must be punished. This is not a scientific attitude, of course, considering the definition of the rem of radiation.

A second major controversy is the attack on inventories, per se. Critics of nuclear power frequently point to significant inventories of radioactive material (in some cases, inventories of radioactive waste) as being capable of producing extremely dire effects, without indicating the real-life probability that these effects would ever be seen. For example, the quantity of plutonium-239 in a fuel element, a reactor core, or other significant specific source will be said to be enough to give a specific number of millions of people lung cancer. In some cases, the qualifying phrase "if perfectly distributed" will be added, but even then the method by which this perfect distribution is to happen is not specified.

Such vagueness invites the interpretation that a significant inventory of radioactive material is dangerous just by its existence, without any consideration of confinement measures or probability of an accident. A nonradioactive analogy may be helpful on this point. A few deep breaths of chlorine at 1000 parts (by volume) per million parts of air is invariably fatal. This fact is certainly pertinent to any work around cylinders of pressurized chlorine gas, and should give any prudent person a healthy respect for the importance of the associated safety regulations. If this quantity of chlorine (a few milligrams) is divided into the annual U.S. industrial production of chlorine gas, it can be seen that the U.S. production, if perfectly distributed, is sufficient to kill every person on each of 10^8 Earth-type planets. Although this second fact is rather dramatic, it would hardly seem to justify a moratorium on chlorine production if the ordinary standards of common sense were to be applied. The Waste Management and Transportation position is that any hazards analysis, radioactive or nonradioactive, should be based on what is credible and not on what is theoretical.

A similar view is expressed in an article by Boyce Rensberger in the New York Times for February 2, 1975, describing a meeting held the previous week by the American Association for the Advancement of Science:

"One of the most frequently heard comments at the meeting

concerned the popular idea that, with proper regulation of industry, it should be possible to eliminate completely the hazards associated with any given technology. For example, it is commonly said that if a nuclear power plant or some industrial chemical cannot be made completely safe, it should not be built or marketed."

"Repeatedly the scientists spoke to the effect that there was no such thing as a zero risk. Because of increasingly sensitive analytic equipment and more sophisticated research methods, substances considered toxic at high doses are being found in very minute levels where once they were not thought to exist. It is no longer sufficient, they argued, to say that a substance is toxic. The nature and duration of exposure must be considered."

Critics of nuclear power sometimes claim that the AEC has mismanaged its own wastes and, therefore, it is likely that future commercial radioactive wastes will be mismanaged. The most frequent specific claim of mismanagement involves leaks of high-level liquid waste from tanks at the Hanford site.

A draft environmental statement (WASH-1538) has been issued concerning all phases of radioactive waste management at the Hanford site, and companion statements are in preparation at the INEL and Savannah River sites. The Division of Production and Materials

Management, which is responsible for spent fuel processing and interim high-level waste storage at these three sites, has the lead role in preparation of these environmental statements.

The criticisms of the leakage of high-level radioactive waste usually omit two points essential to placing the problem in perspective. One of the points usually omitted is that the leaks have been from a type of tank which is no longer being constructed. There have been no leaks of liquid waste into the ground from the newer type of completely double-walled tank at either Hanford or Savannah River, and this is the only type of tank which will be built from now on for new waste. There have never been any liquid waste leaks from the system of tanks within vaults used at the Idaho site. NRC has taken the position that only the improved, double-containment principle will be accepted for the short-term (no more than five years) storage of high-level liquid waste permitted at commercial spent fuel processing plants.

The second major point usually omitted from criticisms of the AEC record on high-level liquid waste storage is that neither the AEC's own very sophisticated environmental monitoring systems, nor any other environmental monitoring, have shown any actual radiation exposure to the public from the waste leaks that have occurred. The environmental significance of the leaks is that there will have to be indefinite Government control of the waste tank areas to prevent

any future actions which would disturb the equilibrium situation in which the radioactivity lost in the leaks is now absorbed in the soil beneath the waste tanks.

Critics of nuclear power frequently demand a moratorium of some type (sometimes on processing of fuel, sometimes on operation of reactors themselves) until permanent disposal of the high-level waste has been completely proven. The general rationale for this appears to be the claimed immorality of bequeathing problems of near-surface storage maintenance to future generations.

This argument appears to be a special case of a more general thesis to the effect that no new technology should be placed into use until all related safety problems have been completely resolved. It seems obvious that none of the many present-day technologies on which U.S. economic welfare and political independence depend could ever have been developed if this requirement had been rigidly enforced throughout our history. To apply such a requirement to the nuclear industry, and to the nuclear industry only, would appear to raise very serious questions as to equal treatment under the law.

At a recent hearing on the draft environmental statement for the Waste Management and Transportation repository development program, Dr. William Rowe of the Environmental Protection Agency was asked by a member of the hearing board if he had an attitude on the

moratorium of nuclear power expansion pending solution of the ultimate disposal question. Dr. Rowe answered:

"I think our answer is, if we can show a plan that will get to the ultimate disposal site with milestones along the way where we can check our progress and our successes and failures, that we feel that would be a prerequisite for continuing in the long run as we go along. It will take some time to develop such a program . . . if we at least have such a plan, we don't think we have to wait for the ultimate disposal method to be proved. We conceptually will take in on faith that we think that technology can come up with an acceptable method, at some time."

Waste Management and Transportation believes this is a reasonable attitude on this question and that such a plan can and will be developed, with the help of constructive criticism of groups such as this.