

January 31, 1977

SECY-77-48

For: The Commissioners

From: Howard K. Shapar, Executive Legal Director

COMMISSIONER ACTION

Thru: Executive Director for Operations *JWJ*

Subject: NRDC PETITION FOR RULEMAKING ON WASTE MANAGEMENT

Purpose: To provide an analysis of the issues and options and tentative Staff recommendations on the petition.

Discussion: On December 15, 1976* the Commission requested that the Staff submit an analysis of the issues and options and a tentative Staff recommendation on the NRDC petition for rulemaking filed with the Commission on November 8, 1976. The petition asked that the Commission initiate a rulemaking proceeding to determine whether a "definitive" finding can be made that high-level radioactive wastes can be safely disposed of without undue risk to public health and safety prior to issuance of a nuclear power reactor operating license. After consideration of SECY-76-576, the Commission approved publication in the Federal Register of an "early" notice of the petition which requested public comments on the desirability of initiating rulemaking proceedings (42 FR 2730, January 13, 1977). No comments have yet been received; the comment period expires on February 14, 1977.

The petition raises two principal substantive issues. First, the petition raises the issue whether the Atomic Energy Act or Energy Reorganization Act or sound policy considerations require a finding that high-level radioactive wastes can be safely disposed of prior to issuance of a power reactor operating license. Second, the petition raises the question whether such a safety finding could be made and, if

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* Memorandum from the Secretary to the Executive Director for Operations dated December 16, 1976.

so, what would be the nature of the finding if it were to be based upon available information. These substantive issues are discussed briefly below and in more detail in the attachment.

There is another procedural issue regarding the disposition of the petition that will be addressed later.

I. Substantive Issues

A. The need for some safety finding.

The better view is that no safety finding regarding high-level radioactive waste disposal is required by the Atomic Energy Act or Energy Reorganization Act prior to issuance of a reactor operating license. Whether as a matter of policy such a finding or conclusion should be made depends on a number of factors. The fact that for over 15 years the AEC (and NRC) treated high-level waste disposal and reactor questions as separate issues, the fact that over 60 reactors have been licensed for operation on this basis, and the fact that this long-standing policy has been well known to the Congress, all argue against now making such a finding in a reactor licensing context. Furthermore, an association between continued licensing and safety of high-level waste disposal does not appear necessary to sustain the present momentum and priority of the Government's waste management program.

On the other hand, while denial of the petition can be supported on legal grounds, a notice of denial which included only legal considerations might be construed by some segments of the public to mean that the Commission refused to recognize the reactor as the genesis of the high-level waste disposal problem, and was not concerned with the safety of high-level radioactive waste disposal. Also to leave unchallenged NRDC's

assertions that no safety finding can be made at the present time would put the legal argument that no safety finding is required in an unfavorable context.

The Staff's tentative recommendation is that the petition be denied on legal grounds, but that a discussion of the nature of the Commission's waste management program and the prospects for safe disposal should be included in the denial. However, this discussion of the prospects for safe disposal would not be clearly set forth as a ground for denial.

If the Commission should decide that the law does require some high-level waste disposal safety finding prior to reactor operation, this will place in jeopardy all the operating licenses that have been issued to date and place a moratorium on new operating licenses until some satisfactory finding is made.

B. The Nature of the Finding.

It is not possible, based on present information, to make a "definitive finding" that high-level wastes will be safely disposed of, and have that finding supported by the same depth of information as would be available in a later ERDA waste disposal licensing proceeding. However, a conclusion can be reached based on available information that there is reasonable assurance that safe disposal methods will be developed.

II. Procedural Issues

There is one principal procedural issue - the question (noted in SECY-76-576) whether this NRDC petition should be consolidated with the Table S-3 rulemaking proceeding. If it was consolidated, Commission action on the petition would be included in the Table S-3

final interim rulemaking, and the matter would be subject to reconsideration along with other Table S-3 issues in the later rulemaking hearing on the "permanent" Table S-3 rule. The advantages of this course are that the underlying factual issues associated with any conclusion on prospects for safe disposal of high-level wastes will be discussed in the Table S-3 rulemaking (both interim and permanent) and consolidation of the two petitions will result in a better record. This would also avoid criticism that the Commission is drawing an artificial distinction between NEPA issues and safety issues.

On the other hand, the two petitions do raise different legal questions. As noted in SECY-76-576, under the Atomic Energy Act a nuclear reactor operating license application may be denied when there is insufficient data even though all existing data is fully explored, while it is arguable whether NEPA would require denial where the data is inadequate but the inadequacies are fully set forth. Consolidation might confuse this issue. Further, consolidation would prolong final resolution of the question--a question upon which the validity of all power reactor operating licenses depend--for a year or more. The Staff's tentative recommendation is that the proceedings be kept separate.

Coordination: The Office of Nuclear Materials Safety and Safeguards concurs.

Recommendation: The Staff's tentative recommendation is that the petition be denied. After expiration of the comment period, a final staff recommendation will be developed which takes into consideration guidance from the Commission received in response to the present paper as well as consideration of the public comments.

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Attachment:

1. Analysis of the Issues



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Executive Legal Director

Commissioners' comments should be provided directly to the Office of the Secretary by close of business Wednesday, February 9, 1977.

Analysis of the Issues

I. Legal Analysis

We have carefully considered the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974, as amended, the legislative history of these statutes, and relevant case-law in assessing the legal merits of NRDC's petition.

NRDC argues, in essence, that the safety finding required by the Atomic Energy Act prior to issuance of a reactor operating license must extend to the safety of the ultimate disposal of high level radioactive wastes, since it is the operation of the reactor which creates the wastes and which is the genesis of the waste disposal problem. The NRDC petition seemingly does not recognize that disposal of high-level radioactive wastes is itself the subject of a licensing proceeding that is separate and distinct from the reactor licensing proceeding. Thus, the principal legal issue is whether the law requires that the safety of high level radioactive waste disposal be addressed in both the reactor licensing proceeding and in the later waste disposal licensing proceeding.

At the outset it is clear that the law does not require the full measure of what NRDC requests--a "definitive" finding at the reactor operating license stage that high-level waste can be safely disposed of, supported by the same amount of conviction and information as the safety findings regarding the final design of the reactor itself. The disposal of high-level radioactive wastes has long been regarded as a Federal responsibility, and the framers of the Energy Reorganization Act of 1974 were aware of long-standing plans

for the transfer of high-level radioactive wastes to a Federal repository for ultimate disposal. The Reorganization Act makes specific provision for the licensing of certain ERDA high-level waste disposal facilities in sections 202(3) and (4). This authority over certain ERDA waste disposal facilities in sections 202(3) and (4) was clearly recognized as an extension of the licensing authority in the Atomic Energy Act.^{1/} Surely, if the "definitive" finding of safety was required in reactor operating license proceedings, this would have been mentioned in these sections. Furthermore, it flies in the face of logic to require a "definitive" safety finding at the reactor operating licensing stage where none of the information required for such a finding regarding the suitability of the disposal site or the adequacy of the disposal facility engineering design is available for review or even within the responsibility of the license applicant to provide.

Finally, the concept in the Reorganization Act of a separate licensing proceeding to provide the context for a "definitive" safety finding is not a new one. From the very inception of the nuclear regulatory program in 1954, the Atomic Energy Act has provided for nuclear materials licensing proceedings, including radioactive waste disposal proceedings, that were separate and distinct from facility licensing proceedings. The two-step facility licensing provision in sections 101-106 and 185

^{1/} S. Rep. No. 93-980 (on S. 2744), July 27, 1974, at 21, 59-60.

in the Atomic Energy Act are in sharp contrast to the one-step licensing provisions of sections 53, 54, 57, 62, 63, 81 and 82. Furthermore, the Atomic Energy Act provides for separate licensing proceedings for reactor operation and for the manipulation of the controls of a reactor, activities which are even more closely related than are safe reactor operation and waste disposal. 2/

However, the more difficult legal question--one which NRDC does not directly address--is whether, in light of the fact that reactor operation is the genesis of the high-level waste disposal problem, some conclusion regarding the prospects for safe disposal of high-level radioactive wastes is required, prior to licensing reactor operation even though this conclusion need not and indeed cannot be supported by the same degree of conviction or amount of information as would be required for a "definitive" finding at some later ERDA waste disposal licensing stage.

The Atomic Energy Act offers some guidance on this particular issue. The Atomic Energy Act clearly requires that a safety finding be made prior to issuance of an operating license for a nuclear power reactor. Section 103d provides that no such license may be issued if, in the opinion of the Commission, this would be inimical to the health and safety of the public. It seems clear that this required safety finding

2/ Sections 101-106, 185 (facility licensing), 107 (operator's licensing).

applies only to the conduct of the licensed activities. For example, the related statutory findings required by section 103b (1) and (3) refer specifically to the "proposed activities" and "activities under such licenses". Further, the maximum term for a reactor operating license under section 103c--40 years--is incompatible with a waste disposal activity that may extend for tens or hundreds of years. Since the activities authorized under the reactor operating license do not include disposal of high level waste, the basic question becomes whether any safety conclusion must be reached as to an activity that is not authorized by the license but which must eventually follow from it.

There is some indication in the Act that no such conclusion is required. Section 182, which deals with license applications, provides that in the case of facilities, the license application must contain information on the amount, kind, and source of the special nuclear material required, "the place of use [of special nuclear material], the specific characteristics of the facility, and such other information as the Commission may ... deem necessary in order to enable it to find that the utilization or production of special nuclear material ... will provide adequate protection to the health and safety of the public." Such information "shall be a part of any license issued." This is not compatible with a concern for waste disposal, which has little or nothing to do with the "specific characteristics" of the reactor or the reactor site ("place of use"). Further, waste disposal problems are only indirectly related to the "amount, kind, and source" of fuel, as contrasted with the radioactive materials produced by the fuel. Also, it would make little sense to make information regarding high-level waste disposal "a part of" a reactor operating license when the licensee has no control over the

conduct of the waste disposal operations. Furthermore, the opening language of section 182 requires that information be provided with the application regarding the technical and financial qualifications of the applicant, the character and citizenship of the applicant, and "any other qualifications" of the applicant. Such information is totally irrelevant to the safety of high-level waste disposal, because such waste disposal is not carried out by the applicant. If Congress had intended that the reactor safety review must include the safety of "follow-on" activities such as high-level waste disposal, the statutory provision regarding content of license applications would not have been drafted as it was. However, the legislative history of the Atomic Energy Act of 1954 contains no mention of high-level waste disposal problems.

The actual language of the Energy Reorganization Act of 1974 cuts both ways on the question whether some conclusion regarding prospects for safe disposal of high-level waste must be drawn prior to licensing reactor operation. The provisions of section 202, providing for licensing of certain ERDA high-level waste disposal facilities, have already been cited. The language of sections 203 and 204, which establish separate offices of Nuclear Reactor Regulation and Nuclear Material Safety and Safeguards, offers some support for NRDC's position. Section 203 provides that the functions of the Office of Nuclear Reactor Regulation shall include "licensing ... including all facilities, and materials licensed under the Atomic Energy Act of 1954 ... associated with the construction

and operation of nuclear reactors" and reviewing the "safety ... of all such facilities [and] materials [including] ... evaluating methods of transporting and storing high level radioactive wastes to prevent radiation hazards ..." Section 204, which provides for an Office of Nuclear Material Safety and Safeguards, does not specify waste disposal as a responsibility of that Office. Thus, the text of the Act can be read as associating the high level radioactive waste disposal problem with licensing of nuclear reactors, rather than with licensing of nuclear materials. However, the legislative history does not indicate that the Congress intended any connection to be drawn between reactor safety and waste disposal safety. In fact, the legislative history leads to the contrary conclusion.

The affected language in the Act seems to have been a carry-over from the Senate-passed bill which assigned essentially all safety responsibilities to a "Director of Nuclear Reactor Safety," and all safeguards functions to a "Bureau of Nuclear Materials Security."^{3/} In contrast, it was clearly the intent of the conferees that the Office of Nuclear Reactor Regulation be concerned with activities within the boundaries of reactor sites, and the Office of Nuclear Materials Safety and Safeguards with materials and safeguards outside such boundaries.^{4/} This was explained to the conferees as follows:

^{3/} S.Rep.No. 93-980, July 27, 1974, at 62-63.

^{4/} H.R. Rep. No. 93-1445, October 8, 1974, at 36.

The compromise, as it stands now, is perhaps flawed by the language which is used to indicate the mainline elements of the Commission. Basically the compromise sets up a Commission with an Executive Director and three major line elements. The line elements are one for all safety, safeguards, all regulatory matters dealing with reactors. In other words, everything within the fence of a reactor, so if someone wants a license, or in any way seek regulatory permission from the Nuclear Regulatory Commission for a reactor, he would go, in essence, to one office.

The second box sets up a Regulatory Office for all regulatory matters dealing outside the fence of a reactor, dealing with processing plants, the transportation field, and so forth.

So, again, safety and safeguards are involved, anyone involved in the transportation of nuclear materials, in the processing of nuclear materials and so forth would have one office they can go to.^{5/}

High-level waste disposal activities are outside the boundary of a nuclear reactor. Thus in the minds of the conferees the high level waste disposal problem was to be assigned primarily to an office that did not license reactors. One may reasonably conclude that the conferees regarded reactor licensing and high level waste disposal problems as essentially separate. This separation of the two problems is also reflected in Senator Ribicoff's opening remarks at the hearings on S. 2135 and S. 2744. In setting forth the issues to be explored, Senator Ribicoff separated the issue of whether "the present generation of light-water reactors [is] safe" from the issue of whether "the AEC [is] adequately safeguarding materials and wastes being generated."^{6/}

This separation of reactor safety from waste disposal safety in the Reorganization Act of 1974 is particularly noteworthy since witnesses at the earlier hearings before the Senate Subcommittee had urged that the connection be drawn between reactor and high-level waste disposal

^{5/} Statement of Paul Leventhal, Counsel to Joint Conference Committee, Joint Conference Committee Hearings, October 2, 1974, pp. 103-104.

^{6/} Hearing before Senate Committee on Government Operations and House Committee on Government Operations, Joint Conference Committee, March 12, 1974, pp. 105, 106.

safety.^{7/} One witness cited the high-level waste disposal problem as one of several problems which in his opinion warranted a moratorium on continued construction of nuclear power reactors^{8/}, and another witness stated that "many people have come to believe that present nuclear power plant construction plans which imply accumulations of more radioactive wastes, should be halted until a proven method for safely storing radioactive wastes is available."^{9/} Chairman Ray of the AEC, in written response to questions put to her at the hearings, described the existing proposals for long-term waste management and disposal, but made no claim that methods for permanent disposal had been developed.^{10/} Thus, the basic issue presented by the NRDC petition--whether nuclear power reactors should be licensed in the absence of some finding or conclusion that high level wastes can be safely disposed of - was also presented to the Congress. Yet the Congress enacted no nuclear power reactor licensing moratorium, made no modification of the safety findings required prior to licensing of nuclear power reactors, and assigned the functions of licensing of high level waste disposal facilities to an Office that had no responsibility for licensing of reactors.

^{7/}Hearings on S. 2744 before the Senate Subcomm. on Reorg., Research and Int'l Org. of the Senate Comm. on Government Operations, 93rd Cong., 1st sess., (1973), see particularly the prepared statement of Daniel F. Ford, Union of Concerned Scientists, pp. 210-215; Hearings on S. 2135 and S. 2744 before the Subcomm. on Reorg., Research, and Int'l Org. of the Senate Comm. on Government Operations, 93d Cong., 2d sess., (1974), see particularly the testimony of Dr. Edward P. Radford, Johns Hopkins University, p. 139, prepared statements submitted by Sam Love, Environmental Action Foundation, p. 141 and Anthony Roisman, p. 212.

^{8/} Id., testimony of Sam Love, at 141.

^{9/} Hearings on S. 2135 and 2744, supra note 7, testimony of Daniel F. Ford, at 213.

^{10/} Hearings on S. 2135 and S. 2744, supra note 7, at 336-47.

There is another line of reasoning which argues against the NRDC position. In 1959, shortly following enactment of the Atomic Energy Act of 1954, the Joint Committee on Atomic Energy held hearings on waste disposal problems. Six days of hearings were held, and the printed hearing materials total over 3,000 pages.^{11/} The hearings were followed by a detailed Joint Committee survey analysis.^{12/} These materials make it clear that the same problems regarding high level radioactive waste disposal discussed today were also discussed back in 1959. For example:

The significance of the half life, particularly in the industrial waste field where we are dealing with radioactive materials which may have a half-life radiation of hundreds of years, is that here again we are confronted with a problem of supervision and control of a guaranteed nature which is unlike anything else that we have ever encountered.

In other words, we have to have continuity of governmental supervision, whether long or short, whether strong or weak. This is not a problem, in other words, which can be tackled from the standpoint of temporary expedience.

It is a problem which will require a deep governmental supervision, a very long continued and uninterrupted supervision over the fate and the location of these materials.

Representative Holifield. This means that this has to be taken care of for hundreds of years into the future?

Dr. Wolman. There is no way of which I can conceive in which these could be simply forgotten.

Representative Holifield. So it is very important that the policy decisions on the methods of storing these wastes permanently, you might say, be made wisely at this time because, if they are not made wisely, the hazard may erupt a hundred, 500, or a thousand years from now?

^{11/} "Industrial Radioactive Waste Disposal," Hearings before the JCAE Special Subcommittee on Radiation, Jan. 28-30, Feb. 2-3, and July 29, 1959, 86th Cong., 1st Sess. (1959).

^{12/} "Industrial Radioactive Waste Disposal," Summary Analysis

Dr. Wolman. This is correct. This cannot be left to chance. One of the reasons for the primary policy which the Commission has exercised up to date; namely, of holding, rests on the assumption that it is better to have this highly active waste in a situation where you know where it is, where you know what to do with it, where you do not leave it to chance for any given length of time in the future.

Representative Holifield. So it would be accurate to say that the problem of permanent disposal of high-level waste has not been solved; that it is in a state of suspension; that we are holding these high-level wastes to the extent of many millions of gallons in a temporary custody type of control and that no decisions have been made as to the final disposal of the high-level wastes.^{13/}

* * * * *

4. The final disposal of high-level wastes associated with the chemical reprocessing of irradiated nuclear fuels represents an aspect of the problem that, while safely contained for the present and immediate future, has not yet been solved in a practical, long-term, engineering sense at the present time. The practice today is to reduce high-level wastes in volume, if possible, and to contain or hold them in tanks. It was the consensus that tank storage is not an ultimate solution in itself but that temporary (2 to 10 years) tank storage will be an integral part of any ultimate system. Although apparently feasible solutions to the problem of ultimate disposal of high-level waste are in various stages of development, at least several years of pilot plant, prototype, and field-scale testing will be required before engineering practicality can be demonstrated.

* * * * *

High-level wastes come almost completely from the chemical-separation plants. At the present time these wastes are stored in underground tanks and the inventory of some 65 million gallons has already been mentioned. While the cost of tank storage probably could be borne by a nuclear-power economy, there is considerable doubt that tank storage represents disposal in the ultimate sense. This is particularly true since our experience is limited to 15 years and it is difficult to extrapolate this experience to give a realistic tank lifetime. Consequently, there is considerable interest in developing other methods of ultimate disposal. This program takes three directions: (1) the conversion of the liquid wastes

13/ Supra note 11 at 9-10.

to solids and the development of ultimate storage methods for the produced solids, (2) the direct disposal of high-level liquid wastes into the earth at great depth, (3) the removal of specific isotopes from the wastes in the hope that this might reduce the overall waste problem. At the present time there is considerable interest in the conversion of wastes to solids and their storage in some geological formation, probably salt. Research and development on direct disposal into deep wells is just getting underway. Finally, essentially all the witnesses agreed that the removal of specific fission products from the wastes would not significantly change the waste disposal picture.^{14/}

These materials also show that although a logical connection between reactor operation and high level waste disposal was recognized even at that early date, the proposed solution was not cessation of reactor licensing but increased Federal research and development efforts on a solution to the waste disposal problem:

Dr. Wolman. Under the provisions of the act, as you state, the Atomic Energy Commission up to the present time is responsible for taking care particularly of high level radioactive materials and, therefore, it disappears almost from the account book of the power developer.

Representative Holifield. But it does not disappear from the taxpayers' liability?

Dr. Wolman. It does not disappear from my own account book, either, in technology or in economics.

Representative Holifield. Or in responsibility for the hazard.

Dr. Wolman. Yes, without question it is not a sleight of hand operation.

The wastes are there regardless of who manages them.

^{14/} Supra note 11 at 2, 30.

Representative Van Zandt. At this point, and I am talking now about the waste material on hand, in your opinion has there been a laxity on the part of the Commission in this working out a program to properly handle this waste material and also protect the people from its effects?

Dr. Wolman. No, I should think the Commission ought to be congratulated on the efficiency with which it has so far managed this difficult operation.

If I were to make any comment at all it would be that the amount of energy, money, and personnel that ought to be devoted to this, from my own point of view, which may be a prejudiced one, is too low.

Representative Holifield. You are applying that to the field of research and development and the origination or development of methods to handle rather than to the factor of safety, of containment, with which we are quite well satisfied?

Dr. Wolman. That is right. I would say that safety has been amply protected, the Commission has done a superb job in managing a hitherto unknown, unfamiliar, and peculiar material, and it has done it well.

* * * * *

There, again, I would say that is exactly analogous to what happens in any industry. Without picking out any of our familiar industries, I would say, from my dealings with them over the years, when first created they will announce there are no wastes and before very long they will discover there are and still later on they will discover that something has to be done with them and even later on something is done with them.

This is a slow process. I would say the rapidity with which it has been recognized, managed and controlled by the Atomic Energy Commission is extraordinary.

Representative Holifield. Our records show that Dr. Rodger, our consultant, wrote his first paper on this in 1943. Of course, at that time there was very little of this to be dealt with, but as the years have gone along and as these reactors have multiplied both from the weapons standpoint and the now encroaching power development reactor program, the problem becomes larger and larger, the gallonage of this material becomes greater and greater and the concentration of toxicity becomes greater.

The public should know that the Atomic Energy Commission has been alerted to this problem and has been very diligent, in my opinion, in handling it on the only basis they know how to handle it, which is a temporary method of containment and custody.

They also should know this is a field where a permanent solution has not been found.

Dr. Wolman. I think that is a good summary of the situation. There has been an awareness leading to a very rigid control of the disposal or the management.

Secondly, an awareness has existed that this is not the final solution and that something must be pressed in research and development to arrive at a better solution.

I am not sure that there is a final solution. As far as I am aware there is no country in the world in which a solution for the kinds of high level radioactive wastes that we are concerned with has been found.^{15/}

Later, during these same hearings, the AEC described its regulatory program for radioactive waste disposal, and the high level radioactive waste disposal problem was passed over with the brief comment that "for the foreseeable future, all high level waste resulting from processing of spent fuel elements from licensed reactors will be returned to the Commission for processing and handling".^{16/}

Thus, almost from the very beginning of the reactor licensing program, the Joint Committee was aware of the high-level waste disposal problem, aware of a logical connection with reactor operation, and aware that the Commission did not plan to halt licensing until the problem was resolved.

As the U.S. Supreme Court stated in PRDC v. Electrical Union:

No change in this procedure has ever been suggested by the Committee, although it has on occasion been critical of other

^{15/} Supra note 11 at 11-13

^{16/} Supra note 11 at 2515.

aspects of the PRDC proceedings not before us. It may often be shaky business to attribute significance to the inaction of Congress, but under these circumstances, and considering especially the peculiar responsibility and place of the Joint Committee on Atomic Energy in the statutory scheme, we think it fair to read this history as a de facto acquiescence in and ratification of the Commission's licensing procedure by Congress.^{17/}

None of the cases cited by NRDC in support of its petition address specific question whether the Atomic Energy Act requires some finding or conclusion regarding safety of high-level radioactive waste disposal prior to reactor licensing. However, the Vermont Yankee^{18/} case does establish the point that the environmental impact of high-level waste disposal must be considered in the NEPA reactor licensing review, and the U.S. Court of Appeals for the D.C. Circuit stated in Citizens for Safe Power v. NRC that the Atomic Energy Act and NEPA cannot be viewed separately and that NEPA imports into the Atomic Energy Act its "ad hoc risk-benefit weighing requirements."^{19/} The argument could be made that the Vermont Yankee and Citizens for Safe Power v. NRC cases add up to a requirement that the safety risks of high-level radioactive waste disposal must be considered prior to reactor operation under the Atomic Energy Act. NRDC fails to make this argument. However, even if this point were well taken, the nature of the consideration would be the same under both statutes, and Citizens for Safe Power holds that compliance with NEPA in this regard would likely be regarded as compliance with the Atomic Energy Act as well.

^{18/} Natural Resources Defense Council v. NRC, Nos. 74-1385 and 74-1586, (D.C.Cir. July 21, 1976).

^{19/} 8 FRC at 1603 (D.C.Cir. 1975).

II. Technical Aspects

NRDC argues that

- the licensing of a reactor leads to the production of fission products and some transuranic nuclides
- these fission products represent a potential hazard to the public health and safety.

Both of these points are irrefutable. NRDC points to the fact that the direct source of the wastes is the reactor and that production of wastes is authorized by the NRC's licensing action. It, therefore, concludes that some safety finding with regard to wastes must be made at the time the reactor is licensed.

Two counter arguments which might be made at the outset can be readily dismissed on technical grounds. It can be argued that each reactor licensing action will only add a small increment to existing wastes. However, each reactor licensing action authorizes increases of about 13% to present inventories of fission products measured in curies, a significant measure of hazards. Furthermore, the operation of commercial reactors for the next few years will double the existing inventory of waste nuclides. Therefore, the argument that each reactor licensing action will only add a small increment to existing wastes is not persuasive. A second counter argument is that the safety issue will be satisfactorily addressed in a separate proceeding for licensing of one or more ERDA high-level waste disposal facilities. A response

to this is that once the wastes are generated in a reactor, the Commission cannot realistically forever refuse to grant any license to ERDA. The wastes must be eventually disposed of, even if NRC were to conclude, at the later ERDA licensing stage, that substantial safety risks remain.

Thus, the argument that an unprejudiced safety finding will be possible later when disposal facilities are licensed assumes that safe facilities can be developed. If the Commission does not know safe facilities can be developed, so the argument goes, then the Commission cannot authorize production of more wastes by licensing more reactors.

In the Staff's view, while the NRDC's arguments have considerable merit as far as they go, they only address part of the problem. The Commission does not proceed with a clear slate on this question. In light of the discussion in I above, the real question from a policy standpoint is whether the long-standing policy of not addressing the high-level waste disposal issue in reactor licensing proceedings should now be changed by the Commission, after over 60 reactors have been licensed for operation and the policy has been in effect for over 15 years, with the knowledge of the Congress.

The Federal program that has been developed to provide a solution to the waste disposal question is already operating on a high priority basis. It is generally recognized that the high-level waste disposal question is crucial to the future of the nuclear industry. Thus, this is not a case where granting the NRDC petition would provide needed emphasis or momentum to the program.

On the other hand, to deny the existence of any logical connection between reactor licensing and high-level waste disposal would be misleading, and could give the public the impression that the Commission is not concerned with the waste disposal problem.

III. The Finding

Three possible bases exist upon which an explicit safety finding could be developed: 1) past performance in the waste field; 2) recent analyses; and 3) the promise of ongoing or planned programs.

Engineering experts have, in the past, expressed the judgment that there is reasonable assurance that wastes can be safely disposed of.^{20/} In fact, there have been no measurable adverse public health effects from past activities. However, none of the high-level wastes that have been generated to date have been permanently disposed of safely (nor disposed of at all, for that matter).

Problems have arisen in connection with past disposal attempts. Storage tanks, once believed to be sound, have proven to be somewhat less than perfect and AEC attempts to dispose of some wastes in a deep salt mine and to gain support for a retrievable surfact storage facility (RSSF) failed for reasons transcending technology. However, many experts still believe that a permanent disposal method will be devised. These experts are also confident that wastes can be temporarily stored safely until a permanent disposal method is devised. Spent fuel which contains hazardous

^{20/} See, for example, NAS/NRC Report entitled "The Disposal of Radioactive Waste on Land," Sept. 1957.

nuclides has been safely stored for many years in pools at reactors and at reprocessing plants. Such temporary storage has undergone licensing review and has been judged to be safe. Experience over the past years has born out this judgment. Thus, as long as the nuclides remain locked up in the spent fuel, there is a firm basis for confidence in temporary storage for at least a few decades.

Recent analysis and ongoing programs also indicate that wastes can be safely disposed of in the long term. In the last four years there have been four significant analyses which bear upon the waste management and disposal questions. The four reports include two reports on the technology for disposal (BNWL-1900 and ERDA-76-43) and two environmental assessments which include both waste management and disposal (NUREG-0002 and NUREG-0116). In addition, there has been expert testimony in Congressional hearings on several recent occasions regarding waste disposal. ^{21/}

The documents dealing with the technologies for waste management-- "High-Level Radioactive Waste Management Alternatives", BNWL-1900 and Alternatives for Managing Wastes from Reactors and Post Fission Operations in The LWR Fuel Cycle, ERDA 76-43--conclude that a number of alternatives for handling wastes are both technically feasible and ready for application. These documents do not, however, explicitly reach conclusions regarding the safety of such technologies.

^{21/} See, for example, Hearings before the Subcommittee on Environment and Safety of the JCAE on Radioactive Waste Management, 94th Cong., 2d. Sess., May 10-12, 1976.

The two environmental analyses--GESMO, NUREG-0002 and Environmental Survey of the Reprocessing and Waste Management Portions of the LWR Fuel Cycle, NUREG-0116--both calculate small environmental impacts (including radiological impacts) of waste disposal. However, both documents contain significant areas where analysis is still to be completed regarding detailed estimate of risk or impact. Still, in both cases a reasoned judgment has been made that additional analysis which would show additional impacts or risks would add only negligibly to those already calculated.

A number of Congressional hearings have been held in the last few years providing a record of recent expert testimony in the waste management field. ^{22/} While there is some consistency among the witnesses from Federal agencies who are optimistic regarding the safety of deep geological disposal, other witnesses with distinctly pessimistic views have also testified. Even the witnesses from Federal agencies have been quite cautious since all of the information is not as yet available.

Foreign experience may, to the extent that foreign countries follow patterns similar to that of the U.S., have some bearing on the confidence regarding our ability to manage nuclear wastes. We know of

^{22/} Id.

no serious exposures in foreign countries attributable to the failure of waste management systems where those systems are comparable to ours. However, to our knowledge, no country has an operational disposal system for high-level wastes.

Two individuals, unallied to any agency or specific interest group, have attempted independent quantitative analyses of the consequences of geological disposal. An analysis by Bernard Cohen was based upon a model whose adequacy has been questioned by the Staff. The second analysis, by Ralph Lapp, is based upon analogy to naturally occurring substances and has not yet been reviewed by the Staff. Both analyses conclude that geological disposal is safe.

The Staff knows of no quantitative analysis which indicates that deep geological disposal of high-level wastes is not safe. Most of the arguments against geological disposal rely upon historical trends and the lack of hard data on future geological events to point out the risks involved. Some argue that geological disposal should be considered to be unsafe until proven safe. Most of the arguments conclude merely that no "proof" has been offered of the ultimate safety of disposal of high-level waste and that there is no operational system for that disposal.

In summary, the status of the information regarding the safety of geological disposal of high-level waste (or spent fuel) is as follows:

- the technology may be reasonably judged to be available (i.e., ready to be put into use),
- those analyses or parts of analyses which have been done to date indicate safety of geological disposal,
- these analyses are neither complete nor approved by the NRC staff,
- expert judgment is weighted toward safety of geologic disposal (and the Staff would likely concur pending completion of the ongoing studies), but
- no operational system is in place,
- no one has established criteria defining what will be acceptable, and
- no thorough NRC safety analysis based on site specific engineering design information has been carried out.

The Federal government has taken on the responsibility of providing a solution to the waste management problem with the objective of having an operational geological disposal facility by 1985. To this end, ERDA has undertaken a major program to develop, test and operate several geological disposal facilities. The NRC is beginning its program to regulate such a facility and the EPA has a crash program to establish quickly "generally applicable environmental criteria" for waste management. In addition, the USGS is adding substantive supportive activities in developing geological data and rationale. These programs raise the hope that a safe method of disposal will be developed.

Data and analysis regarding the safety of disposal of wastes today are not conclusive. Still, many experts believe and the number of analyses now on hand indicate that wastes can be disposed of safely and ongoing programs should fill in the gaps in information and analysis. Thus, a conclusion that there is reasonable assurance that wastes can be permanently disposed of without undue risk to the public health and safety could be based on the following:

- expert opinion,
- GESMO and NUREG-0116,
- ERDA 76-43 (Technical Alternatives Document),
- lack of quantitative analysis giving a negative finding, and
- the promise of ongoing programs to resolve the remaining issues in the next few years.

A conclusion cannot be reached on the basis of the small increment to be added to the inventory in the next few years nor on the basis of experience in the operations involved. The Staff would recommend that if, as a matter of policy, the Commission decides to make a statement that wastes can be disposed of safely, the statement should clearly indicate that its conclusion is tentative, based on limited data as set forth above, and not of the same quality (i.e., not backed up by the same amount of information and analyses) as the facility-specific finding that would be required prior to licensing an ERDA waste disposal facility.