Nuclear Waste Management, 9/11/79 [Briefing Book] [1]

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THE WHITE HOUSE

WASHINGTON

8/24/79

Mr. President:

Congressional Liaison comments:

"With respect to site selection of a HLW repository, no designation of any kind should be made before November, 1980. Congressional views were stated in detail with respect to WIPP, thus we have no further comment."

Rick

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THE WHITE HOUSE
WASHINGTON
9/11/79

Stu Eizenstat

The attached was returned in the President's outbox today and is forwarded to you for appropriate handling.

Rick Hutcheson

cc: Phil Wise

3643

BACKGROUND NOTEBOOK

ON

NUCLEAR WASTE MANAGEMENT

AND

INTERAGENCY REVIEW GROUP (IRG) FINDINGS

THE WHITE HOUSE

WASHINGTON

September 5, 1979

MEMORANDUM FOR: THE PRESIDENT

FROM: JIM MCINTYRE
STU EIZENSTAT

SUBJECT: NUCLEAR WASTE MANAGEMENT DECISION MEMO

Attached is the nuclear waste decision memorandum which presents the findings and recommendations of the Interagency Review Group (IRG) and presents two unresolved issues for your decision. Although the memorandum is long, we recommend that you read it through since the issue is technically, institutionally and politically complex. You may also find it helpful to have a meeting on these issues, focusing particularly on the numerous (and sensitive) political ramifications of these questions in Congress and in the general public. We would recommend such a meeting, which need not take more than 30 minutes.

One procedural point merits clarification here. Because of the requirements of the National Environmental Policy Act (the environmental impact statement process) and the unanimous recommendation of the IRG that NEPA be rigorously adhered to in making final decisions on this issue, the IRG has had to devise a method for seeking interim decisions or guidance on long-term directions for the program while not reaching final decisions prior to completion of the necessary environmental impact statements. In many instances, an EIS cannot be written until further research is done, yet the direction of the research will inevitably color the outcome of the final decision. As a result of this concern, the IRG has made extensive use of what we call an "interim strategic planning basis" which will permit you to guide the program and make near-term choices while making clear our intent to complete an EIS prior to final decision on a particular waste site, disposal medium, or long-range strategy.

Attachments

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF MANAGEMENT AND BUDGET
WASHINGTON, D.C. 20503

September 5, 1979

ACTION

MEMORANDUM FOR: THE PRESIDENT

FROM: JAMES T. McINTYRE, JR/STUART E. EIZENSTAT

SUBJECT: Nuclear Waste Management

This memorandum summarizes the findings and recommendations of the Interagency Review Group (IRG) on Nuclear Waste Management which you established in March 1978. In addition, your decision is requested on two issues (Tabs A and B) which could not be resolved by the Interagency Group. The final report of the IRG on its efforts to address this very complex social, technical and political problem is very extensive. Therefore, this memo focuses your attention only on the major new directions being proposed by the IRG, the actions required to implement the most important recommendations detailed in Tab C and on the information necessary for your decisions. We are also providing separately for your background information a notebook which contains more details on all aspects of the nuclear waste issue and the IRG results. The table of contents for the notebook is attached at Tab D.

I. Background on Nuclear Waste Management

For over 30 years, radioactive wastes have been generated from defense and commercial sources. These wastes have potential health hazards due to their radioactivity. There are two problems facing the Federal Government in assuring the safe storage and disposal of these wastes: (1) minimizing any present hazards due to the storage of radioactive wastes and (2) providing safe and environmentally acceptable isolation of the longest lived wastes for hundreds to thousands of years. Some wastes now present no immediate health hazard; others however do:

- Defense high level wastes are presently stored in tanks at the DOE defense facilities and commercial high level waste is presently stored as spent fuel in cooling ponds at reactor sites or now in very limited amounts at away-from-reactor cooling ponds. The threat to public health from both wastes is believed to be minimal if they continue to be maintained adequately. However, some leakage has occurred in the past from defense waste tanks. Ultimately, however, both these wastes must be disposed of in a way that ensures isolation from the biosphere for long periods of time. No disposal facility currently exists.

- The most significant problems related to wastes that generate low levels of radiation and are short-lived, are (1) some material disposed of in the past by shallow land burial may require remedial cleanup; and (2) uranium mill tailings which are current health hazards, in some cases, must be disposed of and cleanup has been authorized under legislation passed last year.

The IRG process has been widely visible and has stimulated extensive interest, support and participation by industry, citizens groups, the scientific community, Congress and State and local governments as well as by the general public. 15,000 copies of the draft report were issued; about 3,400 sets of comments received. Consequently, a greater degree of agreement with and credibility of the government's program exists now than has been the case for many years. All agencies feel that your personal and public imprint on the new waste initiatives will be beneficial to the program, help focus and orient on-going public debate and demonstrate your interest in resolving this long-standing and troublesome public policy issue. Accordingly, the IRG has recommended a Presidential statement on nuclear wastes. Following your decisions on the issues in this memo, we will prepare a waste statement. Recognizing the political sensitivity of this issue and other related nuclear issues we will seek your decision on whether and how you wish to announce your nuclear waste policy after a draft statement has been completed.

II. Background Considerations

Prior to delving into the nuclear waste management problem there are a few general considerations which we wish to bring to your attention:

- The greatest hazard presented by high level nuclear wastes, from the standpoint of intrinsic radioactivity, occurs during the first 1,000 years, after which time the radioactivity will have decreased by a factor of over 1,000. After 1,000 to 10,000 years, the total radioactivity in high level nuclear wastes is about the same as in the original uranium ore from which it was taken, depending on whether the wastes contain large quantities of transuranics such as plutonium, neptunium, etc.

- The Federal waste effort is broader than DOE's waste management program and includes non-regulatory activities conducted mainly by the U.S. Geologic Survey (DOI) and regulatory activities conducted by EPA, NRC and DOT.

- This Administration has inherited a waste management program that has left unresolved a wide range of technical issues pertaining to the disposal of wastes. Considerable additional technical work will be required to deal with concerns of some of the technical community and public interest groups over the possible risks of waste disposal.

- Although waste disposal involves major technical questions, many of the most difficult aspects of the waste management problem are largely institutional in nature. A key reason for past failures in obtaining an acceptable permanent waste disposal solution has been a focus on the engineering rather than institutional or scientific components of the problem. While satisfaction of the engineering and scientific problems are essential, successful waste disposal will not be achieved unless the concerns of a multitude of individuals, agencies and organizations at the local, State and Federal levels are addressed as well. Such institutional concerns span the entire range from waste standards and investigation of potential sites to long term monitoring of a permanent repository. Recognizing these concerns the IRG recommendation to develop a framework for Federal/State cooperation in nuclear waste matters should be the first order of business for the Administration and must be accomplished before there can be any real progress on the establishment of waste repositories.

- Many concerned citizens, nuclear intervenor groups, some States, CEQ and to a degree the Nuclear Regulatory Commission itself have linked the waste disposal problem to the question of continued licensing of nuclear power plants. This linkage stems from the view that until adequate long term disposal of wastes is assured, licensing of additonal nuclear plants should be questioned. No single point was made more frequently in the IRG's public hearings. Because the nuclear waste management issues must be resolved regardless of the future of nuclear power development in this country, the IRG throughout its deliberations has attempted to remain neutral on the question of the future of nuclear power, and has not addressed the proposed linkage of nuclear waste disposal and reactor licensing. CEQ believes, that because the future growth of the nuclear industry affects the amount of waste that must be managed, the linkage issue should have been addressed to the extent of analyzing the effects of future nuclear growth on the real ability of our technical, political and social institutions to manage nuclear waste safely on the scale required. While these matters were analyzed to varying degrees in the IRG reports, the report also recommends that further assessments of the handling of large amounts of wastes should be undertaken.

- The choice of a waste disposal program strategy is a major Federal action affecting the environment and, therefore, such a choice must not be made prior to full NEPA review. Full public participation and strict adherence to environmental impact statement requirements are essential in maintaining public confidence in the Federal programs. However, planning near-term waste programs and R&D programs must go forward prior to completion of NEPA review. Therefore, the IRG has developed the concept of an Interim Strategic Planning Basis which will act as a framework and a guide to these activities during this period. This planning basis will not result in the foreclosure of any options. Some of the decisions you are asked to make here in addition to many IRG recommendations will become a part of this Interim

Strategic Planning Basis and will establish interim guidance only, pending completion of NEPA reviews. Final decisions will be made when the results of NEPA reviews are in hand. Six draft environmental impact statements relevant to waste management issues have already been released.

III. Nuclear Wastes Descriptions

There are five different types of nuclear wastes which are discussed through the remainder of this memo:

- High Level Wastes (HLW): Includes discarded spent nuclear fuel, predominately commercially generated and now stored in cooling ponds, and reprocessed defense wastes which are stored in large tanks as liquids, slurries and solids.

- Transuranic Wastes (TRU): Those wastes, e.g. contaminated articles mostly from defense activities in solid or liquid form, generally do not have high radioactive or thermal output, but do contain sufficient quantities of long-lived radioactive isotopes to require long term management.

- Low Level Wastes (LLW): These wastes contain sufficient short-lived radioactive isotopes to require management, but do not contain significant quantities of long-lived isotopes. They are currently disposed of in shallow burial dumps at a number of different sites. They are generated in commercial nuclear fuel cycle, medical, industrial and research activities.

- Uranium Mill Tailings: Low level radioactive concentrations (mostly radium) generated by the residual material from mining and milling activities. The hazards per unit quantity are small but there are very large quantities of these wastes. About 85 percent of the radioactivity in uranium ore remains in the tailings after milling.

- Decontamination and Decommissioning Waste: Material arising from the cleaning and dismantling of nuclear facilities. The level of radioactivity can vary widely.

IV. Major IRG Findings and Recommendations

The detailed IRG findings and recommendations are contained in the final IRG report which is included with the separate notebook. Sections VII through X, see Tab C, of this memo detail the IRG actions that will be taken to implement these findings and recommendations. Section VI, see Tabs A and B, is an analysis of the two issues which require your decision. In order to establish a frame of reference for your consideration of these issues we summarize below the major IRG technical findings and recommendations:

- With respect to HLW and TRU waste, disposal in mined repositories (i.e. in deep geologic formations) is the most advanced technology and should be available for earliest implementation of the six candidate disposal approaches examined.

- Present scientific and technological knowledge is adequate to identify potential repository sites for further investigations. No scientific or technical reason is known that would prevent identifying a site that is suitable for a repository, provided that a systematic approach is followed in identifying sites. Significant gaps and uncertainties do, however, exist in our technical understanding. The feasibility of safely disposing of high level wastes in mined repositories can only be assessed on the basis of investigations at specific sites. However, the final assessment of the adequacy of a proposed repository site and design must be made on the basis of a societal judgment that considers the level of risk and the associated uncertainty. This final judgment will be a product of the regulatory process, and the interaction of a multitude of individuals and institutions at the local, State and Federal level. These conclusions result from a thorough review conducted over a six month period by the Science Advisor, with help from experts in various agencies represented in the IRG, and with extensive, external peer review.

- Reprocessing is not required to assure safe disposal of commercial spent fuel in appropriately chosen geologic environments.

- Detailed studies of specific, potential repository sites in <u>varying geologic environments</u> should be further expanded. Although most is known about the engineering aspects of a repository in salt and most site studies to date were conducted in salt, no particular geologic environment is an obvious preferred choice at this time on purely technical grounds.

- A commitment to build several waste disposal repositories sited on a regional basis, insofar as technical considerations permit, could help reduce local opposition to site evaluation studies. Although one repository could conceivably accommodate all civilian and defense HLW generated through the end of this century, building two or three repositories sited regionally during this period would be advantageous since it would reduce transportation of waste, reduce the risks of depending on a single site, and be more acceptable to the public and individual states that are understandably concerned about being the only recipient of U.S. nuclear wastes.

- The technical and socio-political success of any Federal waste management program will largely depend on effective State participation in the process. States want and deserve to participate in the site selection process from the beginning, i.e. in the long term planning and repository system design stages, as well as in the final selection stages. A further discussion of this important topic is found in Section VII, Tab C.

- The resolution of institutional issues required to permit the orderly development and effective implementation of a nuclear waste management program is as important as the resolution of outstanding technical and State participation issues. Such institutional concerns include: obtaining local site approvals and demonstrating sufficient organizational competence and stability to assure safe operation of a repository and any necessary long term maintenance.

- With respect to HLW, extensive recommendations on the approach to identifying appropriate disposal sites were made by the IRG and these are discussed in the HLW site selection issue, Issue #1.

- The effects of future human activity at or near potential disposal sites must be evaluated more carefully.

- Interim storage of commercial spent fuel is needed before disposal facilities are available. The IRG encourages maximimum spent fuel storage at reactor sites but the Federal Government should provide for Away-From-Reactor (AFR) storage capacity of limited quantities of spent fuel. (This recommendation essentially repeats the proposal contained in your Nuclear Spent Fuel Policy announcement of October 1977.)

- With respect to low level waste better technical characterization of sites than was conducted in the past must be accomplished prior to future site selection. In addition, the U.S. Government should offer to states the option of Federal takeover (which will require legislation) of low level burial sites, on a full cost recovery basis in order to assure adequate long term care. With respect to mill tailings, low level and decontamination/decommissioning waste, increased R&D to define the most appropriate disposal solutions are necessary.

- A number of legislative proposals will be required to implement IRG recommendations. A summary of this legislation with expected timing of submittal to Congress, appears in Tab I of the background notebook.

V. Budgetary Impacts

The costs of disposing of all high level and TRU wastes will be very high, although outlays will not rise as rapidly in the immediate future as they will in subsequent years. In addition, all costs for commercial waste disposal will be recovered from the generators of the nuclear wastes. Commercial waste disposal represents about half the total waste program costs. (Section C in the separate notebook provides detailed information on the potential budgetary impacts of IRG recommendations.)

The total waste disposal costs through the year 2000 for all types of waste are estimated to cost the nation in the neighborhood of $30 billion, in 1979 dollars. The total estimated cost increases associated with the

IRG recommendations (from 1979-2000) would not necessarily be large--perhaps reaching only $100 million cumulative. This increment would result primarily from the recommendation to broaden the DOE geologic site evaluation and characterization activities prior to disposal site selection. However, the IRG has made general recommendations for an acceleration of current waste management efforts--particularly on the issue of ultimate disposal. These recommendations will have no FY 1980 budget impacts, since your FY 1980 budget was formulated to accommodate anticipated IRG recommendations. The appropriate level of funding in the FY 1981 budget to address IRG concerns will be formally reviewed by OMB in the fall. DOE may recommend an FY 1981 waste management budget (commercial and defense wastes) as high as $900 million as compared with the currently projected FY 1981 level of $719 million, and $572 million in the FY 1980 budget.

The costs of preparing the defense high level wastes for disposal will be by far the largest component of the total waste program costs because of the necessity for remote handling, the great waste volume reductions required, and the need to handle sludges and immobilize the waste. In addition, the costs associated with defense wastes cannot legally be reimbursed by utilities as can commercial wastes.

All agencies and OMB concur that such increased program costs are acceptable prices to pay to assure resolution of this issue. More importantly, it should be noted that the important focus of the IRG on developing appropriate programs and plans for addressing the waste issue will result in much more effective use of total Federal waste program expenditures (including uranium mill tailings clean-up and non-DOE programs).

VI. Issues for Decision

This section (Tabs A and B) describes areas of agency disagreement and seeks your decision on two issues. The final sections, (Tab C) VII through X, describe for information only the major implementation actions which are being taken pursuant to the IRG waste recommendations. These issues for your decision are:

Issue #1: When should the new waste management program plan for a decision on site selection for the first high level waste (HLW) repository?

Issue #2: Should DOE proceed with present plans for the Waste Isolation Pilot Plant (WIPP), a deep geologic disposal project in New Mexico?

TAB A

Issue #1: When should the new waste management program plan for a decision on site selection for the first high level waste (HLW) repository?

During the course of the IRG review, a reassessment of the DOE policy for selecting high level waste repository sites was made, leading to adoption of the following programmatic guidelines:*

- Before selecting a site for the first HLW repository, geologic and hydrologic evaluation and qualification of at least several alternative sites must be made. This is a departure from past Federal policy of selecting the first qualified site available.

- These alternative sites should be in diversified geologies, as a hedge against finding that some sites or host rock types thought to be adequate are unsuitable. This is a departure from the historic emphasis on salt as a host rock.

- Extensive supporting R&D (including R&D on long term waste form integrity) is required to assess adequately the ability of the various host geologic media.

- The emplaced wastes should be retrievable (and adequately monitored) for an initial, but as yet unspecified period of time.

The total number of potential sites to be evaluated over the next decade will number at least half a dozen. However, the decision on when to make a specific site selection and seek NRC licensing can be made, in principle, at any time following adequate NEPA review.

The agencies differ on the appropriate number of sites to be investigated prior to conducting site comparisons which might lead to the choice for a first repository and how the Administration position should be presented to the public.

Under all of the following options, the DOE site qualification program and the development of a comprehensive plan for siting waste management facilities with State participation would be identical. The options do present substantial differences, however, in how these processes are used to drive toward a choice for the first repository and how the public will perceive the Administration's new waste management program.

It should be noted that because the required NEPA review has not been completed, only interim guidance is being sought at this time. After completion of the Generic Environmental Impact Statement on Commercial Waste Management, your final guidance and decision for this program will be sought.

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* The FY 1980 budget is consistent with the following approach. Planning for the FY 1981 budget, which is beginning, will continue the diversification of the site characterization work.

Option #1: After 2-3 sites with different geologic environments and diverse media have been qualified,* a decision would be made to either (1) propose one or more of these sites as repository locations to NRC for licensing or (2) determine that further sites should be qualified prior to such a decision.

The earliest possible date for submission of a site to NRC would be 1982 with a repository operational by 1990.

This option would provide clear guidance to DOE for interim planning purposes and permit a public statement about what milestones must be passed in the site qualification program before DOE would expect to consider selecting a site for the first repository.

Although the choice of the first site for submission to NRC might not be made at the time of the comparison among the 2-3 sites, this option permits such a choice to be made if it is appropriate. As a result, this option would leave open the possibility of having a repository available earlier than would be possible under Option #2.

Since the choice of the first repository site could be postponed at the time of its first consideration until more sites with a wider diversity of geologic characteristics and more R&D results are available, proponents of Option #1 claim that the likelihood of technical success is as great for Option #1 as for Option #2 and #3.

Option #1 implies a considerable departure from the past practice of evaluating the suitability of sites on a case-by-case basis and would be viewed this way by most members of the public. However, it is not as great a departure as Option #2 or #3. Option #1 will be perceived to be the least technically conservative of the options and the one most oriented toward early action. For this reason the environmental community would oppose it.

The nuclear industry tends to prefer Option #1. However, utility representatives have made it clear that they are more concerned that the overall program be well conceived, deliberate and under adequate management than with the target date for the first repository.

Option #2: After 4-5 sites with different geological environments and diverse media have been qualified, a decision would be made either: (1) to propose one or more of the sites as repository locations to NRC or (2) to determine that further sites should be qualified prior to decision.

The earliest possible date for submission of a site to NRC would be 1985 with a repository operational before 1993.

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* A qualified site is one that has been thoroughly investigated and found to be suitable for submission to NRC for its determination on final site acceptability as a waste repository.

This option, as does Option #1, would provide clear guidance to DOE for interim planning purposes and permit a public statement about what milestones must be passed in the site qualification program before DOE would expect to consider selecting a site for the first repository.

This option insists on the availability of 4-5 qualified sites before consideration of whether or not a site should be selected for the first repository and precludes such consideration after only 2-3 sites have been qualified. As a result, the earliest possible date of selection and of repository operation is later than for Option #1. It should be noted, however, that the dates under all options are estimates and subject to uncertainties and possible further delays for institutional as well as technical reasons.

Proponents of Option #1 point out that if adequate technical readiness has not been achieved by the time of the 2-3 site intercomparison, the choice of site under Option #1 can and will be delayed until it has been achieved.

However, proponents of Option #2 believe that Option #2 will provide greater assurances than Option #1 of the availability of adequate site and basic research information prior to any site selection. Proponents of Option #2 argue that setting a schedule for a decision after 2-3 sites have been qualified, i.e. Option #1, establishes a predisposition to move on one of those sites prior to obtaining further information from the characterization of additional sites and from more R&D.

In addition, proponents of Option #2 believe that it is likely to attract a wider range of support from interested parties than is Option #1 and, therefore, is likely to result in greater ease in overcoming institutional barriers to progress, including the implementation of a framework for improved Federal/State relations.

Option #2 and Option #1, do establish now a fixed schedule, a firm process and a specific amount of information that will be required prior to site selection. This gives more of an indication than Option #3 does that the Federal Government has a firm process in place for addressing the waste management problem. This will also permit easier more effective near term, i.e. FY 1980 and FY 1981, program planning and budgeting decisions due to the increased certainty provided over Option #3.

However, proponents of Option #3 believe that by virtue of Option #3's process rather than schedule orientation, it has the greatest likelihood of finding acceptance by State and local institutions involved in wastes and, therefore, of dealing successfully with the institutional issues surrounding waste management.

Option #3: After the completion in 1981 of the comprehensive waste management plan which would be developed with state participation and would detail processes for decision-making, the schedule for a site comparison leading to site submission to NRC would be determined. Announcement would be made now of this process and how it would be used to determine the schedule for selection of the first repository site.

This could lead alternatively to a schedule consistent with Option #1 with an earliest possible site choice in 1982, a schedule consistent with Option #2 with an earliest possible choice in 1985, or possibly a slower schedule.

One of the IRG recommendations supported by all agencies is the use of a deliberate, open process with full state participation to develop a comprehensive site qualification and R&D plan. Option #3 proposes that this process also be used to develop the date for inter-site comparisons and possible selection of the first repository site. It would result in no statement now about how many sites must be qualified before considering the selection of the first repository site but a strong statement would be made about the process that will be put in place with State involvement leading to resolution of this question by 1981. Opponents of this option argue that it does not provide clear guidance to DOE in how to plan its waste management program over the next few years. Proponents argue that reliance on the site qualification and R&D plans for the development of this guidance is preferable to giving such guidance now in the absence of what they believe to be an adequate basis.

The degree of technical conservatism of the program resulting from this option and the estimated dates for site selection and initial repository operations cannot be compared to the other options since they will not be known until 1981. They will be determined as seems most appropriate at that time. While some proponents of this option believe that 4-5 sites should probably be qualified before the selection of the first site is considered, they prefer to rely on the process of creating the site qualification and R&D plans with State involvement to decide the requisite number of sites to be qualified before consideration would be given to choosing the first site.

Option #3 is the greatest departure from past practice and would be seen as such by the public. The proponents of this option believe that since both the site qualification program and the number of sites to be qualified before considering the first selection would in some way be mutually agreed to by the States and Federal Government, this option has the greatest likelihood of overcoming the institutional barriers to making progress. They also believe that Option #3 would best eliminate the previous practice of establishing "promised" dates for repository availability, a practice that has undermined the Government's credibility in the past.

TAB B

Opponents of this option point out that the process to develop the comprehensive site qualification and R&D plan with State participation will go forward under any of the options, that adjustments can be made later and that most members of the public would probably like evidence not only that the Government's decision-making processes has improved but also that a plan and schedule, albeit tentative and subject to revision, exists today. In addition, they point out that none of the options would lead to commitments or promises now that a repository would be open at any specific time. All agree that making such commitments would be a mistake.

Decision

Issue #1: When should the new waste management program plan for a decision on site selection for the first high level waste (HLW) repository?

Option #1: Site selection after at least 2-3 sites qualified. (Recom. by DOE, ACDA, DOS) /___/

Option #2: Site selection after 4-5 sites qualified. (Recom. by OMB, OSTP, CEQ,** EPA, DOC, DPS*)** /___/

Option #3: Let the answer to site selection emerge out of the process that will determine the comprehensive waste management plan. (Recom. by DOI) /___/

* DPS favors Option #2. It establishes a clear timetable but will indicate that the government has done a thorough job of exploring reasonable candidate sites and thereby reduce the inevitable frictions which will surround the decision on when to build at the first site.

** While NRC cannot make a formal recommendation on the above issue, NRC staff have expressed a preference for option #2. (This preference does not necessarily represent the views of the Commission). DOT, NSC and NASA did not wish to make a recommendation on this issue.

why not 3-4?

Issue #2: What role should the Waste Isolation Pilot Plant (WIPP), a proposed mined repository in New Mexico, have in the new waste management program?

Background

In FY 1977, Congress first authorized the construction of an unlicensed mined repository in salt near Carlsbad, New Mexico, for the disposal of Defense TRU wastes and for R&D (but no disposal) with Defense HLW. Congress has consistently reaffirmed this purpose for WIPP---most recently in the FY 1980 authorization. A detailed Geologic Characterization Report and a draft EIS for this project have recently been released for public comment. Engineering design is currently in progress. The current DOE plan calls for initiation of construction in 1982 and completion in 1987.

In recent years, DOE had proposed that a limited amount of commercial spent fuel also be disposed of at the WIPP site, with provision for retrievability during the initial years of emplacement. This proposal is consistent with the IRG concept of an Intermediate Scale Facility (ISF) which would be a licensed facility for geologic disposal, on an initially retrievable basis, of several hundred (up to 1000) spent fuel assemblies or HLW cannisters.* In addition, DOE recommended that WIPP also be licensed by the NRC.

However, both the House and Senate Armed Services Committees have taken a very strong position against licensing of the WIPP facility by the NRC, and also against the disposal of any spent fuel in the WIPP facility. (This position results from the fact that the WIPP project is managed under the DOE Atomic Energy Defense Programs and that the NRC presently has no authority to license a Defense TRU repository.) As a result of this strong Congressional position, the DOE has recently agreed to follow the Congressional direction for WIPP and is no longer advocating licensing of WIPP or spent fuel disposal at the WIPP site, though it did advise Congress that this might not reflect the final Administration position on WIPP. Secretary Duncan has yet to review the WIPP issue.

The IRG was unable to resolve whether the Administration should support the continuance of the WIPP project, and if so, how it should deal with the Congressional position on licensing and spent fuel storage. The following issues are relevant:

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* The IRG believes that earlier technical, institutional, procedural and organizational learning and experience including exercising the licensing process could be gained from such a facility if it proceeded on a schedule significantly faster than the first high level waste respository. It is important, however, to note that an ISF could possibly mature into a HLW repository but that if no ISF were built the above mentioned learning and experience could and would have to be derived from the licensing, construction and early operation of the first repository. It should be noted that an ISF and a TRU disposal facility can be colocated at the same site.

- The IRG recommends that NRC licensing be extended to include new DOE facilities for the disposal of TRU waste. There was no Congressional action on WIPP during the IRG deliberations last Spring. Therefore, the IRG did not address the question of whether the Administration should continue to take this position on the licensing of WIPP in view of the strong opposition to such licensing which Congress has now expressed.

- Much of the previous incentive and justification for proceeding with WIPP was found in the prospect of co-locating an ISF at the WIPP site. The total estimated construction costs of WIPP amount to about $500 million whether or not an ISF is co-located at the WIPP site. The cumulative estimated total operating costs at the WIPP facility during the emplacement of the wastes at WIPP would amount to at least an additional $750 million or more (in 1979 dollars), assuming a 30 year period of emplacement. At least several hundred million dollars more would be also required to build a facility to prepare the existing TRU wastes for disposal. The total estimated costs for WIPP (direct and indirect) would probably reach about $1.5 billion.

- The IRG recommends that at least several alternative sites in differing geologies be thoroughly evaluated and qualified before selecting the first site for a full scale HLW repository.

- The WIPP project is very controversial, and numerous specific objections to the adequacy of the WIPP site itself have been raised.

History

- In 1974 a repository in salt (the most studied medium to date) was proposed for TRU wastes in the WIPP area. Initial site evaluation work had begun in 1972. This disposal of TRU wastes would partially satisfy the commitment made by the AEC and reaffirmed by the DOE to the political leaders of the State of Idaho to remove TRU wastes from that State as soon as possible. It should be noted, however, that no imminent public health hazard presently exists from continued storage of this material at Idaho for substantial additional time periods.

- During some confusion just prior to the formation of DOE, the WIPP site was also being pursued as a site for disposal of defense high level wastes.

- After its formation DOE, in March 1978, reaffirmed the original mission of WIPP for disposal of TRU wastes (and some R&D) and proposed for consideration the addition at the WIPP site of an ISF for disposal of some commercial spent fuel. DOE at that time also proposed licensing this facility.

- DOE will have obligated about $40 million on the WIPP construction project by the end of FY 1979. The Energy and Water Development Appropriation bill for FY 1980 provides an additional $26.5 million in construction funds for the WIPP project (mostly for engineering design) subject to the restrictions that the project not be licensed and that no spent fuel be disposed of at the site. Actual construction would not start until 1982.

- DOE was unsuccessful in its attempts to transfer WIPP to a different authorizing committee (in order to remove the licensing and spent fuel restrictions).

The issue for your decision is how and whether the controversial WIPP project should proceed. Option #1 provides Administration support for continuing the WIPP project contingent on the removal of Congressional restrictions on licensing and spent fuel disposal at WIPP. Option #2 corresponds to the current Congressional position on WIPP (i.e. no licensing and TRU disposal only). Option #3 would attempt to terminate the WIPP project, and commits to an initial combined TRU/ISF repository pending qualification of 2-3 alternative sites (including WIPP).

Option #4 would also terminate the WIPP project. Under this option the WIPP site would then become one of the potential sites for an initial high level waste respository at which Defense TRU waste would also be stored.

Option #1: Continue with the WIPP project only if Congressional support can be obtained for licensing of WIPP and for colocation of an ISF at the WIPP site.

The Administration would make clear that it regards a repository for TRU disposal alone as now proposed by Congress to be unjustifiable. It would announce its support for a combined licensed TRU/ISF facility at the WIPP site, subject to clearance by the EIS and NRC licensing processes. Should the site be found unacceptable by either DOE or NRC, efforts would be directed to locate an ISF alone at the next acceptable site. The WIPP site would be used for R&D as appropriate. The Administration would communicate to Congress that it cannot support the continuation of the WIPP project in FY 1981 (and beyond) if Congress maintains its present position. Thus, this option could lead to a halt of the WIPP project.

The DOE and most other IRG members now view the disposal of spent fuel (an ISF) at the WIPP site as having higher priority than the disposal of TRU wastes. Many IRG members do not believe the disposal of TRU wastes alone would justify total expenditures of $1.5 billion over the next several decades. An ISF could result in a valuable learning experience applicable to a later full scale HLW repository, provided the ISF proceeded on a schedule significantly faster than the full scale repository. In addition, the Department of State and ACDA note that an early ISF would help contribute to Administration nonproliferation objectives.

However, the WIPP project (with or without an ISF) is opposed by a number of environmental groups, some members of the technical community, and some members of the IRG. They object to the WIPP project because of the lack of consideration of alternative sites (recommended by the IRG for HLW) and because of reservations concerning the adequacy of the WIPP site for a repository.

Some public groups will, in all likelihood, vigorously oppose the project at every step, and extensive litigation with an uncertain outcome is to be expected. All members of the IRG agree with DOE that if the project goes forward, it must be managed in such a manner that lack of success does not damage the credibility of the rest of the waste disposal program. Some agencies, however, doubt that such decoupling is possible. Specific objections that have been suggested to proceeding, at least at this time, with the WIPP project include the following:

- An ISF, even if co-located with TRU disposal, should only be located at a site that is subject to the same site selection, review and approval process as a HLW disposal site, since it might generate institutional pressure to grow into a full scale HLW repository at a later date. DOE believes that the data is already available to evaluate the site in the manner suggested.

- Questions have been raised by some members in the technical community regarding the suitability of salt as a disposal medium, particularly for spent fuel. It is argued that these technical questions will have to be resolved before proceeding with construction. The IRG has stated, however, that it is not appropriate to endorse or criticize any particular host rock without consideration of other characteristics of specific repository sites including repository design. Although the U.S. Geological Survey (DOI) has taken no official position on the suitability of the WIPP site or of salt as a host rock, they do believe that a number of years may be required to resolve adequately the technical questions concerning salt as a host medium.

- Potash, oil and gas in economically extractable amounts are present at the WIPP site, and a number of companies with leases have protested withdrawal of the land by DOI for use as a repository site. It is argued that the longer term integrity of the site could be jeopardized by the possibility of extraction of any of these three resources in future years.

<u>Option #2</u>: <u>Proceed now with an unlicensed WIPP for TRU disposal only, in agreement with the Congressional position</u>.

This option would respond to previous commitments to Idaho, while avoiding the controversy with Congress associated with licensing the facility and the proposed disposal of spent fuel at the site. However, a number of IRG members are strongly opposed to this option, believing that it wastes money by not including the storage of high level wastes (e.g. an ISF). In addition, the TRU wastes intended for disposal at WIPP present no immediate health hazard. When a HLW repository is available, TRU wastes could be disposed of at considerably lower incremental cost than at the WIPP site.

Under this option, high level wastes (both Defense and Commercial) would be stored at a subsequent repository. As NRC already has licensing authority for high level wastes, the current problems being experienced with Congress would not be expected at the subsequent facility. The primary argument for this option is that it would permit the Administration to take needed concrete, visible action leading to the construction of the first waste disposal facility on an accelerated schedule, and with Congressional support. WIPP could be completed by 1987, whereas choice of Options #3 and #4 would delay the first repository until the early 1990's. Opposition arguments are that the costs are excessive ($1.5 billion total), the benefits to public health of TRU disposal alone are unclear, and that the continuing opposition to the WIPP project may well prove detrimental to the long term viability of nuclear waste management programs.

It is the unanimous view of the IRG that all nuclear waste repositories should be licensed by NRC due to the nature of the significant risks involved in disposal of nuclear waste and the long term protection of public health and safety that is required. This option would concede to the Congress that a TRU repository should be built without being licensed. This represents a fallback from the strong position on licensing taken by the IRG in their deliberations.

Option #3: Continue to plan for a combined licensed TRU/ISF facility, but delay site selection until 2-3 sites (including the WIPP site) are qualified.

Oppose the Congressional position that a TRU only facility should be initiated immediately at the WIPP site. Propose the continuation of the WIPP process aimed at determining a site, possibly WIPP, for a licensed TRU and ISF facility. Even with this somewhat expanded site selection process this approach will be perceived by the environmental community and some members of the public to be a continuation of an imprudent program that was in place prior to the IRG. Proceeding with the WIPP decision process before alternative sites are thoroughly evaluated could be perceived as inconsistent with the IRG HLW recommendations to proceed more cautiously and have several sites qualified before the first HLW repository site is selected. This could jeopardize the credibility of the entire program.

This option maintains a measure of commitment to early disposal of Idaho waste, but delays implementation by several years until a broader set of sites are available for choice. It represents a generally more conservative approach than in the preceeding two options. The WIPP site would be one of these candidate sites reviewed for a TRU/ISF facility.

The WIPP project as contemplated would be terminated and no FY 1981 funding would be proposed. (As Congressional support for WIPP does not appear to be strong, termination of WIPP is more likely to be acceptable to Congress than Option #1, though a backlash from Congressional supporters of WIPP is quite possible.) DOE would seek a land withdrawal from DOI to bank the site for possible future use as a repository, and to the extent appropriate, would

use the site for other purposes such as R&D activities, which could include the use of limited quantities of radioactive wastes on a retrievable basis, and in a manner that would not compromise the site for a future HLW repository.

Under this option the ISF for disposal of some commercial spent fuel would be deferred. This implies that if a full scale HLW repository is selected after 2-3 sites have been qualified (e.g. Option #1 in the previous issue) it is anticipated that the retrievable phase of that repository would replace the ISF.

This option would be implemented by the immediate development of any near term R&D plan for the use of the WIPP site as may be appropriate, preparation and approval of budget estimates for that plan and, following this, discussions with members of Congress on the new proposals and required new authorizations.

Option #4: Plan for an initial combined HLW/TRU facility, but delay site selection until at least several sites (which may include WIPP) are qualified.

As with Option #3, the WIPP project would automatically be terminated, and the WIPP site would continue to be used for R&D activities, as appropriate. No FY 1981 funding for WIPP would be proposed. This option differs from Option #3 in several important respects however: (1) the initial HLW/TRU facility would be operated under the Commercial Waste Management program, and thus would automatically be licensed by the NRC--thereby avoiding the current problems with the Armed Services Committees; and (2) the number of alternative sites to be evaluated would be determined by your decision on Issue #1. It is anticipated that Defense HLW would also be stored at this site. As with the other options, the wastes would be retrievable for some initial period of time (at least several years).

This option is probably the most consistent with the IRG general recommendations to approach waste disposal more conservatively and site selection more deliberately. If acceptable to Congress, this option could result in the least cost to the taxpayer of storing high level and TRU wastes, provided that TRU wastes are stored at a full scale HLW repository. This option does not provide geologic exploration for potential TRU disposal sites in specific areas which are not suitable for HLW disposal.

The prospects for ever using the WIPP site under this option, however, are probably small recognizing that the political support for the project that exists now in New Mexico would have to be turned off and rekindled sometime in the future.

It should be noted that the Administration would accept some degree of unavoidable risk, no matter which option is chosen. Option #1 would result in a direct confrontation with Congress over licensing and spent fuel storage at WIPP. Option #1 and #2 would incur the political risks of confronting the existing opposition to WIPP e.g. by environmental groups. (Some degree of opposition would probably be inevitable for any chosen repository site, however.) Options #3 and #4 would incur the risk of an appearance of inaction by the Administration on nuclear waste management and could result in significant backlash from Congressional supporters of WIPP. Indeed, continued Congressional support of WIPP in the face of Administration opposition to the repository (a possible outcome of Options #1, #3 and #4) could reinforce a public perception of Administration inaction, although it is unclear how strong general Congressional support for WIPP is, at this time. There is no agreement in the IRG as to which option ultimately carries the least risk.

Decision:

Issue #2: What role should the Waste Isolation Pilot Plant, (WIPP) a proposed mined repository in New Mexico have in the new waste management program?

Option #1: Continue with WIPP only if Congress agrees to licensing and colocation of an ISF. /__/

Option #2: Proceed now with WIPP process but for TRU disposal only. (Recom. by DOE 1/) /__/

Option #3: Delay site selection for TRU/ISF facility. (Recom. by OMB, OSTP, CEQ,* EPA, DOS, DOI, 2/ DPS) 3/ /✓/

Option #4: Plan for an initial HLW/TRU facility with selection from at least several alternative sites. /__/

1/ The Department of Energy previously supported Option #1 but recently has agreed to follow the congressional position on WIPP. Secretary Duncan has yet to review this issue.

2/ Secretary Andrus has not reviewed these options after Congress recently took its position on WIPP. From earlier discussions Assistant Secretary Davenport indicates that Secretary Andrus would probably not oppose Option #2 under the present circumstances but would prefer Option #3.

3/ While NRC cannot make a formal recommendation on the above issue, NRC staff have expressed a preference for Option #2. (This preference does not necessarily represent the views of the Commission.)

* CEQ's views are expressed at Tab E.

TAB C

VII. Federal/State Relationships

As mentioned earlier, development of effective Federal/State relationships will play a crucial role in the success of future nuclear disposal programs. While some Federal/State interaction already occurs as the result of ongoing DOE and U.S. Geological Survey (DOI) programs (as well as through the political process), there is a need for a more comprehensive framework to facilitate effective and harmonious Federal/State relationships.

In the past, States have had only a relatively minor role in the waste management planning process, e.g. in the evaluation and location of potential waste disposal sites. The States need to be better informed, and to be provided more opportunity to influence waste management planning. While operational and procedural mechanisms for accomplishing this must be worked out in further detail with the States, all agencies agree that the basic framework should include:

(1) Use of "consultation and concurrence" with the States which would involve the States at every phase of the waste repository program from program planning and site identification through the operation of a completed repository. This would include active participation by the States in NEPA and regulatory review (e.g. standards development).

Using the procedures of consultation and concurrence, a State effectively would have a continuing ability to prevent the Federal Government from carrying on activities it deems inappropriate. Nonetheless, consultation and concurrence differs importantly from "State veto" in which a State has a one time opportunity to permit or prohibit the siting of a facility. The IRG believes that such an approach will lead to better protection of the States' interests than would a system of State veto. Legislation has been introduced to implement the State veto concept. In order to block the passages of such legislation, the Administration may have to suggest an alternative that puts into law the rights of States under consultation and concurrence.

(2) Immediate establishment of a State Planning Council (SPC) by Executive Order followed by legislation to facilitate a more permanent structure and to involve Congress. This Council (suggested by the National Governor's Association) would include elected State officials and four high ranking Federal officials. It would be chaired by a governor. The functions of the Council would include participating in the development of the Federal waste management plan and advising on additional State roles in the Federal Government's waste management program. It would serve in an advisory capacity and report to the President, the Secretary of Energy and the Congress. While the SPC should be helpful, it cannot by itself, ensure effective State participation, since not all States can be represented directly on the Council.

(3) Name, on a temporary basis, a special assistant or liaison to the President to consult over the next three months with local, State and Federal officials, the SPC and Congress. The objective would be to (1) assist these officials in their interaction, reflecting the President's viewpoint and (2) give special attention to fast-breaking legislative issues arising either from State or Congressional actions and including possible legislative definitions of a consultation and concurrence process emerging prior to the SPC coming into full operation.

VIII. Coordination of Interagency Waste Management Programs

A number of agencies have an immediate role in the nuclear waste management programs. These include: DOE, (lead agency for non-regulatory waste programs); DOI (earth sciences expertise and possible withdrawal of public lands); DOT (transportation of nuclear wastes); Department of State (international waste management issues); EPA and NRC (standards, regulatory review and licensing); and OMB, OSTP and CEQ (budgetary, technical and environmental review). The IRG has made a number of waste management implementation recommendations, see Tab H in the notebook, for these agencies--many of which will require increased interagency coordination.

The IRG recommends maintaining DOE as the Federal lead agency for waste management programs, with overall responsibility for developing, planning, integrating and implementing the non-regulatory waste management programs and for interfacing with the regulatory programs.

However, because of the scope of the IRG implementation recommendations, the need for increased interagency coordination (e.g. between EPA and NRC) and the widely perceived need for additional waste management policy oversight outside of DOE, there is a need to implement an overall framework for interagency coordination to assist DOE in its lead agency responsibilities, and to assure that IRG recommendations are integrated and implemented. The IRG recommends that it have the following features:

- A comprehensive nuclear waste management plan for each type of radioactive waste. This would include multi-year plans for programs, budgets and regulatory review, with biannual updates. These plans would be coordinated among the agencies with waste management responsibilities, and would incorporate comments from the public and the State Planning Council. These plans would have increased broad scientific and public participation including subjecting the comprehensive plan to public comment.

- Appointment of a working committee to assist in the coordination and implementation of IRG waste management recommendations among the various agencies. The IRG recommends that this committee be chaired by a DOE official and be composed of working level Federal agency representatives. This working committee would help ensure

that overall existing Administration waste management policy is carried out, but would not formulate new policy in its own right, or have program management responsibilities. It would facilitate interagency communciation and coordination (both on technical and non-technical matters), and ensure that established guidelines, procedures and timetables are met. Agency representatives would advise their agency heads on the status of waste program activities. This mechanism combined with other coordination devices described in Tab H of the background notebook including Memorandum of Understanding between key agencies, such as DOI and DOE, and multiagency participation in the preparation of waste management plans should assure the desired degree of agency interaction as new policy issues arise.

- Even with the above measures, each agency must bear the primary responsibility for executing its waste management responsibilities and for coordinating with the other agencies, as appropriate.

- OMB staff will conduct management and programmatic reviews of nuclear waste programs and the integration of these programs across the Federal agencies involved. This would be done in the context of the normal budget cycle, and would assess the need for additional programmatic, management and implemented recommendations.

- Finally, systematic reviews of major program documents by the EOP agencies should be conducted to augment existing Executive Office budgetary review.

IX. NRC Licensing of Waste Management Activities

All commercial nuclear activities and facilities (except those involving only minimal quantities of nuclear materials) are licensed by the NRC. Congress has also passed legislation requiring licensing of any new DOE facilities for the ultimate disposal of high level wastes (which includes commercial spent fuel and reprocessed military wastes). This legislation also includes any future DOE interim storage facilities for commercial spent fuel.

The IRG recommends proposing legislation extending NRC licensing authority to include new DOE facilities for the disposal of TRU waste and new non-defense low-level waste. The NRC is conducting a complete review of NRC licensing authority. The IRG further recommends that the forthcoming NRC licensing study should be completed and reviewed prior to consideration of extension of NRC authority beyond that proposed above.

The IRG further recommends that you request the NRC to respond, on the basis of a process that provides full opportunity for public, technical and government agency participation, to the following two questions after publication of the DOE's final GEIS on the Management of Commercially Generated Radioactive Wastes:

(1) Determine whether or not it agrees with the findings DOE has made based on its GEIS; and

(2) Determine whether or not it currently has confidence that radioactive waste produced by nuclear power reactors can and will be disposed of safely?

These questions reflect further thinking since Febraury 1978, when you decided in the context of discussions of the Nuclear Siting bill to ask the NRC whether wastes can be handled safely. It is understood that NRC will use other documents and information in addition to the GEIS in formulating an opinion.

X. Other Major IRG Recommendations and Implementation Actions

Detailed implementation directives to each agency involved in waste management have been prepared and are included in the attached notebook. The following summarize some of these for your information.

° Transportation. Significant shortcomings exist with the nuclear waste transportation system. To a large extent, existing Federal law places the authority for permitting waste shipments in the hands of State and local authorities. In the absence of Federal guidelines and regulations, local authorities in response to public concerns have often prohibited nuclear waste shipments, irrespective of the actual risks to the public. The IRG recommendations to help correct this situation include the following:

- DOT will be requested to accelerate its consideration of the appropriate Federal position regarding local restrictions on highway transportation.

- DOT will be directed to increase agency resources and management attention in that area of waste transportation.

- While no serious technical problems with nuclear waste transportation are apparent, public concerns regarding transportation of nuclear waste indicate that additional measures should be taken which are outlined in Tab H of the notebook.

° Financing Waste Activities. All costs associated with commercial waste activities will be paid by the generator and borne by the beneficiary of the activity of generating the waste. The IRG recommended that a trust fund be established and advanced payments for disposal services be sought. This fund would include the funds already proposed in the Administration's Spent Fuel Storage bill.

- Low Level Waste (LLW). The IRG recommends that DOE assume responsibility for developing and coordinating a national plan for LLW disposal with active participation from Federal agencies, states, general public and industry. The States could retain management control of existing or future commercial LLW sites, if they wished, though provision would be made (through new legislation) to transfer existing or future sites to Federal control. All resultant Federal activities would be done on a cost recovery basis. The IRG also recommends that NRC consider requiring the submission of a plan for radiation monitoring as a prerequisite for future licensing of LLW burial ground.

- Public Participation and Advisory Groups. The IRG considers it essential that all aspects of the waste management program be conducted with full disclosure and participation by the public and the technical community. Agencies will develop or improve mechanisms to ensure a high level of such participation, including providing technical and financial assistance to permit informed public input to programs and decisions and supporting non-government efforts to increase social and technical understanding.

- Regulatory Agency Actions. The IRG examined the schedules of regulatory activities conducted by EPA and NRC and the current statutory authorities and regulatory overlap among EPA, NRC and DOE. As a result the following actions will be taken.:

  - DOT and NRC will complete a new Memorandum of Understanding within three months to resolve residual problems of coordination and overlapping authority.

  - EPA and NRC will complete a Memorandum of Understanding within three months dealing with coordinating methodologies and procedures.

  - EPA will attempt to accelerate further its schedule for standard setting activities.

  - Procedures for sending EPA's proposals for Federal guidelines on radiation matters to you will be developed that will give you the benefits of other agencies' comments and views. The proposed general criteria for waste management activities will be the next proposed guideline to be sent forward.

TAB D

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TAB E

EXECUTIVE OFFICE OF THE PRESIDENT
COUNCIL ON ENVIRONMENTAL QUALITY
722 JACKSON PLACE, N. W.
WASHINGTON, D. C. 20006

August 31, 1979

MEMORANDUM FOR THE PRESIDENT

FROM: GUS SPETH

SUBJECT: Your Decision on Nuclear Waste Repository Licensing and WIPP (Nuclear Wastes Decision Memorandum)

The current position of the Department of Energy is to build an unlicensed geologic repository exclusively for the disposal of transuranic (TRU) military wastes at the Waste Isolation Pilot Plant (WIPP) near Carlsbad, N.M. For the reasons discussed below, I believe it is essential to the success of your nuclear waste policy that you (1) endorse the unanimous recommendation of the Administration's Interagency Review Group (IRG) report that all such geologic repositories should be licensed and (2) not endorse proceeding with the WIPP project at this time.

A principal finding of the IRG was:

> "Although disposal of TRU waste generated from military activities is not now subject to licensing it should be since the permanent disposal of such material presents long-term hazards comparable to those encountered in the disposal of high level waste which is licensed."

The argument of some members of the Armed Services Committees that the NRC should not license military-related nuclear wastes is misplaced. Current law already requires licensing of military-related high level wastes. The IRG has unanimously found that the long-term hazards of TRU wastes are comparable.

The sole opportunity for obtaining public confidence that TRU (or HLW) wastes will be disposed of properly and in a manner which considers health and safety issues is through the licensing process. As the decision memorandum points out, there are major technical questions (which have been raised by USGS and others) about the WIPP site itself, including the presence of oil and gas and mineral resources. Many believe because of this the WIPP site is a poor choice.

The state of New Mexico views licensing as a critical aspect of the proposal. Governor King stated recently that WIPP must be licensed.

Moreover, proceeding with even a licensed TRU facility at WIPP at this time is opposed by most IRG agencies. The reasons are both political and substantive. Substantively, it is important to identify and study a range of possible sites, examining diverse geologic environments, before making a decision. This DOE has not done in the case of WIPP. Also, disposing of TRU wastes in a facility simply for that purpose is wasteful: it will be cheaper and easier (with no penalty in safety) to wait until a HLW repository is licensed and put the TRU wastes there.

Politically, WIPP is extremely controversial and symbolic for the scientific and environmental critics of the federal program. An endorsement of proceeding with WIPP now would badly damage our otherwise good chances for a broadly acceptable policy. For the environmental community, WIPP is symbolic of the "pick a site and ram it through" mentality that has dominated the federal program prior to your Administration. Moreover, since a TRU site at WIPP does not address the commercial waste issue, it should be of little interest to the nuclear industry.

BACKGROUND NOTEBOOK

ON

NUCLEAR WASTE MANAGEMENT

AND

INTERAGENCY REVIEW GROUP (IRG) FINDINGS

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TAB A

Memo Initiating IRG

THE WHITE HOUSE

WASHINGTON

March 13, 1978

MEMORANDUM FOR

THE SECRETARY OF STATE
THE SECRETARY OF THE INTERIOR
THE SECRETARY OF TRANSPORTATION
THE SECRETARY OF ENERGY
CHAIRMAN, COUNCIL ON ENVIRONMENTAL QUALITY
ADMINISTRATOR, ENVIRONMENTAL PROTECTION AGENCY
ACTING DIRECTOR, OFFICE OF MANAGEMENT AND BUDGET
DIRECTOR, OFFICE OF SCIENCE AND TECHNOLOGY POLICY
ASSISTANT TO THE PRESIDENT FOR DOMESTIC AFFAIRS AND POLICY
ASSISTANT TO THE PRESIDENT FOR NATIONAL SECURITY AFFAIRS

SUBJECT: Interagency Nuclear Waste Management Task Force

By this memorandum I am establishing an interagency Nuclear Waste Management Task Force to formulate recommendations for establishment of an Administration policy with respect to long-term management of nuclear wastes and supporting programs to implement this policy. I have asked the Secretary of Energy to chair this Task Force.

The Department of Energy is issuing a draft report setting forth preliminary views on key issues in the waste management area. This report should serve as the basis of initial discussion for the Task Force. Areas which should be considered, leading to establishment of an Administration policy for nuclear waste management, include wastes from commercial nuclear power operations, existing low-level, transuranic (TRU), and high-level defense wastes. In addition, on-going programs should be reviewed to assure that the policy is implemented in a timely manner. Attention should also be given to the necessity of legislation,

environmental assessment, support for our non-proliferation objectives, and budgetary impacts including potential involvement in waste management programs by private industry.

The deliberations of the Task Force should include opportunity for appropriate participation by the interested public, industry, States, and Members of Congress.

I am directing that the activities of the Task Force be initiated by March 15 and final recommendations should be completed by October 1, 1978.

Jimmy Carter

B

TAB B

Members of Interagency Review Group

MEMBER	DEPARTMENT
Sam Bleicher	DOC
Eliot Cutler	OMB
Joan Davenport	DOI
John M. Deutch	DOE
David Hawkins	EPA
James Kramer	NASA
Jessica Tuchmen Mathews	NSC
Joseph Nye	DOS
Lee Santman	DOT
Katherine P. Schirmer	Domestic Policy
Clifford Smith	NRC
Philip Smith	OSTP
Gus Speth	CEQ
Charles Van Doren	ACDA

C

TAB C

Potential Budgetary Impacts of IRG Recommendations

While the IRG recommendations should not significantly affect the total costs of waste disposal (in 1979 dollars), they could affect the timing of these costs. Table 1 presents the current OMB budget projections for all DOE waste management programs. Table 2 presents DOE budget estimates taking into account their suggestions for implementation of general IRG recommendations to accelerate waste management programs, particularly on the subjects of waste immobilization (e.g. in a glass form) and of waste disposal. The "maximum" total in Table 2 result from implementation of various options in issues #1 and #2 of the Presidential Decision Memorandum. Table 3 summarizes the 1979-1984 estimates presented in Table 2 and extends the estimates (by DOE) to the year 2000.

The DOE figures are tentative, and present only one possible interpretation of IRG recommendations; they cannnot be considered as mandated by IRG policy. The majority of the difference between the OMB and DOE totals result from the DOE assumption of early construction of the following two proposed facilities:

- The Defense Waste Processing Facility (DWPF) at the DOE Savannah River plant in South Carolina (TEC of $3 billion). This proposed facility would process and prepare the Defense liquid and solid high level wastes at Savannah River for disposal. (The radioactive isotopes would be concentrated and immobilized in glass or some other waste form.)

- A proposed facility in Idaho (TEC of $500 million) which would process and prepare TRU wastes in Idaho for disposal. (The wastes would be incinerated and converted into a slag.)

With respect to Defense wastes, the IRG recommended, that "remedial action, including immobilization of the waste, should begin as soon as practicable." However, the IRG avoided any judgment on the proper timing, for such waste immobilization, realizing that many factors had to be weighed in reaching such a programmatic decision. The IRG did recommend that DOE "accelerate its R&D activities oriented toward improving immobilization and waste forms." The above two proposed construction projects (particularly the DWPF) have been under review for some time, and construction funding (including detailed engineering design) for these projects will be requested by DOE in the 1981 budget submission. The 1979 and 1980 budgets provide for upgrading of the interim storage of Defense high level wastes, and for significantly expanded waste R&D efforts.

TABLE 1

NUCLEAR WASTE MANAGEMENT
OMB BASE PROGRAM
(Outlays in $ millions)

	1979	1980	1981	1982	1983	1984
Interim Defense Waste Management Operations	193	239	218	209	194	220
Permanent Waste Repository (HLW) Program	136	175	216	241	267	280
WIPP	27	61	130	122	173	78
Waste R&D, Technology Dev.	81	117	120	120	120	121
Uranium Mill Tailings	9	19	20	20	20	20
LLW Operations Upgrade	0	0	0	0	0	0
Other	11	11	16	16	16	16
Total	457	622	720	728	790	735

TABLE 2

WASTE MANAGEMENT PROGRAM WITH DOE RECOMMENDED
INCREASE TO IMPLEMENT IRG RECOMMENDATIONS
(Outlays in $ millions)

	1979	1980	1981	1982	1983	1984
Interim Defense Waste Management Operations	193	239	325	311	263	256
Permanent Waste Repository Program (HLW)a/						
Option #1 of Issue #1	136	182	224	247	275	305
Option #2 of Issue #1	136	182	220	236	222	235
WIPPb/						
Baseline Case	27	61	130	122	173	78
Delay WIPP until 1982	27	2	0	3	12	40
Waste R&D, Technology Dev.						
Defense Waste Processing Fac.	0	0	30	165	550	634
TRU Idaho Facility	0	0	20	100	150	200
Other R&D, Tech. Dev.	81	117	206	250	265	264
LLW Operations	0	0	0	15	20	25
Uranium Mill Tailings	9	19	59	70	79	37
Other	11	15	52	51	50	50
Total (Maximum)	457	633	1046c/	1331	1825	1849
Total (Minimum)	457	574	912	1201	1611	1741

a/ Budgetary impacts of Issue #1 (as determined by DOE) are provided. Funded in Commercial Waste Management program.

b/ Includes operating costs. High and low options represent options #2 and #3, respectively of Issue #2.

c/ The above figure differs from the $934 million value in the PDM, as it contains funding for additional programs, (e.g. uranium mill tailings) and assumes slightly different program options.

TABLE 3

Long Term Waste Management Cost Summary

(Outlays in billions of constant 1979 dollars)

	1979-84	1985-90	1991-95	1996-2000	Total
Waste Management Base Programs	5.2	8.9	8.7	4.3	27.2
Impact of Waste Issues:					
Issue #1; Permanent Waste Repository:					
Option #1	1.3	2.1	1.2	1.0	5.7
Option #2	1.2	2.1	1.6	1.0	5.9
Issue #2; WIPP:					
Option #2 (Start now)	0.6	0.2	0.2	0.2	1.3
Option #3 (Delay until 1982)	0.2	0.7	0.2	0.2	1.3
Total (Early cases)	7.1	11.3	10.2	5.6	34.2
(Late cases)	6.5	11.7	10.6	5.6	34.4

D

TAB D

Quantities of Existing Waste*

High Level Waste	
Defense reprocessing waste	9,400,000 cubic feet
Commercial reprocessing waste	80,000 cubic feet
Spent fuel discharged from commercial reactors	2,300 metric tons of heavy metal
Transuranic Waste	
Defense	1100 kilograms of radioactive isotopes contained in wastes
Commercial	123 kilograms of radioactive isotopes in wastes
Low Level Waste (buried)	
Defense	50.8 million cubic feet
Commercial	15.8 million cubic feet
Uranium Mill Tailings	140 million tons

* The following chart is a summary of the physical quanitites of all existing radioactive wastes. The disposal problem associated with each type of waste is not solely proportional, however, to the quantity of the wastes but is also a function of their radioactivity levels, present waste forms (liquids, solids), etc.

E

Interim Strategic Planning Basis for HLW

The elements of this strategic basis as presented in the IRG Report, are as follows:

- The approach to permanent disposal of nuclear waste should proceed on a stepwise basis in a technically conservative manner.

- After having examined the status of knowledge relevant to disposal in mined repositories and by such other technical options as placement in deep ocean sediments, placement in very deep holes, placement in a mined cavity in a manner that leads to rock melting, partitioning of reprocessing waste and transmutation of transuranic elements, and ejection into space, we conclude that near-term program activities should be predicated on the tentative assumption made for interim planning purposes that the first disposal facilities will be mined repositories. The nearer-term alternative approaches (i.e., deep ocean sediments and very deep holes) should be given funding support so that they may be adequately evaluated as potential competitors. Funding of other concepts should allow some feasibility and preliminary design work to proceed. Once the NEPA process has been completed, program activities can be tailored accordingly.

- Near-term R&D and site characterization programs should be designed so that at the earliest date feasible, sites selected for location of a repository can be chosen from among a set with a variety of potential host rock and geohydrological characteristics. To accomplish this, R&D on several potential emplacement media and site characterization work on a variety of geologic environments should be increased promptly.

- A number of potential sites in a variety of geologic environments should be identified and early action should be taken to reserve the option to use them if needed at an appropriate time. In order to avoid working toward and ultimately having a single national repository, near-term options should create the option to have at least two (and possibly three) repositories become operational within this century, ideally and insofar as technical and other considerations permit, in different regions of the country. In pursuing a regional approach to siting, geologic, hydrologic, tectonic and other technical characteristics of sites and safety considerations must remain the primary basis for selection.

- Construction and operation of a repository should proceed on a stepwise basis and initial emplacement of waste in at least the first repository should be planned to proceed on a technically conservative basis and permit retrievability of the waste for some initial period of time. Further definition of the retrievability concept, the circumstances in which waste would be retrieved and the technical aspects (including development of waste packaging, containers and handling, is necessary.

- Interim storage of spent fuel is required during the period of time before disposal facilities are available and will reduce the heat burden for disposal. To the maximum extent possible, utilities should keep their spent fuel at reactors until a repository is available. However, some quantity of spent fuel will have to move to away-from-reactor storage. In order to assist in providing flexibility to the program for selecting respository sites and bringing repositories into operation, the Federal Government should provide storage capacity as needed for limited quantities of spent fuel. All costs of storage and disposal should be paid by the utilities.

- An ISF is not an essential component of a program leading to a full-scale repository. Nonetheless, if an appropriate opportunity to build an ISF on a schedule significantly prior to the opening of the first full-scale, high-level waste repository, were to exist, the opportunity should be taken. From a purely technical perspective, an appropriate opportunity implies technical readiness and the completion of an adequate site characterization program. However, other non-technical factors should also be taken into account. Some agencies believe that an adequate site characterization program must include characterization of a variety of sites, in different geologic environments and relying on diverse media. All ISF's should be licensed, since these elements will be an important step in the ultimate location and construction of repositories to acquire institutional experience and to protect public health and safety.

All IRG members agree with the above elements of the recommended interim strategic planning base for high-level waste. The elements

- do not prejudge the NEPA process

- require the Federal Government to maintain a technically conservative approach

- call for resolution of uncertainties by increasing the technical and program breadth with respect to the near-term repository characterization program

- do not preclude subsequent adoption of longer term technologies inasmuch as they call for increased R&D to develop selected alternatives

- support a step-wise approach to the development of a HLW repository, while maintaining storage capacity for managing wastes until emplacement and disposal opportunities are available.

The IRG wishes to reiterate in the strongest possible way its commitment to the careful application of the NEPA process and other step-wise decision-making processes. The concept of an Interim Strategic Planning Basis is directly designed and intended to avoid any preemption of this process before completion of all necessary environmental reviews. The IRG believes this approach to be both sound and fully compatible with NEPA requirements.

F

IRG Findings

1. The need for a Deliberate, Well Conceived and Well Managed Program

The credibility of the Federal Government's waste disposal programs and the public's willingness to believe technical or program-related statements of the Federal Government in this area are very low. This is the result of 30 years of inadequate planning and execution of waste disposal programs and will be a difficult legacy to overcome. Although the IRG found a wide spectrum of opinion on the technical aspects of nuclear waste disposal, the public and all interest groups are virtually united in stressing the difficulty and importance of institutional aspects of the problem and in insisting that government programs be more deliberate, better conceived and better managed than in the past. Among the most frequently cited requirements are:

- clear legal and management responsibility
- coordination of activities under the National Environmental Policy Act (NEPA)
- greater attention to technical understanding and acknowledgement of lack of understanding where gaps exist
- an expeditious program with clear schedule and milestones of major events
- greater coordination and cooperation between Federal agencies, particularly between DOE and USGS, between EPA and NRC and between DOE and the regulatory agencies
- better relationships between the States and Federal agencies
- adequate opportunity for states to review and either permit or deny Federal programs within their boundaries
- full public review of all aspects of the waste management program
- adequate peer review of technical aspects.

The IRG agrees that these perceptions are extremely important and has sought to put in place appropriate programs, procedures and principles of operation for dealing with each. In the following sections you will be presented with the relevant policy recommendations and implementation proposals.

2. The Linkage to the Debate over Nuclear Power

Both in its public meetings and in the unprecedented number of public comments received on its draft report the IRG found intense and deeply held feelings

about the advisability of continuing to generate radioactive wastes or of increasing the U.S. commitment to nuclear power until there is greater assurance that there can be safe storage and disposal of nuclear wastes. Many members of the public urged that the IRG explicitly endorse a linkage between the feasibility of waste disposal and the licensing of future nuclear power plants.

Others strongly expressed the view that the technical feasibility is not in question and that, therefore, only limited benefits and considerable economic risks would arise from linking reactor licensing and waste disposal issues. However, many who hold this view still emphasize that the past Federal record in this area is poor and lack of confidence in the Government's ability either to develop a scientifically sound and socially acceptable waste disposal program or to implement such a program competently or expeditiously.

Throughout its deliberations the IRG has attempted to maintain a position of neutrality.

Of course, the IRG recognized that positive movement toward resolution of the waste disposal problem will not only deal with serious environmental issues, but also influence public perceptions concerning the acceptability of nuclear power and in that sense can be viewed as not being neutral. However, the IRG felt its task was to help resolve the nuclear waste disposal problem for its own sake. Neutrality as used by the IRG implied the views that:

- the substantial existing inventory of civilian and military nuclear waste must be managed in the safest possible way and must be subject to the same strict safety criteria applicable to newly generated wastes, despite pressures to be more lenient toward existing waste;

- the waste management problems should be planned and implemented so as to remain equally viable, whatever the course of nuclear power growth;

- the IRG should express no preference with respect to the future of nuclear power.

The IRG believes that the future of nuclear power and the relation of this energy source to other energy sources are important questions that will be debated in many forums but that the IRG should not have participated in this debate. It endeavored to act according to this belief.

The IRG also notes that the United States possesses significant quantities of existing nuclear waste, much of which derived from sources totally separate from nuclear power and that even if no new waste were generated by the nuclear power industry, a significant problem of nuclear waste disposal would still exist.

3. Interim Strategic Planning Basis

Because the choice of program strategy for the nuclear waste disposal programs, particularly those for HLW and TRU, are major Federal actions affecting the environment, the choice should not be made prior to adequate NEPA review and, therefore, should not be made now. Nonetheless, near-term waste management programs must be developed, priorities must be assigned and R&D programs must go forward prior to the completion of NEPA review. The IRG developed the concept of an Interim Strategic Planning Basis in order to avoid any preemption of the NEPA process and yet permit some interim guidance to be given to the waste programs. Many of the recommendations in this paper should be viewed not as final program decisions but rather as providing interim guidance pending NEPA review. Prior to completion of this review, Federal actions must not prejudice the final choice of strategy. The IRG believes this approach to be sound, prudent, and fully compatible with NEPA requirements.

4. Overall Technical Findings

The IRG made the following technical findings with respect to the disposal of HLW and TRU waste:

- Of six candidate disposal technologies examined, the IRG found that--

  - disposal in mined repositories (i.e., in deep geologic formations) is the furtherest advanced technology and will probably be available for earliest implementation;

  - disposal in deep ocean sediments and deep drill holes is perhaps 10-15 years away from being able to begin implementation; and

  - disposal in a mined cavity in a manner that leads to rock-melting, partitioning of reprocessing waste and transmutation of the heavy transuranics and ejection into space are even more distant.

- A systems approach should be used to select the geologic environment, repository site, and waste form. A systems approach recognizes that, over thousands of years, the fate or radionuclides in a repository will be determined by the natural geologic environment, by the physical and chemical properties of the medium chosen for waste emplacement, by the waste form itself and other engineered barriers. If carefully selected, these factors can and should provide multiple, and to some extent independent, natural and engineered barriers to the release of radionuclides to the bioshpere.

- Present scientific and technological knowledge is adequate to identify potential repository sites for future investigation. No scientific or technical reason is known that would prevent identifying a site that is suitable for a repository provided that the systems view is

utilized rigorously in evaluating the suitability of sites and designs, and in minimizing the influence of future human activities. A suitable site is one at which a repository would meet predetermined criteria and which would provide a high degree of assurance that radioactive waste can be successfully isolated from the biosphere for periods of thousands of years. For periods beyond a few thousand years, our capability to assess the performance of the repository diminishes and the degree of assurance is therefore reduced. The feasibility of safely disposing of radioactive wastes in mined repositories can only be assessed on the basis of specific investigations at and determinations of suitability of particular sites. Information obtained at each successive step of site selection and repository development will permit reevaluation of risks, uncertainties, and the ability of the site and repository to meet regulatory standards. Such reevaluations would lead either to abandonment of the site or a decision to proceed to the next step. Reliance on conservative engineering practices and multiple independent barriers can reduce some risks and compensate for some uncertainties. However, even at the time of decommissioning some uncertainty about repository performance will still exist. Thus, in addition to technical evaluation, a societal judgment that considers that level of risk and the associated uncertainty will be necessary.

- CEQ, while agreeing with the above technical finding, has expressed a concern that insufficient attention is given in the IRG Final Report to significant gaps and uncertainties in our current technical understanding. The scientific feasibility of the mined repository concept remains to be established. CEQ believes the preferred approach to long-term nuclear waste disposal may prove difficult to implement in practice and may involve residual risks for future generations which may be significant.

- Detailed studies of specific, potential repository sites in different geologic environments should begin immediately. Generic studies of geologic media or risk assessment analyses of hypothetical sites, while useful for site selection, are not sufficient for some aspects of respository design or for site suitability determination. Detailed, time-consuming, site-specific investigations are needed to determine the suitability of a particular site. The need to obtain access to specific potential repository sites is therefore urgent to assure the timely development of the first repository and, subsequently, a series of repositories. Although most is known about the engineering aspects of a repository in salt, on purely technical grounds no particular geologic environment is an obvious preferred choice at this time. The system view implies that geologic environments and media heretofore not examined may be suitable for repository sites.

- The actinide activity in TRU wastes and HLW suggest that both waste types present problems of comparable magnitude for the very long term (i.e., greater than a thousand years). Although TRU does not generate a significant amount of heat, and has lower levels of

penetrating radiation and transuranics per unit of weight than HLW, the transuranic content of a TRU waste repository could be significant. Therefore, the waste form and the leach rate, groundwater flow rate, and retardation factors used in selecting TRU waste repositories should be considered as carefully as when choosing HLW repository sites and design.

- The degree of long-term isolation provided by a repository, viewed as a system, and the effects of changes in repository design, geology, climate, and human activities on the public health and safety can only be assessed through analytical modeling. Although work is needed to assure that all potential release mechanisms are considered, to improve modeling of groundwater flow through fractured media, and to evaluate or remove other uncertainties, bounding calculations can ben performed in most instances so as to place reasonable limits on the expected behavior of a repository.

- The effects of future human activity must be evaluated more carefully. Relatively little attention has been devoted to the effects of future human activity on the repository or its hydrogeologic environment, or to the means available to the present generation for influencing such effects. Because it is not possible to predict or to restrict the activities of future generations, site selection guidelines, site suitability criteria, and repository design criteria must be developed in such a way as to minimize potentially deleterious effects of human activities.

- Reprocessing is not required to assure safe disposal of commercial spent fuel in appropriately chosen geologic environments. Major gaps exist in current knowledge of the chemical interactions of spent fuel, its cladding and containers with salt or any other candidate repository host rock. Such questions are now receiving intensive study but at least several more years of work will be required before the chemical interactions are well-understood and characterized. Because of the special chemical features of spent fuel, there may be greater difficulty in finding an appropriate host rock and environment for spent fuel disposal. However, we know of no technical reason why this should not be possible.

With respect to low level waste, the IRG found that shallow land burial sites have not always been chosen with sufficient care and that siting of LLW disposal facilities should give much more attention to the hydrologic characteristics of proposed locations than has sometimes been the case in the past. Because shallow land burial as currently practices may not be an adequate disposal method for all LLW in the future, the study of improved methods and alternative approaches should continue.

With respect to uranium mill tailings, past control has been poor and remedial action is required. Considerable R&D remains to be done before the best approach to dealing with mill tailings will be known.

The technology applicable to D&D and to the disposal of D&D waste must be determined on a site-specific basis. Little experience has yet been acquired. R&D and operating experience are both required.

5. Approach to HLW and TRU Repositories

Safe disposal of HLW or TRU waste in a mined repository places unprecedented demands on the earth sciences and on our capability for long-term prediction and risk assessment. The IRG concludes that the approach to permanent disposal in mined repositories should proceed on a step-wise basis and in a technically conservative manner. This implies:

- a diversified site characterization program to hedge against findings of unsuitability of particular sites or host rock types;
- reliance on extensive laboratory and in-situ R&D testing before a repository site is chosen;
- initial operation of a repository should proceed in a technically conservative manner, i.e. margins of safety should be included in such design and construction features as heat loading, and rates of emplacement; and
- a repository should be designed to permit retrievability and adequate monitoring of emplaced waste for an initial period of time.

An intermediate scale facility (ISF)* would be a small, licensed facility for geologic disposal in which several hundreds (up to 1000) spent fuel assemblies or HLW canisters would be emplaced with the intention of disposal. Valuable technical, institutional, procedural and organizational learning and experience could be gained from such a facility if it proceeded on a schedule significantly faster than the first HLW repository. Exercising the licensing process for an ISF would be extremely useful for the later licensing proceeding for the first HLW repository. Although an ISF is not an essential component of a program leading to a full-scale repository, if an appropriate opportunity to build an ISF on a schedule significantly in advance of the opening of the first full-scale high level waste repository were to exist, the opportunity should be taken. From a purely technical perspective, an appropriate opportunity implies technical readiness and the completion of an adequate site characterization program. However, other non-technical factors should also be taken into account. Agencies differ on ways this might be implemented and the meaning of an adequate site characterization program. An ISF could be built either as a separate facility or be colocated with a dedicated TRU repository, if one is constructed. An ISF could presumably be expanded at a later date into a full-scale high level waste repository. Such a decision would require additional NEPA review and subsequent NRC licensing and, in any event would not be taken before other qualified sites were available to provide a basis for choice.

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* An ISF has sometimes been called a "demonstration" of waste disposal, but the IRG considers that term to be inaccurate and misleading because actual demonstration of containment over periods of thousands of years is not really possible.

As noted above, examination of potential repository sites should proceed immediately. However, site-specific investigation requires access to potential sites and gaining access from States, even to perform characterization work only, has become a major barrier to progress. The IRG found that one significant consideration in the States' reluctance to permit site evaluation to proceed is an unwillingness perhaps to provide the country's only repository, the nuclear garbage dump of the nation. The IRG believes a commitment to build several repositories sited on a regional basis insofar as technical considerations permit would help reduce the opposition to site evaluation studies that DOE now encounters. Therefore, although one repository could conceivably accommodate all civilian and defense HLW generated through the end of this century, even assuming an expanded nuclear power industry, the IRG believes building two or three repositories sited regionally, would be a preferable approach.

Considerable concern was expressed in public comments about this regional siting concept. Some commentors felt the concept was unworkable for technical or political reasons. Others were concerned that an insufficient and less rigorous determination of technical suitability might result.

The IRG believes that the concept is politically workable and sees no technical impediment. There is some risk that, in applying the regional approach, organizational and political commitments might develop to particular regions or locations to such an extent that less than full attention might be given to safety, environmental and security considerations. The IRG believes, however, that this risk is small and will be adequately guarded against by the existence of environemtnal and licensing criteria established by EPA and NRC and by the required NEPA review. In all cases geologic, hydrologic, tectonic and other technical characteristics of sites must remain the primary basis for site selection. For this reason the IRG's recommendation of a regional siting strategy is purposely and importantly qualified by "insofar as technical considerations permit."

States are also concerned that once a site is identified for evaluation, it is automatically assumed to be an actual repository site. They, therefore, want an opportunity to participate in the site selection process from the beginning. The IRG believes that a more broadly based program for site characterization which involves the States at every stage in the long term planning and design of a system of repositories will enhance the likelihood of socio-political as well as technical success.

6. Transportation

The IRG has found that the following significant problems exist with the nuclear waste transportation system:

- Significant public and therefore State concern exists about transportation safety despite a generally excellent performance record to date and about liability considerations.

- Local communities are placing restrictions on nuclear transportation through their jurisdications, thereby interfering with interstate commerce.

- Common carriers (particularly railroads) also have significant safety and pricing concerns.

- There is need of an expanded capability for spent fuel transportation by the time the first government AFR is available (approximately 1983).

- Substantially increased resources and management support for the vital responsibilities at DOT are needed.

- Private industry is expected to be capable of meeting the need for waste transportation services once DOE has established a firm implementation program for present fuel storage and nuclear waste management.

7. Institutional Issues

The IRG would reiterate its previously articulated view that the resolution of institutional issues, required to permit the orderly development and effective implementation of a nuclear waste management program is equally important as the resolution of outstanding technical issues and problems and would add that the resolution of institutional issues may well be more difficult than finding solutions to remaining technical problems.

The IRG did attempt to deal with important institutional issues, including resource and logistical questions. In particular, many aspects of implementing specific IRG recommendations must be dealt with on a site-specific or facility-specific basis and therefore were not amenable to being addressed at the level of policy generality to which the IRG felt its task appropriately confined it. Moreover, the resource and logistical issues highlighted in the following paragraph were not examined sufficiently. However, the IRG did attempt to deal directly with the most important institutional issues and to set forth a conceptual framework for dialogue on such matters with various interested parties. Solutions to institutional problems cannot be developed quickly. Substantial time and effort will be required to explore alternative approaches in appropriate depth, which was beyond the capability of the IRG within the time frame of this review.

Significant institutional difficulties are involved in: marshalling the resources and programs capable of accurately detailing site suitability criteria and establishment of standards; thoroughly investigating possible sites; accurately assessing site characteristics in light of the technical criteria; carrying out credible analyses of the risks; obtaining agreement on site selection; getting the facility approved and licensed; providing for careful construction and operation of the repository (including safe

transportation and handling of the wastes); mitigating accidents and responding to repository failure if that occurs; and providing adequate, long-term monitoring. The level of difficulty of all these problems could increase with the size of the nuclear waste inventory and its rate of growth. Institutions that can cope on a small scale may fail as the demands placed on them multiply. The IRG believes that a more detailed analysis of logistical and other institutional problems which would arise out of attempting to manage wastes on the scale required should be undertaken.

G

IRG RECOMMENDATIONS

This section presents IRG policy recommendations addressing the following topics:

1. Objectives for waste management planning and implementation.

2. Federal/State relationships in planning and executing a waste disposal system.

3. Coordination of interagency waste management programs.

4. Regulatory agencies' activities.

5. Special issues in Defense waste.

6. Financing.

7. Low level waste.

8. Decontamination and Decommissioning.

9. International cooperation in R&D.

These policy recommendations have the support of all IRG members. and are provided for your information. While most of these recommendations were presented in the Presidential Decision Memorandum, additional detail is provided here.

1. Objectives

The IRG recommends that the primary objective of waste management planning and implementation be that:

- Existing and future nuclear waste from military and civilian activities (including discarded spent fuel from the once-through nuclear fuel cycle) should be isolated from the biosphere and pose no significant threat to public health and safety.

Of the sub-objectives stated by the IRG, the following are most important:

- The selected technical approaches must meet all of the relevant radiological protection criteria as well as any other applicable regulatory requrements; although zero release of radionuclides cannot be attained any potential release of radionuclides should be within pre-established standards and, beyond that, be reduced to the lowest level practicable.

- The paramount consideration must be the public health and safety. The program should explicitly include consideration of all aspects of the waste management system including safety, environmental, organizational, and institutional factors.

- The responsibility for establishing a waste management program shall not be deferred to future generations. Moreover, the waste disposal system should not depend on the long-term stability or operation of social or governmental institutions for the security of waste isolation after disposal.

- The capability to deal with a wide range of alternative situations in the future must exist. The basic elements of the program should be independent of the size of the nuclear industry and of the resolution of specific fuel-cycle or reactor-design issues of the nuclear power industry.

2. Federal/State Relationships

There are several members of Congress and State representatives who believe that legislation to empower States to veto DOE waste management decisions within their or perhaps any State should be enacted. This view is a product of a number of factors, including the belief that wastes should not be disposed of in particular States and dissatisfaction with DOE's historical approach in dealing with State participation in the site identification and characterization process. The IRG does not believe that prior approaches to Federal/State relations have been practical and constructive or that provisions of State-veto by itself will necessarily result in constructive participation by the States in the development and implementation of the waste management program. However, the IRG firmly believes that the technical and socio-political

success of any Federal waste management program will largely depend on effective State participation in the process. This should begin well in advance of the licensing and regulatory processes with participation in DOE program planning for waste management activities and the development of R&D and the site identification and characterization programs.

In order to achieve, over time, a more constructive relationship between the Federal Government and the States, the IRG recommends the following approach:

Consultation and Concurrence - Federal dealings with individual states should be characterized by "consultation and concurrence." This concept implies an ongoing dialogue, participation and the development of a cooperative relationship between States and all relevant Federal agencies during program planning and the site identification and characterization programs, through the identification of specific sites, the joint decision on facility, any subsequent licensing process, and through the entire period of operation and ultimate decommissioning. Under this approach the State effectively has a continuing ability to participate in activities at all points throughout the course of the activity and, if it deems appropriate, to prevent the continuance of Federal activities. The IRG believes that such an approach will lead to better protection of the States' interests than would a system of State veto by which is usually meant that a State approves or disapproves of Federal activities at one specific moment as well as ensure effective State participation in the Federal Government's Waste Management program. Such an approach will also lead to freer access to areas for the conduct of geologic investigations.

The IRG believes that legislation to implement the consultation and concurrence concept would be helpful but extremely difficult to draft in a way that does so with sufficient flexibility to take account of the needs of the individual States and the Federal Government. The IRG believes that the help of the State Planning Council and appropriate committees of the Congress could be sought in drafting appropriate implementing legislation.

Regional Siting - As explained above, regional siting of respositories and other nuclear waste facilities is expected to reduce the opposition by States to DOE's efforts to examine the technical suitability of potential repository locations and to final siting of a repository. The same approach would be used for low level waste burial sites.

State Planning Council - A State Planning Council, comprised of elected officials appointed by the President and policy level representatives of the President, was proposed by the National Governors Association as a mechanism to facilitate the Federal/State relationships. It would report to the President, the Secretary of Energy the Congress. The functions of the Council, whose budget would be provided by DOE, would include:

- providing State perspectives
- preparing annual report on activities and containing recommendations
- advising on the implementation of the consultation and concurrence concept
- advising on regional siting and reviewing and making recommendations on the siting process and siting decisions
- participating in the development of the waste management plan, the site characterization program and other waste management planning activities
- defining additional State roles in the Federal Government's waste management program including addressing State organizational and other institutional questions.

Special Assistant - A special assistant or liaison to the President will be named, on a temporary basis. He will consult over the next three months with local, State and Federal officials, the SPC and Congress. The objective would be to (1) assist these officials in their interaction, reflecting the President's viewpoint and (2) give special attention to fast-breaking legislative issues arising either from State or Congressional actions and including possible legislative definitions of a consultation and concurrence process emerging prior to the SPC coming into full operation.

Participation in NEPA and regulatory review - States should actively participate in all stages of standards development, NEPA review and the regulatory process. Federal technical and financial help should be available to States to help them ensure that the regulatory and NEPA processes are carried out fully.

3. Coordination of Interagency Waste Management Programs

A number of agencies have an immediate role in the nuclear waste management programs. These include: DOE, (lead agency for non-regulatory waste programs); DOI (geologic site investigation and possible withdrawal of public lands); DOT (transportation of nuclear wastes); Department of State (international waste management issues); EPA and NRC (standards, regulatory review and licensing); and OMB, OSTP and CEQ (budgetary, technical and environmental review). The IRG has made a number of waste management implementation recommendations, see Tab G in the notebook, for these agencies--many of which will require increased interagency coordination.

The IRG recommends maintaining DOE as the Federal lead agency for waste management programs, with overall responsibility for developing, planning, integrating and implementing the non-regulatory waste management programs and for interfacing with the regulatory programs. The question of where the responsibilities for planning and managing non-regulatory aspects of the waste program should be lodged has attracted considerable attention. The DOE inherited these responsibilities from ERDA and the AEC and is burdened by the adverse reaction to past errors. Some Congressional and

environmental group interest exists to establish a new, independent waste management authority. The IRG considered three alternative approaches:

- Using ad hoc or formal interagency committees for program management.
- Maintaining primary responsibility in DOE.
- Creating a new, independent authority.

The first approach would be cumbersome as an ongoing management method and would lack a programmatic focal point. The third program approach would delay actions that should be taken immediately while the new authority was created, organized and got underway. However, it would satisfy those who do not believe that the DOE will be able to carry out a careful and safe waste management program. The second approach would provide a focal point and avoid disruptive structural changes. It would also maintain the appropriate perspective of waste management in relation to other energy production and energy-related environmental issues.

Thus, the IRG recommends that DOE remain the lead agency. The IRG believes that over time DOE can gain public confidence in its ability to conduct a careful and responsible waste management program in an open manner.

However, because of the scope of the IRG implementation recommendations, the need for increased interagency coordination (e.g. between EPA and NRC) and the widely perceived need for additional waste management policy oversight outside of DOE, there is a need to develop an overall framework for interagency coordination to assist DOE in its lead agency responsibilities, and to assure that IRG recommendations are integrated and implemented. While this overall framework is largely undeveloped at present, the IRG recommends that it have the following features:

- A comprehensive nuclear waste management plan for each type of radioactive waste. This would include multi-year plans for programs, budgets and regulatory review, with biannual updates. These plans would be coordinated among the agencies with waste management responsibilities, and would incorporate comments from the public and the State Planning Council.
- Appointment of a working committee to assist in the coordination and implementation of IRG waste management recommendations among the various agencies. The IRG recommends that this committee be chaired by a DOE official and be composed of working level Federal agency representatives. This working committee would help ensure that overall existing Administration waste management policy is carried out, but would not formulate new policy in its own right, or have program management responsibilities. It would facilitate interagency communciation and coordination (both on technical and non-technical matters), and ensure that established guidelines, procedures and timetables are met. Agency representatives would advise their agency heads periodically on the status of this activity.

- Even with the above measures, each agency must bear the primary responsibility for executing its waste management responsibilities and for coordinating with the other agencies, as appropriate.

- OMB staff will conduct management and programmatic reviews of nuclear waste programs and the integration of these programs across the Federal agencies involved. This would be done in the context of the normal budget cycle, and would assess the need for additional programmatic, management and implemented recommendations.

- Other IRG recommendations would also put in place new oversight mechanisms such as:

  - joint participation of State and local governments
  - increased broad scientific and public participation
  - systematic review of major program documents by the EOP.

  These new mechanisms would augment existing EOP review, and Congressional review and legislative oversight. These new mechanisms should deflect some criticism of DOE's remaining the lead agency.

4. Regulatory Agencies' Activities

Criteria and standards for waste management must be and are being developed by EPA, NRC and DOE. Using its authority derived from the former Federal Radiation Council, EPA is responsible for promulgating general criteria applicable to all waste management activities. These were issued in draft form for public comment in November 1978. When revised, these will be sent by EPA to you for your review and concurrence. A process to give you the benefit of other agencies' comments on the proposed criteria is being worked out.

EPA also establishes numerical standards for each type of waste which, when available will be implemented by NRC through its licensing authority and by DOE for unlicensed activities. Ideally, these numerical standards should be available before NRC engages in licensing or DOE conducts disposal activities. In many cases, however, NRC has been or will be called upon to license and DOE has taken or wishes to take action to dispose of waste before EPA standards are available. In such cases, NRC or DOE uses its own standards when these are available. This is an undesirable, but in view of the IRG, acceptable situation.

During the IRG process, EPA agreed to accelerate its standard-setting schedule. Public comment was still critical of this accelerated schedule, which does not call for all standards to be available until 1985. EPA has since agreed to work with NRC to make their regulatory calendars more responsive to the Nation's needs. In addition, the IRG recommends that EPA, in consultation with DOE and NRC, prepare a position paper by mid-1979 that sets forth:

- written guidance in advance of issuance of EPA standards, indicating EPA's final proposed approach in developing specific standards for various classes of waste.

- discussion of the relationship between EPA standards and standards set by DOE and NRC.

- upper limits of risk associated with radioactive waste.

- discussion of the relationship between man-made radioactive waste and naturally occurring radiation.

In response to public comment, the IRG examined the current statutory authorities and regulatory overlap among the three relevant regulatory agencies, EPA, NRC and DOT. It found that:

° The division of authority andy day-to-day working relationship between DOE and NRC has been quite acceptable. A new Memorandum of Understanding between them has been nearly completed and will address any remaining difficulties.

° The division of labor between EPA and NRC seems appropriate.

° There is need to address whether it is practicable and sound for EPA to issue general guidance or set generally applicable environmental standards derived from health effects and not specific technology capabilities. The IRG has asked the Interagency Task Force on Ionizing Radiation to consider and advise on this question.

° Existing problems between EPA and NRC in the nuclear waste area should be worked out in a Memorandum of Understanding between the two agencies that addresses

  - the division of responsibilties

  - methodologies for standard setting

  - procedures for standard setting and for sending draft criteria issued under EPA's FRC authority to the President

  - acceleration of regulatory calendars

  - optimum approach for EPA to exercise its authorities with respect to nuclear waste under the Clean Air Act and the Marine Protection, Research and Sanctuaries Act.

5. Special Issues of Defense Waste

It is recommended that, as a first step toward expediting the disposal of existing defense waste, DOE accelerate its R&D activities oriented toward improving immobilization and waste forms and review its current immobilization programs in the light of the latest views of the scientific and technical community. This activity was initiated in the FY 1980 budget and will continued in future years. Since final processing of defense waste has been deferred for three decades, remedial action, including immobilization of the waste, should begin as soon as practicable. If any action were taken in the future to begin constructing an immobilization facility before a repository site is chosen, this facility should be designed to permit flexibility in the ultimate choice of waste form to assure an appropriate degree of compatibility between the waste form and the disposal host rock. These actions should be identified as an important priority of this Administration's nuclear waste program.

6. Financing

The IRG recommends adoption of the general principle that the costs of nuclear waste disposal should be paid by the generator and borne by the beneficiary of the activity generating the waste. This principle is partially in effect now for low level waste disposal, mill tailings management and D&D. It must be implemented for the high level wastes of the nuclear power industry. The recently submitted spent fuel legislation will implement this principle for spent fuel for which title is transferred to the government. Further implementation will require additional action. The objectives should be to minimize transfers between taxpayers and rate payers and to maximize the availability to the Government of front-end financing.

The IRG recommends establishment of a trust fund under DOE management for holding advanced payments for disposal services and for financing of the R&D disposal costs. Enabling legislation to create this trust fund, integrate the trust fund proposed in the spent fuel legislation and to complete implementation of the financing principle with respect to spent fuel will be submitted.

7. Low Level Waste

With respect to shallow land burial disposal of LLW, national planning that assures an adequate number of sites, regionally located and available when needed, is not occurring. The IRG recommends that DOE assume responsibility for developing and coordinating the needed national plan for LLW with active participation and advice from other concerned Federal agencies and input from individaul States, the State Planning Council, the general public, and industry.

The IRG further recommends that States be provided the option to retain management control of existing commercial LLW sites or to transfer such control to the Federal Government. Legislation will be required to accomplish this. Future sites could be developed either by the individual States or by the Federal Government within the agreed upon framework of the overall LLW siting plan. The philosophy of consultation and concurrence and the concept of regionality should apply to siting of LLW disposal facilities. These recommendations received wide endorsement in the public comment on the Draft IRG Report.

The IRG feels that one component of the Trust Fund, discussed above, with separate accounting from the high level waste component, should be used for providing for care of Federally owned LLW sites.

Although the IRG did not undertake a detailed technical evaluation of current LLW disposal sites and practices or of various available and anticipated alternatives, some technical recommendations were nonetheless made:

- In the future, siting of LLW disposal facilities should give much greater attention to the hydrologic characteristics of proposed locations than has sometimes been the case in the past. The NRC and DOE should take appropriate action to ensure that this occurs.

- NRC should consider requiring the submission of a plan for monitoring as a prerequisite for future licensing of LLW burial grounds. Monitoring may be desirable and/or necessary for several decades or more.

- By 1981, DOE and NRC should review existing and alternative LLW disposal techniques and determine whether any should be adopted in the near future.

- DOE's existing land burial technology program, designed to upgrade all DOE LLW operations by 1987, should continue.

8. Decontamination and Decommissioning (D&D)

Unrestricted use of land should be the objective of D&D and institutional controls should not be relied upon after some period of time to provide long-term protection of people and the environment. However, because certain existing sites and/or facilities cannot be decontaminated at a reasonable cost, or perhaps at any cost, long-term institutional control may be required in these exceptional cases. Site specific programs and enabling legislation are required.

DOE should prepare a nationwide plan for the D&D or surplus facilities owned by DOE and other Government agencies and should consider ways to design and construct any new facilities in a manner that will facilitate D&D.

For new nuclear facilities D&D specifications must be included in the initial design and institutional arrangements must be made to ensure sufficient funding. Responsibility and methods for financing D&D of licensed facilities will be determined by NRC. The funding of D&D of government-owned facilities and sites will be through Federal appropriations. The estimated cost of D&D should be included in the total estimated project costs for new government facilities at the time of authorization.

9. International Cooperation in R&D

In the past, the U.S. Government, through DOE, NRC and USGS, has participated in numerous bilateral and multilateral nuclear waste management R&D efforts. Because some R&D in this area borders closely on reprocessing technology and, therefore, on technology transfer restraints derived from our non-proliferation policy, new guidelines to guide such cooperation are needed. The IRG recommends the following three principles:

- Any integral part of a spent fuel reprocessing system or any technology that directly supports the separation of uranium and plutonium should be treated as a reprocessing technology and handled consistent with U.S. policy. Exceptions might be made for studies of alternatives to reprocessing, if the policy-level judgment is that the overall benefits outweigh the drawbacks.

- Existing international cooperative efforts focusing on waste management not directly coupled to reprocessing but involving separated waste should be continued. New cooperative efforts in this area should be reviewed on a case-by-case basis.

- International cooperation on studies of waste management technologies that apply to spent fuel storage or apply equally to the disposal of spent fuel and separate waste, should be encouraged. Such studies would include spent fuel storage technology, geologic examinations, risk assessment, and transportation.

H

IMPLEMENTING DIRECTIONS TO AGENCIES

This appendix summarizes the directions (or in the case of NRC the recommendations) to be issued by the President to Federal agencies to implement the IRG's recommendations. Any changes that the President makes in the recommended policies would lead to appropriate changes in these directions. In instances where the President is being asked to choose between alternative recommendations, alternative implementing directions are presented here.

DEPARTMENT OF ENERGY

Planning and Management Responsibilities

1. Assume primary responsibility for planning, integrating and implementing the overall nonregulatory Federal nuclear waste management and disposal programs and for relationships with the regulatory agencies. In so doing, work with other involved agencies, particularly the Departments of Interior and State.

2. Establish an interagency working committee, chaired by a DOE official, and composed of working level officials of other agencies to help ensure that overall waste management policy is carried out but not to formulate new policy or have program management responsibilities. The committee's functions would include:

   - facilitate interagency communication and coordination and technical and nontechnical matters; and

   - ensure that established guidelines, procedures and timetables are met.

   Agency representatives would advise their agency heads on the status of waste program activities.

3. In dealing with regulatory agencies adopt the following principles in order to ensure the independence and integrity of the regulatory process:

   - The work plans developed by both regulatory and nonregulatory agencies should be analyzed to determine inconsistencies.

   - Discussions with appropriate agencies should be initiated when problems exist in the timing and scope of products;

   - Work plans should be adjusted when it is convenient and acceptable to all interested parties; and

   - When accomodation is not possible all interested agencies would take the issue to the President jointly.

4. Prepare by 1981 and update biannually thereafter, a comprehensive and integrated nuclear waste management plan. Submit this plan in draft form for public review and in revised form and with a summary of public comment to the Executive Office. The plan should include:

   - updated summaries of the status of knowledge relevant to disposal of high level and transuranic waste by means of various technical options and of low level radioactive wastes and uranium mill tailings.

   - updated multi-year program plant for interim management, the repository site qualification program and R&D in the earth sciences and waste form and containers for high level waste and TRU waste disposal.

   - updated national plan for low level waste.

   - updated plan for decontamination and decommissioning of government facilities.

   - updated plan for remedial action at inactive mill tailings sites.

   - an integrated NEPA plan.

   - revised work plans for each waste type.

   - updated cost estimates.

5. Within six months prepare a Memorandum of Understanding with DOI delineating areas of cooperation and mutual responsibility and creating procedures to ensure that the two Departments work jointly of reinforce each other in waste management activities. This Memornadum of Understanding should cover:

   - procedures for banking of potential repository sites on public land;

   - procedures for collaboration on the summaries of the status of knowledge relevant to disposal of high level and transuranic wastes, low level waste and uranium mill tailings;

   - procedures for collaboration on the site qualification and earth sciences components of the multi-year program plan;

   - including mechanisms for transfer of funds as appropriate;

   - procedures for DOI to assist and advise DOE in the conduct of studies relevant to rock mechanics of repositories in reviewing repository designs and in monitoring repository construction activities;

   - implementation of consultation and concurrence in relations with States and liaison with the State Planning Council;

- continuation of the ongoing relationship in the area of low level waste R&D and site monitoring;

- NEPA implementation planning; and

- other relevant matters, as mutually agreed.

Objectives

6. Adopt as the primary objective of waste management planning and implementation:

   "Existing and future nuclear waste from military and civilian activites (including descarded spend fuel from the once-through nuclear fuel cycle) should be isolated from the biosphere and pose no significant threat to public health and safety."

7. Adopt the following sub-objectives for the waste management program:

Technical Objectives

- The selected technical option must meet all of the relevant radiological protection criteria as well as any other applicable regulatory requirements; although zero release of radionuclides cannot be assured, any potential releases should be within preestablished standards and, beyond that, be reduced to the lowest level practicable.

- The technology selected for waste disposal, as well as the reasons for its selection, must be well understood, clearly articulated, and widely accepted.

- The existence of residual technical uncertainties must be recognized and provided for in the program structure.

Objectives Related to Implementation

- The paramount consideration must be the public health and safety. The program should explicitly include consideration of all aspects of the waste management system including safety, environmental, organizational, and institutional factors.

- The responsibility for establishing a waste management program shall not be deferred to future generations. Moreover, the system should not depend on the long-term stability of operation of social or governmental institutions for the security of waste isolation after disposal.

- The capability to deal with a wide range of alternative situations in the future must exist. The basic elements of the program should be independent of the size of the nuclear industry and of the resolution of specific fuel-cycle or reactor-design issues of the nuclear power industry.

- Appropriate cost of storage and disposal of any waste generated in the private sector should be paid for by the generator and borne by the beneficiary.

- Concerns for security and safeguards should be reflected in the program and system design.

- Budgetary and cost considerations, while important, should not dominate the design of the program or system.

High Level and Transuranic Waste Programs

8. Adopt the following interim strategic planning basis for the high level and transuranic waste disposal programs, pending NEPA review:

   - The approach to permanent disposal of nuclear waste should proceed on a stepwise basis in a technically conservative manner.

   - Near-term program activities should be predicated in the tentative assumption made for interim planning purposes that the first disposal facilities will be mined repositories. The nearer term alternative approaches (i.e., deep ocean sediments and very deep holes) should be given funding support so that they may be adequately evaluated as potential competitors. Funding of other concepts should allow some feasibility and preliminary design work to proceed. Once the NEPA process has been completed, program activities can be tailored accordingly.

   - Near-term R&D and site characterization programs should be designed so that at the earliest date feasible, sites selected for location of a repository can be chosen from among a set with a variety of potential host rock and geohydrological characteristics. To accomplish this, R&D on several potential emplacement media and site characterization work on a variety of geologic environments should be promptly increased.

   - A number of potential sites in a variety of geologic environments should be identified and early action should be taken to reserve the option to use them if needed at an appropriate time. In order to avoid working toward and ultimately having a single national repository, near-term options should create the option to have at least two (and possibly three) repositories become operational within this century, ideally and insofar as technical considerations permit, in different regions of the country. In pursuing

a regional approach to siting, geologic, hydrologic, tectonic and other technical characteristics of sites and safety considerations must remain the primary basis for selection.

- Construction and operation of a repository should proceed on a stepwise basis and initial emplacement of waste in at least the first repository should be planned to proceed on a technically conservative basis and permit retrievability of the waste for some initial period of time. Further definition of the retrievability concept, the circumstances in which waste would be retrieved and the technical aspects (including development of waste packaging, containers and handling) is necessary.

- Interim storage of spent fuel is required during the period of time before disposal facilities are available and will reduce the heat burden for disposal. To the maximum extent possible utilities should keep their spent fuel at reactors until a repository is available. However, some quantity of spent fuel will have to move to away-from-reactor storage. In order to assist in providing flexibility to the program for selecting repository sites and bringing repositories into operation, the Federal Government should provide storage capacity as needed for limited quantities of spent fuel. All costs of storage and disposal should be paid by the utilities.

- An ISF is not an essential component of a program leading to full-scale repository. Nonetheless, if an appropriate opportunity to build an ISF on a schedule significantly in advance of the opening of the first full-scale, high-level waste repository were to exist, the opportunity should be taken. From a purely technical perspective, an appropriate opportunity implies technical readiness and the completion of an adequate site characterization program. However, other nontechnical factors should also be taken into account. All ISF's should be licensed, since these elements will be an important step in the ultimate location and construction of repositories to acquire institutional experience and to protect public health and safety.

- Continue the reorientation of the waste management program to be consistent with this interim strategic planning basis. In particular, continue to broaden the site investigation program to permit repository sites to be chosen from among a set with a variety of host rock and hydrogeologic characteristics.

9. With respect to the point at which consideration should first be given to the choice of a site for the first repository for high level waste, proceed, pending NEPA review, on the following assumption made for interim strategic planning purposes: (the choice here depends on the outcome of of Issue #1).

- After 2-3 sites with different geological environments and diverse media have been qualified, a decision would be made either: (1) to propose one or more of the sites as repository locations to NRC or (2) to determine that further sites should be qualified prior to such a decision. (Option #1)

- After 4-6 sites with different geological environments and diverse media have been qualified, a decision would be made either: (1) to propose one or more of the sites as repository locations to NRC or (2) to determine that further sites should be qualified prior to such a decision. (Option #2)

- After the completion in 1981 of the comprehensive waste management plan which would be developed with state participation and would detail processes for decision-making, the schedule for a site comparison leading to a site submission to NRC would be determined. Announcement would be made now of this process and how it would be used to determine the schedule for selection of the first repository site. (Option #3)

10. With respect to planning for intermediate scale facilities and a dedicated TRU waste repository, proceed pending NEPA review on the following assumption made for interim strategic planning purposes: (the choice depends on the outcome of Issue #2).

    - Permit the noraml departmental decision process to proceed which would lead to submission of the present WIPP site to the NRC for the disposal of TRU, for an ISF and for HLW R&D. (Option #1)

    OR

    Proceed now with the WIPP site for TRU disposal only; defer siting of an ISF until at least 2-3 alternative sites (including the WIPP site) have been qualified. (Option #2)

    OR

    Continue to plan for a combined TRU/ISF facility, but delay site selection until 2-3 sites (including the WIPP site) are qualified. (Option #3)

    OR

    Concentrate on evaluation for an initial full scale HLW repository. Do not plan now for an ISF and plan for disposal of TRU in the HLW repository. (Option #4)

11. Following the publication of appropriate NEPA documents, the President will be asked to make the final decision on the choice of high level waste and transuranic waste strategies.

12. Prepare a multi-year program plan for the repository site qualification program and the R&D programs in earth sciences and waste form and containers relevant to high level and transuranic waste disposal. Collaborate with the Department of the Interior with respect to the site qualification and earth sciences components and consult with other agencies as necessary throughout. This plan should serve as a budgetary and program guide. It should identify proposed schedules for the work underway and contemplated and relate the schedule of R&D activities to the site qualification program to ensure that data will be available when needed to submit aproposed repository design and site to NRC for licensing. It should specify the sequence of activities and decisions leading to the creation of a system of repositories. Preparation of the first plan should begin immediately and a preliminary version is to be prepared during 1979. The plan will be updated as part of the biannual comprehensive waste management plan. This plan should be submitted in draft form for technical and public review and in revised form with a summary of comments received to the Exectuvie Office.

13. In collaboration with the Department of the Interior and consulting other agencies as necessary, update the summaries of the status of scientific and technical knowledge relevant to disposal of high level and transuranic wastes for inclusion in the comprehensive waste management plan to be issued biannually beginning in 1981. This plan should be submitted in draft form for technical and public review and in revised form with a summary of comments received to the Executive Office.

14. Seek the advice and assistance of the Department of the Interior in the conduct of studies into the fundamental properties of rock, rock structure, earth pressures, stability of underground openings, workings, shafts and seals relevant to repositories, in reviewing repository designs and in monitoring construction activities.

15. Continue to accelerate R&D activities oriented toward improving immobilization and waste forms and review current immobilization programs in the light of the latest views of the scientific and technical community.

16. Continue the policy of giving high priority to remedial action at existing defense waste management facilities and proceed with disposal actions, including immobilization as soon as practicable.

17. Accelerate environmental and technical analysis of disposal options for buried transuranic waste at all DOE sites containing such material. Reach a conclusion by mid-1982 on whether the buried material should remain in place or be exhumed and relocated for disposal.

Federal-State Relations

18. Implement the Executive Order creating the State Planning Council to advise the President, the Congress, and the Secretary of Energy.

Prepare legislation within three months that will give a legal basis for the Council. Among the tasks to be given to the State Planning Council are:

- Provide state perspectives for the development of the National Nuclear Waste Management Plan, the site characterization program and other waste activity planning and other planning documents to insure that they adequately address the needs of the states and localities;

- Prepare an annual reports to the President the Congress and the Secretary of Energy on its activities to include its recommendations concerning the government's nuclear waste disposal programs;

- Advise on the regional distribution of site characterization activities and placement of facilities for the management and disposal of nuclear wastes and review and make recommendations regarding the process of selecting, characterizing and placement of facilities for the management and disposal of nuclear wastes and review and make recommendations regarding the process for selecting, characterizing and determining the suitability of potential repository sites;

- Assist DOE and the states in recommending proposed sites for licensing by NRC to assure that the needs of the states and localities are met;

- Assist and advise on the implementation of the consultation and concurrence concept.

- Establish under its auspices such advisory committees as are deemed necessary to assist in its deliberations. Such committees should include representatives of all relevant interest groups.

- Define additional state roles in the Federal Government's waste management program including State organizational and other institutional questions.

19. Implement the concept of consultation and concurrence in all waste management programs. In doing so, solicit the views and assistance of the State Planning Council, appropriate committees of the Congress and others.

20. Implement the regionality concept in the siting of waste management facilities.

21. Develop mechanisms to ensure state participation in all stages of NEPA review within the waste management program.

Site Banking

22. Inform the Department of the Interior of site investigation plans relevant to high level and transuranic or low level waste disposal so that steps may be taken to protect potential sites from other usage.

Licensing

23. Lead an interagency review of the forthcoming NRC licensing study and prepare recommendations for the President. Prepare legislation to be submitted to Congress within three months to implement the extension of NRC licensing to all new transuranic and low level waste disposal facilities and any other facilities that may be decided for inclusion following review of the NRC's licensing study.

Low Level Waste

24. Produce a national plan for low level waste disposal, including research and development programs and mechanisms for adopting improved siting criteria. Collaborate with the Department of the Interior with respect to the component of the plan that summarizes the status of scientific and technical knowledge relevant to disposal of low level waste. Preparation of the first plan should begin immediately and a preliminary version is to be prepared during 1979. The plan will be updated as part of the biannual comprehensive waste management plan. This plan should be submitted in draft form for public and technical review and in revised form with a summary of comments received to the Executive Office.

25. By 1981, review existing and alternative low level waste disposal techniques and determine whether any should be adopted in the near future.

26. Accelerate R&D on improved methods of disposing of low level wastes.

27. In cooperation with other agencies draft legislation for submittal to Congress within six months to authorize DOE ownership and operation of low level burial sites and permit transfer of control of existing sites from States to the Federal Government.

28. Continue the existing land burial technology program presently designed to upgrade all DOE low level waste operations by 1987.

29. Take appropriate action to ensure that in the future siting of low level waste disposal facilities gives adequate attention to the hydrologic characteristics of proposed locations.

Uranium Mill Tailings

30. Initiate remedial actions at inactive uranium mill tailings sites under the Uranium Mill Tailings Radiation Control Act of 1978.

Prepare a plan of remedial actions to be taken under this Act. It collaborates with the Department of the Interior with respect to the component of the plan that summarizes the status of scientific and technical knowledge relevant to disposal of mill tailings. Preparation of the first plan should begin immediately and a preliminary version is to be prepared during 1979. The plan will be updated as part of the biannual comprehensive waste management plan. The plan should be submitted in draft form for public and technical review and in revised form with a summary of comments received to the Executive Office.

31. Expand R&D on improved methods of disposing of mill tailings.

32. Take appropriate remedial action at the DOE-owned facility at Ray Point, Texas, to protect public health in consonance with the requirements of the Uranium Mill Tailings Radiation Control Act of 1978.

Decontamination and Decommissioning

33. Produce a national plan for decontamination and decommissioning of surplus government nuclear facilities and consider ways to design and construct new facilities in a manner that will facilitate eventual D&D. The preparation of the first plan should begin immediatley and a preliminary version is to be prepared during 1979. The plan will be updated as part of the biannual comprehensive waste management plan. This plan should be submitted in draft form for public review and in revised form with a summary of public comments received to the Executive Office.

34. Implement the D&D plan and conduct whatever R&D is required to support it.

35. Following the completion of the first D&D plan, prepare legislation for submittal to Congress to establish surveillance of decommissioned facilities not releasable for unrestricted use and to permit remedial action at abandoned sites.

36. Work with the Office of Management and Budget to ensure that planning for new Federal nuclear facilities explicitly provides for D&D of such facilties and that estimated costs of D&D be included in the total estimated project cost at the time of authorization.

NEPA Implementation Plan

37. Prepare a comprehensive plan for meeting NEPA documentation requirements applicable to DOE nuclear waste management responsibilities. Incorporate needed activities of other nonregulatory agencies, including land withdrawal activities of the Department of Interior, in this plan. The first plan should be issued during 1979 for public, State Planning Council and EOP review and be undated as part of the biannual comprehensive waste management plan.

Financing

38. Consider legislative approaches to implement the principles that the costs of nuclear waste disposal should be paid by the generator and borne by the beneficiary of the activity generating the waste. The objective should be to maximize the availability to the Government of front-end financing for actions falling within Federal responsibilities.

39. Prepare legislation for submittal to Congress within three months to implement this principle and to establish a Trust Fund under DOE management for holding advanced payments for disposal services and for financing R&D and disposal costs.

Transportation

40. By March 1980, complete studies to define the need for any further physical protection measures in nuclear transportation. Submit this study in draft form for public review.

41. Take the lead in a coordinated program (with NRC and DOT) for testing and evaluating the performance of current and future generation transportation packaging systems.

42. In consultation with the Departments of State and Transportation, determine what steps need to be taken to be able to transport limited quantities of foreign spent fuel to the United States under various conditions of urgency.

    Initiate a study that will examine objectively the benefits and associated costs of special trains for transport of nuclear waste. Ensure participations of both shippers and the railroad industry in determining the scope and approach of this study.

Public Participation

44. Develop mechanisms to ensure a high level of public participation in and review of all aspects of the nuclear waste management programs.

45. Develop criteria for providing technical or financial assistance to permit informed public input to programs and decisions and for supporting nongovernment efforts to increase social and technical understanding and agreement on nuclear waste issues. The criteria should be submitted, in draft form, to OMB for approval.

46. Strengthen formal mechanisms for receiving the best scientific and technical advice available and to receive regular input from a broad cross-section of the interested public.

DEPARTMENT OF TRANSPORTATION

1. Provide increased agency resources and management attention to nuclear waste management matters under the Department's cognizance.

2. Complete a Memorandum of Understanding with the Nuclear Regulatory Commission within three months.

3. Proceed expeditiously to complete the current rulemaking on the role of Federal and local government bodies in routing of nuclear waste transportation along highways. In doing so, consider the entire range of preferences and encourage active participation by States and localities.

4. Monitor transportation of nuclear materials by rail and barge so that any problems can be foreseen and examined before they are allowed to affect adversely the transportation of nuclear wastes.

5. Foster increased State participation in the development and review of nuclear waste transportation safety policy and standards and in enforcement of standards. Workings with NRC, identify additional responsibilities to strengthen the role of States, including with respect to emergency response activities.

6. Develop mechanisms to ensure a high level of public participation in and review of all aspects of nuclear waste transportation safety policy and standards development. In this connection develop criteria for providing technical or financial assistance to permit informed public input to programs and decisions and for supporting nongovernment efforts to increase social and technical understanding and agreement on nuclear waste issues. These criteria should be submitted in draft form to OMB for approval.

7. Strengthen formal mechanisms for receiving the best scientific and technical advice available and to receive regular input from a broad cross-section of the interested public.

8. Working in cooperation with all levels of government, expand Federal assistance in the development of capabilities for handling emergencies. Take the lead for assisting States in planning and training.

9. Develop a data bank on shipment statistics and accident experience to be operational by 1982.

10. Provides support to and cooperate in every way with a transportation subgroup of the State Planning Council if one is formed.

11. Prepare a comprehensive plan for meeting NEPA documentation requirements applicable to Department of Transportation nuclear waste programs. The first plan should be issued during 1979 for public State Planning Council and EOP review and be updated biannually.

DEPARTMENT OF THE INTERIOR

1. Collaborate with DOE, consulting other agencies as necessary, to prepare the repository site qualification and the earth sciences component of the multi-year program plan. This plan should serve as a budgetary and program guide. It should identify proposed schedules for work underway and contemplated and relate the schedule of R&D activities to the site qualification program to ensure that data will be available when needed to submit a proposed repository design and site to NRC for licensing. It should specify the sequence of activities and decisions leading to the creation of a system of repositories. Preparation of the first plan should begin immediately and a preliminary version is to be produced during 1979. The plan will be updated as part of the biannual comprehensive waste management plan. These plans should be submitted in draft form for technical and public review and in revised form with a summary of comments received to the Executive Office.

2. Collaborate with DOE, consulting other agencies as necessary, in updating the summaries of the status of scientific and technical knowledge relevant to disposal of high level and transuranic wastes and in preparing such summaries for low level waste and mill tailings. Preparation of the summaries for low level waste and mill tailings plans should begin immediately and a preliminary version is to be prepared during 1979. These summaries will be updated for inclusion in the comprehensive waste management plan to be issued by DOE biannually beginning in 1981. These plans should be submitted in draft form for technical and public review and in revised form with a summary of comments received to the Executive Office.

3. As mutually agreed with DOE take the lead in implementing appropriate components of the earth sciences and repository site qualification segments of the multi-year program plan, particularly with respect to identification of regional hydrologic environments and specific sites. Conduct R&D on site investigations, characterization and evaluation methodology.

4. Assist and advise the Department of Energy in the conduct of studies into the fundamental properties of rock, rock structures, earth pressures, stability of underground workings, shafts, and seals relevant to repositories, in reviewing repository designs and in monitoring construction activities.

5. Continue to perform site-specific evaluations of the performance of DOE low level and other waste sites.

6. Provide technical support as requested to the State Planning Council and its subcommittees and advisory groups.

7. Consult with DOE in implementing the concept of consultation and concurrence and in all relationships with States in the area of waste management.

8. Coordinate with the Department of Energy as appropriate the development and preparation of comprehensive plans for meeting those NEPA documentation requirements applicable to the Department of the Interior's specific area of responsibility.

9. Create a mechanism by which areas of public land identified by DOE, USGS or States as potential repository or low level waste disposal sites can be protected from other usage.

10. Within six months prepare a Memorandum of Understanding with DOE delineating areas of cooperation and mutual responsibility and creating procedures to ensure that the two Departments work jointly or reinforce each other in waste management activities. This Memorandum of Understanding should cover:

    - procedures for banking of potential repository sites on public land;
    - procedures for collaboration on the summaries of the status of knowledge relevant to disposal of high level and transuranic wastes, low level waste and uranium mill tailings;
    - procedures for collaboration on the site qualification and earth sciences and components of the multi-year program plan;
    - cooperation in the areas of R&D and site qualification activities including mechanisms for transfer of funds as appropriate;
    - procedures for DOI to assist and advise DOE in the conduct of studies relevant to rock mechanics of repositories, in reviewing repository designs and in monitoring repository construction activities;
    - implementation of consultation and concurrence in relations with States and liaison with the State Planning Council;
    - continuation of the ongoing relationsip in the area of low level waste R&D and site monitoring;
    - NEPA implementation planning; and
    - other relevant matters, as mutually agreed.

11. Support EPA and NRC as they request in the accelerated development for regulatory standards through evaluations of technical adequacy, review of documents, and research that supports site identification and characterization, the development of risk assessment methodology and the generation of data needed for risk assessment models.

12. Work with the Department of State on matters relating to waste disposal and waste storage in U.S. trust territories.

13. Develop mechanisms to ensure a high level of public participation in and review of all aspects of the Department of the Interior's nuclear waste programs.

14. Development of criteria for providing technical or financial assistance to permit informed public input to programs and decisions for supporting nongovernment efforts to increase social and technical understanding and agreement in nuclear waste issues. These criteria should be submitted in draft form to OMB for approval.

15. Strengthen formal mechanisms for receiving the best scientific and technical advice available and to receive regular input from a broad cross-section of the interested public.

DEPARTMENT OF STATE

1. Take steps to ensure that all activities to engage in R&D cooperation with other countries in the field of nuclear waste management be guided by the following principles:

   - Any integral part of a spent fuel reprocessing system of any technology that directly supports the separation of uranium and plutonium should be treated as reprocessing technology and handled consistent with U.S. policy. Exceptions might be made for studies related to advanced reactor systems or of alternatives to reprocessing, if the policy-level judgment is that the overall benefits outweigh the drawbacks.

   - Existing international cooperative efforts focusing on waste management not directly coupled to reprocessing but involving separated waste should be continued. New cooperative efforts in this area should be reviewed on a case-by-case basis.

   - International cooperation on studies of waste management technologies that apply to spent fuel storage or apply equally to the disposal of spent fuel and separate waste, should be encouraged. Such studies would include spent fuel storage technology, geologic examinations, risk assessment, and transportation.

2. Work with the Department of the Interior on matters related to waste disposal and waste or spent fuel storage in U.S. trust territories.

ENVIRONMENTAL PROTECTION AGENCY

1. Prepare, in consultation with NRC and DOE a position paper that sets forth:

   - Written guidance indicating EPA's proposed approach in developing specific standards for various classes of waste, including:

     - the form of future radioactive waste standards
     - how new standards will relate to past EPA standards
     - applicability of such concepts as feasibility (e.g., best available technology) acceptability of risk and non-degration of the environment to waste disposal.
     - considerations other than risk for establishing standards.

   - The relationship between EPA standards and standards set by DOE and NRC.

   - A discussion of risk levels associated with radioactive waste;

   - the relationship between the hazards of man-made radioactive waste and the hazards associated with naturally occurring radiation.

This position paper should be reviewed by the affected agencies for its programmatic and budgetary implications and by the public. It should then be integrated into the interim strategic planning basis and development of long-term waste management plans.

2. Prepare a Memorandum of Understanding with NRC within three months that addresses:

   - The division of responsibilities;
   - Methodologies for standard setting;
   - Procedures for standard setting;
   - Regulatory calendars that are accelerated to be more responsive to the needs of the nation; and
   - The optimum approach for EPA to exercise its authorities with respect to nuclear waste under the Clean Air Act as amended and the Marine Protection, Research and Sanctuaries Act and actions, if any, that are necessary.

3. Prepare a comprehensive plan for meeting NEPA documentation requirements applicable to EPA nuclear waste programs. The first plan should be issued during 1979 for public, State Planning Council and EOP review and be updated biannually.

4. Develop mechanisms to ensure a high level of public participation in and review of all aspects of nuclear waste programs.

5. Develop criteria for providing technical or financial assistance to permit informed public input to programs and decisions and for supporting nongovernment efforts to increase social and technical understanding and agreement on nuclear waste issues. These criteria should be submitted in draft form to OMB for approval.

6. Strengthen formal mechanisms for receiving the best scientific and technical advice available and to receive regular input from a broad cross-section of the interested public.

TENNESSEE VALLEY AUTHORITY

1. Take appropriate remedial action at the TVA-owned facility at Edgemont, South Dakota, to protect public health in consonance with the Uranium Mill Tailings Radiation Control Act of 1978.

THE OFFICE OF MANAGEMENT AND BUDGET

1. Work with the DOE to ensure that planning for new Federal nuclear facilities explicitly provides for D&D of such facilities and that estimated costs of D&D be included in the total estimated project cost at the time of authorization.

2. In consultation with EPA, NRC and other interested Federal agencies, devise a procedure to permit review by Federal agencies of EPA's proposed criteria drafted under its FRC authority and to provide agency advice to the President with respect to accepting the proposed criteria.

COUNCIL ON ENVIRONMENTAL QUALITY

1. Review the NEPA plans of the Department of Energy, the Environmental Protection Agency, the Department of Transportation and the Nuclear Regulatory Commission to determine their adequacy and advise each Department and Agency on how to coordinate its NEPA plans and schedule most appropriately with those of other agencies.

NUCLEAR REGULATORY COMMISSION*

1. Prepare a Memorandum of Understanding with EPA within three months that addresses:

   - The division of responsibilities;
   - Methodologies for standard setting;
   - Procedures for standard setting;
   - Regulatory calendars that are accelerated to be more responsive to the needs of the nation;
   - The optimum approach for EPA to exercise its authorities with respect to nuclear waste under the Clean Air Act as amended and the Marine Protection, Research and Sanctuaries Act and actions, if any, that are necessary.

2. Complete a Memorandum of Understanding with the Department of Transportation within three months.

3. Review current programs to ensure that they are compatible with those of the DOE as it adjusts to implement the new interim strategic planning basis.

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* Since the NRC is an independent regulatory body, the President will recommend rather than direct that the listed actions be taken.

4. Following the publication of DOE's final Generic Environmental Impact Statement on the Management of Commercially Generated Radioactive Wastes and the resultant findings with respect to the strategy for high level waste disposal, and on the basis of a process that provides full opportunity for public, technical and government agency participation, the NRC should:

   - Determine whether in its opinion the findings DOE has made based on its GEIS are consistent with existing scientific and technical information; and

   - Express its view as to whether or not it currently has confidence that radioactive waste produced by nuclear power reactors can and will be disposed of safely.

   It is understood that the GEIS will not be the only basis for NRC's addressing these questions.

5. By 1981, review existing and alternative low level waste disposal techniques and determine whether any should be adopted in the near future.

6. Reconsider the period of time that licensees should be required to monitor low level burial grounds, after cessation of operations.

7. Take appropriate action to ensure that in the future siting of low level waste disposal facilities gives adequate attention to the hydrologic characteristics of proposed locations.

8. Expedite the puting in place of the regulatory framework for dealing with uranium mill tailings.

9. Review and improve as necessary current practice with respect to requirements for D&D plans and financing of licensees to guarantee that D&D is adequately considered at time of licensing.

10. Expand State participation on regulation and enforcement in the area of nuclear waste transportation. Working with DOT, identify additional responsibilities to strengthen the role of States, including with respect to emergency response activities.

11. Complete ongoing studies to help define the need for physical protection measures for nuclear waste transportation by March 1980 and any rulemaking needed by 1981.

12. Review and improve as necessary mechanisms to ensure State participation in all stages of NEPA review and regulatory activities within the waste management program.

13. Prepare a comprehensive plan for meeting NEPA documentation requirements applicable to NRC nuclear waste programs. The first plan should be issued during 1979 for public, State Planning Council and CEQ review and be updated biannually.

14. Review and improve as necessary mechanisms to ensure a high level of public participation in and review of all aspects of nuclear waste programs.

15. Investigate ways to and develop criteria for providing technical or financial assistance to permit informed public input to programs and decisions and for support of nongovernment efforts to increase social and technical understanding and agreement on nuclear waste issues.

16. Strengthen formal mechanisms for receiving the best scientific and technical advice available and to receive regular input from a broad cross-section of the interested public.

I

Legislation. The following legislative proposals will be required to implement the IRG recommendations. The expected timing of submittal to Congress of each is specified.

- Implementation of the U.S. Spent Fuel offer and clarification of NRC's authority to license interim storage and disposal of commercial spent fuel.

  - Submitted February 1979.

- Extension of NRC licensing authority to cover disposal of DOE TRU and non-defense low level waste at new sites and any other facilitites that may be decided to include following review of NRC's licensing study.

  - to be submitted within three months.

- Establish State Planning Council.

  - to be submitted within three months.

- Permit Federal takeover of existing low level burial sites.

  - to be submitted within six months.

- Establish surveillance of decommissioned facilities not released for unrestricted use and to permit remedial action at abandoned sites.

  - to await first DOE decontamination and decomissioning plan in 1979.

- Establish a Trust Fund for all commercial nuclear waste disposal activities (including low level and TRU wastes) and implement principle that the generator pays. This Fund would supplement or replace the Fund called for by the Administration spent fuel legislation submitted in February 1979.

  - to be submitted within three months.

J

Isolation of Radioactive Waste in Geologic Repositories: Background Technical Information

The purpose of this section is to acquaint you with some basic technical information on radioactive wastes and to outline the technical issues that are being currently addressed in evaluating the disposal of radioactive wastes in geologic repositories.

Radioactive Decay of Wastes

The greatest hazard presented by high level nuclear wastes, from the standpoint of intrinsic radioactivity, occurs during the first 1,000 years, after which time the radioactivity will have decreased by a factor of over 1,000. Figure 1 illustrates the time dependence of radioactivity of high level reprocessed wastes (e.g. Defense wastes). As can be seen, after 1,000 years, the total radioactivity of Defense wastes is lower than in the original uranium ore (or in the present mill tailings) from which it was taken.* While the concentration of radioactivity in the above waste form will still be higher than in the original uranium ore, the total radioactivity is the same (or less) as in the natural state. In the very long term, in fact, the depleted uranium from isotope separation will have the higher total level of radioactivity. Because of the presence of longer-lived isotopes in unreprocessed spent fuel, (e.g. from commercial reactors) it takes somewhat longer---10,000 years or so---before the total radioactivity in spent fuel is about the same as in the original uranium ore.

If the radioactivity in deeply buried wastes had to diffuse homogeneously through the overlying rock to reach the surface, the radioactivity would be diluted to concentrations lower than those in natural ores, particularly as the time for this to happen would generally be expected to exceed 1,000 years.

However, in order to reach the surface, the waste would be transported by ground water; thus, the most relevant concern would be the radioactivity of the water that migrated from the wastes to the ground surface as compared with radioactivity level found in ordinary drinking water. The relevant issues, then, in judging the feasibility of the mined repository concept are as follows:

- How rapidly could radioactive isotopes be leached from the waste form into solution in ground water (if any)?

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* The ingestion hazard is a measure of the volume of water (in cubic meters) required to dilute the concentration of radioactive isotopes to levels found in public drinking water. (In the case of Figure 1 the ingestion hazard is normalized to that of typical uranium ore.) The ingestion hazard should not be equated with the intrinsic hazard of wastes because different isotopes would be expected to reach the ground surface at different rates due to varying levels of interaction with minerals in the ground.

- How long would it take for such ground water to get to the surface?
- How effective would the surrounding rock and soil be in "sorbing" the radioactive isotopes (that is, in taking the isotopes out of the ground water and fixing them to minerals in the earth before the water gets to the surface)?
- Could the repository be threatened by unforeseen factors (e.g. vulcanism, breaching by future mining activity, etc.)?
- To what level of certainity can we estimate, or bound, all of the above?

We now will briefly describe the technical work that is being pursued to help resolve these issues.

The Systems Approach

In order to ensure adequate protection of public health, the systems approach is being employed, where multiple barriers to the spread of disposed wastes are envisioned. These are:

- engineered barriers, including both the waste form and the waste container.
- geological barriers, provided by the rock surrounding the wastes.

The basic objective of the engineered barriers is to protect the wastes from any ground water. Waste cannisters, or containers, would be designed to withstand corrosion by ground water and its dissolved minerals. In the case of disposal in salt, hot brine would likely be in contact with the waste cannister, and ultimately with the waste form itself, posing special design problems. In the case of reprocessed waste, the radioactive isotopes would be immobilized in a matrix that would withstand leaching, even if the container were corroded. At present, the leading candidate for such a matrix is a glass, although other alternatives (e.g. a ceramic), are also being actively evaluted, and may prove preferable to glass. Vigorous research programs are addressing all of the above technical issues.

A number of geological characteristics can act to inhibit the spread of radioactive isotopes, whether one is considering deeply buried high level wastes or shallowly buried low level wastes. Such desirable geological characteristics at waste repository sites include the following:

- Dry climate, with a low water table, so that ground water will not be in contact with the wastes other than in minute amounts. This would greatly inhibit any spread of radioactive isotopes by natural means, barring a major climatic change.
- High sorbtive capacity of rock/earth at the repository site. Dry desert alluvium and clays have the highest sorbtive capacity; rock salt the lowest.

- Integrity of the rock form (e.g. lack of faulting, low regional seismicity, resistance of rock to stresses from thermal loading from high level radioactive wastes, low permability to ground water and lack of significant ongoing local erosion by water).

In addition, it is very desirable that repositiories not be located in the vicinity of valuable national resources (e.g. oil, gas, minerals, potable water) that could be extracted in the future, with possible breaching of the repository.

Finally, it is desirable that waste disposal sites be removed from populated areas, and that there be a long pathway between the water table (if any) at the disposal site and the point where the water can reach the earth's surface, either through natural or artifical means. In general, the more difficult it is for ground water at the disposal site to reach the earth's surface, the longer radioactive isotopes will have to decrease to less toxic levels before reaching the surface (in the case of deeply buried wastes). It should be noted that not all of the above features need occur (or perhaps even can occur) at the same individual site. A specific site must be evaluated as a whole, and not solely on the basis of any one criterion mentioned above. In general, however, desirable geologies will offer a high probability of isolating wastes and preventing potentially dangerous quantities of radioactive isotopes from ultimately entering the human body, either through drinking water, or more indirectly through the food chain. In addition, the site would not be a likely candidate for future breaching (e.g. through mining activity).

Potential waste disposal sites are currently being investigated using the above technical considerations in the total evaluation. Current mathematical modeling of expected population doses from permanent geologic waste repositories indicates that the maximum dose levels would be expected to be very small, and pose no significant threat to public health. However, the largest potential threat in the future could come from the unexpected--e.g. human breaching of the repository, uncertainties in various geologic and materials parameters, and improbable events such as large scale erosion, vulcanism, and the like. It is in the evaluation of such factors that perhaps the greatest uncertainties--and the greatest challenges--in evaluating the repository concept are found.

Concerted geologic investigation and materials R&D programs are underway to help reduce the above uncertainties. For example, full scale tests are underway to measure the response of mined cavities in rock to thermal loading from high level radioactive wastes. (One concern raised by some in the technical community is that high thermal loading could possibly lead to significant rock fracturing near the disposed wastes or even failure of open tunnels during emplacement of the wastes.) However, many important geologic materials parameters (e.g. sorbtive capacity) are not well known at present, and are conservatively estimated in computer modeling in order to avoid the possibility of underestimating potential hazards.

A final point worth noting is that stable sites do exist near the earth's surface. In Spain, well preserved cave paintings by the Cro Magnon Man exist to this day.

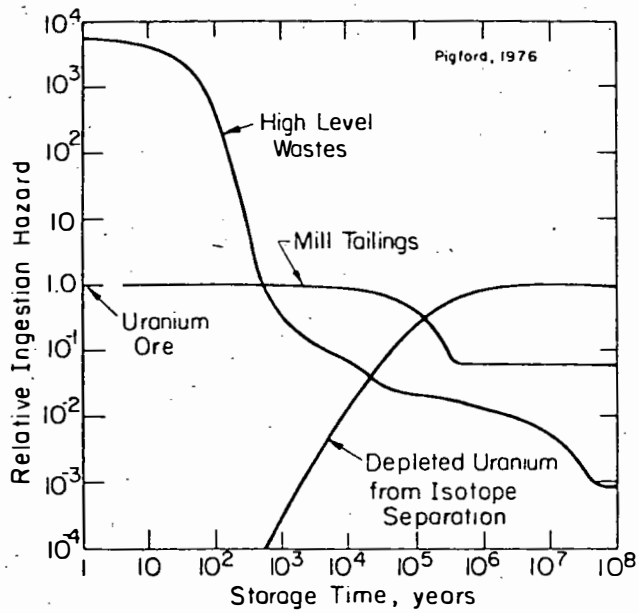

FIG. 1: Relative ingestion hazard of solid residuals from light-water reactor fuel cycle (U Fuel, 0.5% of U and Pu in high-level waste).