

STATEMENT OF
ROBERT R. LOUX, EXECUTIVE DIRECTOR
NEVADA AGENCY FOR NUCLEAR PROJECTS
NUCLEAR WASTE PROJECT OFFICE
TO THE
UNITED STATES NUCLEAR REGULATORY COMMISSION
ROCKVILLE, MARYLAND
SEPTEMBER 9, 1994

We appreciate the opportunity to update the Commission regarding our views on some aspects of the national high-level nuclear waste management and disposal program as they relate to the Commission's pre-licensing and regulatory responsibilities. This meeting is timely in that the Office of Civilian Radioactive Waste Management (OCRWM) is in the process of developing significant changes in its waste program strategy that it plans to begin fully implementing in FY 1995, although much of the strategy has already been incorporated into its program planning. The planned changes may require revision of the NRC's waste management program approach, additional direction from the Commission to the staff, and some of the changes also may require regulatory response.

Today, I will be discussing a number of topics associated with the OCRWM's Proposed Program Approach, which was described to you in general terms by Department of Energy (DOE) representatives on June 6, 1994, and which was the subject of a July 1, 1994, staff memo to the Commission on the staff's initial review of the Proposed Program Approach. As part of the discussion, I also will be suggesting some actions for the Commission's consideration regarding elements of the Proposed Program Approach.

Multi-Purpose Container (MPC):

In the course of the past year, the MPC concept has become the most urgent and pervasive single element of the DOE's program. It has changed thinking about waste handling, acceptance, storage, transportation, criticality, waste package and repository design, waste emplacement, repository thermal loading, repository sealing and closure, and even site characterization itself. All of these are elements to which the NRC must react in some manner.

DOE has imposed urgency on the MPC development, NRC certification, and deployment process in an effort to begin delivery of MPCs to reactors for on-site storage by 1998, thus demonstrating progress toward waste acceptance by that date. This would be more than three years prior to DOE's planned late 2001 submittal of a repository license application to the NRC.

DOE intends to submit the MPC application to NRC for a 10 CFR Part 72 Certificate of Compliance in March, 1996, and expects to receive the certification and begin MPC deployment for spent fuel storage by January, 1998. This schedule is considered critical to the program in order to satisfy DOE's belief that it has an obligation to begin accepting spent fuel by 1998. DOE also intends to submit the MPC application, in March, 1996, for a 10 CFR Part 71 Certificate of Compliance for use in transport of spent fuel. But, it expects that this certificate will be granted by NRC within about 15 months, and prior to the Part 72 certificate. According to the DOE strategy, use of the MPC for disposal will be considered in a repository license application.

Discussions have already begun between DOE and NRC staff on the MPC certifications, and according to SECY-93-265, September 22, 1993, Issues in the Review of a Dual-Purpose Cask for Transportation and Dry Storage of Spent Fuel, "the staff believes the current regulatory scheme is adequate to address dual purpose cask initiatives." However, according to the staff, "The review criteria for the disposal portion related to the multi-purpose canister must await further development of the repository design by DOE."

A major issue in the certification process is DOE's desire to increase MPC capacity by NRC's allowance of burn-up credit for spent fuel. In both SECY-93-265 and meetings with DOE, NRC staff has pointed out the difficulty of accurately calculating specific burn-up characteristics, the need for benchmark experiments, and the need for validated technology to verify the specific burn-up characteristics of individual spent fuel assemblies.

While NRC rules do not preclude burn-up credit, we believe that extreme conservatism must be employed in any consideration of burn-up credit and criticality safety since water ingress must be assumed in both transportation and disposal, and on a case-by-case basis for storage. Also, it is unlikely that the major uncertainties and research and development needs identified by the staff can be resolved acceptably in the short period of time which DOE has allocated for MPC development, certification and deployment. Furthermore, it should be kept in mind that utilities are tending toward higher fuel enrichment and higher fuel burn-up in reactors, which will affect burn-up credit, shielding, weight, and capacity considerations for the MPC in ways that can not be fully known at present because more than 2/3 of the fuel expected

to be used in existing reactors has yet to be fabricated.

The increased capacity provided by burn-up credit for the larger design, 125 ton MPC may afford some cost and operational benefit, however, the payload is only reduced by about 20 percent if burn-up credit is not applied. This capacity advantage from burn-up credit should not be permitted if it results in any increased uncertainty in MPC safety or risk to the public from the waste management and disposal system. The smaller design, 75 ton MPC does not rely on burn-up credit to achieve optimum capacity.

The MPC concept already has become embedded in Yucca Mountain site characterization and repository considerations. For example, in-drift emplacement of the large MPC waste package has replaced vertical emplacement of smaller capacity packages in the drift floor, or possibly horizontal emplacement in drift walls, as the functional planning basis for site characterization evaluations and repository design. This, in turn, has driven decisions such as the ramp grade in the Exploratory Studies Facility (ESF), since the ESF access ramps are intended for use in a repository. It has also constrained evaluations of repository thermal loading and thermal load distribution options, effects of coupled processes on waste isolation, human intrusion scenarios, backfill and repository sealing options, retrieval options, and numerous other site characterization considerations that are important to repository safety.

Overall, DOE's early initiative to deploy the MPC for spent fuel storage at reactors, which may not be authorized by the Nuclear Waste Policy Act, has constrained ESF and repository design options and ongoing revisions of planned site investigation activities to the extent that some alternative repository safety considerations are being foreclosed.

On the other hand, DOE argues that no final decision has been made to deploy the MPC (however, the decision will have been made prior to repository license application). The DOE is aware that it is proceeding at risk with site characterization and repository planning, and maintains that if the MPC is not acceptable for repository use, the waste can be repackaged into an acceptable form at the repository, albeit at considerable additional expense and increased worker exposure and public risk. But, this rationale does not account for irreversible ESF construction, and the imposition of the assumption of an MPC waste package in site characterization investigation planning and performance allocations and assessments.

From our point of view, it is important, at the current stage of DOE planning, that the Commission evaluate the broad safety and regulatory compliance implications of the early deployment of the MPC and its conceptual incorporation, as the waste package, into site characterization and repository planning and design.

Site Characterization and Licensing Approach:

In an attempt to meet its projected 2010 date to begin waste emplacement in a repository, DOE has modified its approach to site characterization, licensing, and repository operation and closure.

In general, relative to NRC licensing, the Proposed Program Approach involves DOE submitting a license application for a construction authorization in June, 2001; receipt of a construction authorization in September, 2004; an updated license application to receive and possess the waste in September, 2008; a license amendment to receive and possess waste, and initial waste emplacement operation in September, 2010. In place of a waste retrieval period of up to fifty years after first emplacement, the DOE is now speaking in terms of a performance confirmation period of up to 100 years prior to seeking a license amendment for repository closure.

In a June 30, 1994 letter, and a July 12 presentation, DOE clarified some aspects of its Proposed Program Approach in response to earlier questions from the Nuclear Waste Technical Review Board (attachment 1 and attachment 2).

On page 18 (attachment 2) of its July 12 handout, DOE summarized its licensing approach as follows:

- "For initial license application for construction authorization
 - Primary focus on operational safety and waste package containment
 - Lower priority given to tests that support demonstration of long-term performance
- Further testing deferred to performance confirmation program"

Pages 7 and 8 (attachment 2) of the July 12 handout further summarize the information planned by DOE to be available at the time of the license application and application to receive and possess waste.

In regard to site investigations (page 8), only the three dimensional geologic description of the site is intended to be final at the time of submittal of a license application for construction authorization. Conditions of climate, postclosure tectonics, saturated and unsaturated zone geochemistry and hydrology are intended to be bounded. And, according to page 26 (attachment 2), the range(s) of thermal loading(s) will be bounded.

With submission of an application to receive and possess waste, in 2008, an initial thermal loading decision will have been made (page 26), subject to revision during performance confirmation. All necessary remaining descriptions of site conditions are planned to be in "subfinal" form for the

Commission's review at that time.

The intended status of performance assessment, which is key to demonstration of "reasonable assurance" of regulatory compliance is summarized on page 7. The waste package (presumably the MPC) subsystem performance assessment is expected to be in final form with submission of the license application for construction authorization. The groundwater travel time subsystem performance assessment will be subfinal, and the assessment for the engineered barrier system will be bounded. With the application to receive and possess waste, DOE plans to have final subsystem performance assessments for groundwater travel time and the engineered barrier system.

For total system performance assessment, the plan is to present an assessment with the application for a construction authorization, and follow with continued revisions presumably through the extended performance confirmation period.

The proposed status of performance assessment at the two stages of NRC license review is troubling in that it is difficult to reconcile DOE's intention to provide advanced or final subsystem performance assessments and a credible total system performance assessment with its intention that critical and fundamental site characterization information will only be "bounded" or in "subfinal" form. The implication of this is that, even though the site characterization information is admittedly incomplete, DOE believes the associated uncertainties in the performance assessments should be acceptable to the Commission, and thus, a less-than-expected standard of "reasonable assurance" of compliance with the regulations should be applied in granting both a construction authorization and license to receive and possess waste.

This should be of particular concern to the Commission because 1) the applicant (DOE) is intending to thwart the Commission's authority and dictate its compromised standard of "reasonable assurance" to the Commission; and 2) the intended unavailability of complete required site characterization information to support its license application is a sole and direct result of DOE's self-imposed schedule to begin waste emplacement operations at a repository in 2010.

Waste Confidence Considerations:

The Commission has repeatedly reminded DOE waste program managers that in order to review a repository license application in the 3 years mandated by the Nuclear Waste Policy Act, the DOE's license application must be complete and of high quality. The Commission's Waste Confidence Decision states the following:

"The NRC does not believe that it is likely that NRC's emphasis on completeness and quality of the license application will contribute to substantial delays in submitting the license application and in the licensing proceeding that would delay repository availability much beyond 2010 at the Yucca Mountain site.

"In any case, the Commission remains convinced that the benefits to the repository program of submitting a high-quality license application would outweigh the cost of delay in preparing the application. NRC has always placed great emphasis on early resolution of potential licensing issues in the interest of expeditious review of the license application and timely repository availability. It is in the same spirit of timely repository operation that the Commission is urging greater attention to quality than to meeting the schedule for submittal of the license application. NRC believes that a complete and high-quality license application offers the best available assurance that timely repository licensing and operation can be achieved.

"In addition to expediting the review of the application, a high-quality license application and site characterization program should enhance overall confidence that any site granted a construction authorization will prove to be reliable during the period of performance confirmation. It will also increase public confidence that the program is being carried out in a thorough and technically sound manner." 55 FR No. 181, September 18, 1990, p. 38505.

Even in its current general conception, the DOE's Proposed Program Approach is clearly in conflict with this stated position of the Commission. Although reference was not made to the Commission's Waste Confidence Decision, the NRC staff recently has noted its concern to the Commission regarding license application sufficiency relative to DOE's Proposed Program Approach. The staff stated:

"Although DOE considers this proposed reduction in testing and resulting information to be appropriate for the license application, the staff believes that such an application would contain greater uncertainty. Therefore, such reductions would need to be very carefully examined in the staff's prelicensing reviews and consultations with DOE. An application with greater uncertainty might make the staff's license application review and the Commission's safety finding with reasonable assurance more difficult and controversial." Staff Memo to the Commission, July 1, 1994, Initial Review of U.S. Department of Energy's Proposed Program Approach.

In a July 26, 1994 DOE/NRC Management Meeting, DOE responded

to the NRC staff concerns regarding license application sufficiency (attachment 3). The limited response asserts the "level of detail proposed for initial LA [license application]...should provide adequate basis for NRC review...[and] this level of detail is appropriate for NRC reasonable assurance finding to authorize construction. Prior to granting of the license to receive and possess waste, additional information would be available."

The proposed level of detail for the license application is said to consist of "high confidence in operational safety and in waste package containment for at least 1000 years" and "bounding analyses for long-term performance." This is consistent with the information presented to the Nuclear Waste Technical Review Board that was discussed above, yet in no way, from our point of view, can it be reconciled with the Commission's stated position regarding the need for a "complete" license application.

Given DOE's intent to submit a less-than-complete repository license application, and the attendant risk to timely license application review and repository availability, the Commission should undertake a systematic review of its Waste Confidence Decision to determine the impact of such an occurrence, should it arise.

The Commission should also initiate a formal review of its Waste Confidence Decision for a much more fundamental reason: if, as is implicit in the Proposed Program Approach, the DOE intends to rely on an extended (up to 100 years) performance confirmation period to provide reasonable assurance of acceptable long-term repository waste isolation performance, the Commission's Waste Confidence Finding 2 is no longer valid. Finding 2 states:

"The Commission finds reasonable assurance that at least one mined geologic repository will be available within the first quarter of the twenty-first century, and that sufficient repository capacity will be available within 30 years beyond the licensed life for operation (which may include the term of a revised or renewed license) of any reactor to dispose of the commercial high-level radioactive waste and spent fuel originating from such reactor and generated up to that time."

In reality, under DOE's Proposed Program Approach, the licensed mined geologic repository will function as an underground spent fuel storage facility for up to 100 years, and only then will a decision be made regarding whether disposal has been accomplished. This decision point is far distant in time from the first quarter of the twenty-first century, by which time the Commission has projected the availability of a repository for disposal of spent fuel and highly radioactive wastes. Also, with the Yucca Mountain site, notwithstanding the repository capacity limitation of the Nuclear Waste Policy Act, a disposal decision is dependent on a capacity decision, because the amount and

distribution of the waste in a Yucca Mountain repository affects the repository post-closure performance. Thus, even with a change in the Act to permit more than 70,000 metric tons of waste to be disposed at Yucca Mountain, there would be no assurance until long after 30 years beyond the licensed lifetime of current reactors that waste disposal was available.

The intent of 10 CFR Part 60 is that a disposal decision be made before repository operations begin, and this is consistent with the Nuclear Waste Policy Act. Only if performance confirmation indicates significant and unmitigatable variance from the information used to make the disposal decision would retrieval be invoked, which would signal that disposal had not been accomplished as intended. The Proposed Program Approach ignores this intent and, in reality, reserves a disposal decision until some time many years after licensing when DOE believes sufficient information is available to give reasonable assurance that the long-term performance of the repository will be acceptable. The license amendment for repository closure, in fact, would become the NRC's decision to permit disposal, which not only violates the regulatory scheme of 10 CFR Part 60, but also removes the basis for the Commission's Waste Confidence Decision regarding the time of availability of spent fuel and highly radioactive waste disposal.

"Disposal," according to 10 CFR Part 60, "means the isolation of radioactive wastes from the accessible environment." The Commission's geologic repository licensing rule, 10 CFR Part 60, provides the basis for the Commission's decision to permit disposal. The DOE, in the Proposed Program Approach, inappropriately has chosen the vehicle of "performance confirmation" as a means to complete site characterization, as well as meet the performance confirmation requirement of 10 CFR Part 60. The Commission's regulatory intent in requiring a performance confirmation program is to "evaluate the accuracy and adequacy" of the information used to support the disposal decision, not to generate new and necessary information to support such a decision, as DOE is proposing.

It also would not be appropriate to consider the retrieval period as a time in which new and necessary information to support a disposal decision can be made, since, according to 10 CFR Part 60, "retrieval means the act of intentionally removing radioactive waste from the underground location at which the waste had been previously emplaced for disposal."

National Environmental Policy Act Considerations:

With the Proposed Program Approach, DOE has set its strategy for compliance with the National Environmental Policy Act (NEPA)

and established a schedule for its implementation. This appears on the Key Milestones handout referenced above (attachment 2) relative to performance assessment and site investigations status and schedules.

Three Environmental Impact Statements (EIS) are planned for major elements of the waste management and disposal system. DOE intends to issue a final EIS for the decision to fabricate and deploy the Multi-Purpose Container (MPC) late in 1996, during the period that the NRC is reviewing the Part 72 and 71 applications for certificates of compliance for MPC use in spent fuel storage and transport.

The Final EIS for the repository is planned for September, 2000, and the final EIS for a rail spur to permit MPC rail access to Yucca Mountain is planned for issuance in December, 2005, one year after DOE expects to receive a construction authorization for a repository from the Commission.

In a June 3, 1994, letter to OCRWM Director Daniel Dreyfus, the State of Nevada informed DOE of its position regarding waste program NEPA Compliance:

"For compliance with the spirit and letter of the National Environmental Policy Act, the Office of Civilian Radioactive Waste Management should prepare a single, comprehensive waste management system Environmental Impact Statement to accompany the Secretary's repository site recommendation decision to the President that a site is suitable for development of a geologic repository for spent nuclear fuel and high-level radioactive waste, pursuant to the Nuclear Waste Policy Act, as amended.

"However, since it has proposed to deploy the Multi-Purpose Canister, a major federal action, prior to the time that the Secretary's repository site recommendation can be made, OCRWM should prepare a comprehensive waste management system Programmatic Environmental Impact Statement, for which a Notice of Intent should be issued as soon as possible, and subsequently "tier" EIS's for major program decisions from that EIS, pursuant to National Environmental Policy Act Regulations and Department of Energy National Environmental Policy Act Implementation Regulations.

"The Office of Civilian Radioactive Waste Management Proposed Program Approach, with its plan to develop three separate Environmental Impact Statements, first for a decision regarding fabrication and deployment of the Multi-Purpose Canister, then for the Secretary's recommendation of a site for development of a geologic repository, and finally for the decision to construct a rail access spur to Yucca Mountain, should Yucca Mountain be found suitable for development as a

repository, is not supportable pursuant to the intent and requirements of the National Environmental Policy Act of 1969."

The rationale for this position was attached to the letter. To date, we have received no formal response to this position statement from OCRWM.

The Commission also must support its decisions regarding MPC certificates of compliance for spent fuel storage and transport casks, and a repository license with NEPA documentation.

Regarding the MPC, DOE has stated that it intends to provide a detailed MPC Environmental Assessment for the Commission's use in meeting its NEPA requirements. However, it is for the Commission to decide whether an Environmental Assessment is sufficient to support its certification decisions, or whether, because DOE intends the MPC to dominate the spent fuel storage and transportation field for the foreseeable future, an EIS is necessary. According to DOE's schedule, a Final EIS for DOE's decision to fabricate and deploy the MPC will be issued prior to the NRC's Part 71 and 72 certification decisions. In the case of either an Environmental Assessment or an EIS, there will be considerable public interest in the NRC's MPC certification decisions because they will follow closely in time the issuance of what is expected to be a highly controversial Final EIS for DOE's decision to deploy the MPC.

Whether or not the DOE accepts our position regarding the need for a single repository and waste management system EIS, or an early Programmatic EIS from which other EIS's can be tiered, the Commission must decide what the NRC staff role should be in the DOE's NEPA compliance process, in terms of participation in the EIS scoping process and commenting on the Draft EIS's. According to DOE's schedule, scoping for the MPC EIS will begin within the next few months, and the NRC staff should be provided direction regarding its participation in this DOE activity, if it takes place as planned.

The DOE's Proposed Program Approach adds a new dimension to the Commission's responsibilities regarding a repository EIS as well, and the Commission's direction to the staff is also needed in this regard, since the DOE schedule sets scoping for the Yucca Mountain repository to begin in mid-1995. The Nuclear Waste Policy Act provides some direction to the Commission regarding its NEPA compliance in the issuance of a repository construction authorization:

"(4) Any environmental impact statement prepared in connection with a repository proposed to be constructed by the Secretary under this subtitle shall, to the extent practicable, be adopted by the Commission in connection with the issuance by the Commission of a construction authorization and license for

such repository. To the extent such statement is adopted by the Commission, such adoption shall be deemed to also satisfy the responsibilities of the Commission under the National Environmental Policy Act of 1969 [42 U.S.C. 432 et seq.] and no further consideration shall be required, except that nothing in this subsection shall affect any independent responsibilities of the Commission to protect the public health and safety under the Atomic Energy Act of 1954 [42 U.S.C. 2011 et seq.].

"(6) In any such statement prepared with respect to the repository to be constructed under this subtitle, the Nuclear Regulatory Commission need not consider the need for a repository, the time of initial availability of a repository, alternate sites to the Yucca Mountain site, or nongeologic alternatives to such site." 42 U.S.C. 10134.

In Nevada's August 1, 1988, comments on the NRC's Proposed Rule, NEPA Review Procedures for Geologic Repositories for High-Level Waste, (53 FR No. 87, May 5, 1988), we discussed, among other topics, the NRC's independent NEPA responsibilities and concluded that nothing in the above statements from the Nuclear Waste Policy Act excuses or precludes NRC from full compliance with NEPA requirements, independent of whatever limitations are exercised in the DOE's repository EIS.

Now, with the DOE's Proposed Program Approach, which includes the deployment of the Multi-Purpose Container, a less than complete license application in terms of predicted long-term repository safety and performance, and an extended period of time in which waste will, in reality, be in retrievable storage in a repository rather than considered disposed, the scopes of the DOE's and NRC's independent EIS's can be expected to differ greatly. As we pointed out in our August 1, 1988, comments:

"The Commission staff wrongly perceives that "[w]hile the action being taken by DOE is the recommendation to the President of a site for repository development and the action being taken by the Commission is issuance of a construction authorization for a repository, the relevant considerations in the two situations are identical." 53 FR 16139, col. 3."

In reviewing the OCRWM's Proposed Program Approach, the Commission should consider the impacts on the NRC's independent NEPA responsibilities, as well as develop direction for the staff regarding whether, and, if it does, to what extent the staff should participate in the DOE's NEPA processes. It also may be timely for the Commission staff to prepare a new draft Proposed Rule for public review and comment on NRC's NEPA review procedures for a high-level waste repository that anticipates the differing scopes of DOE's and NRC's evaluation responsibilities in their respective EIS's.

DOE's Preliminary Site Suitability Decisions and Technical Site Suitability Decision:

Under the DOE's Proposed Program Approach, eight separate preliminary topical site suitability decisions, using the siting guidelines in 10 CFR Part 960, will be made between 1995 and 1998, with a site-wide technical site suitability decision planned for 1998. A final site suitability determination will be made in 2000 for inclusion in the Secretary's site recommendation report to the President.

The 10 CFR Part 960 guidelines were promulgated by DOE, pursuant to the Nuclear Waste Policy Act, and as required they first received the concurrence of the Commission. Because the Commission has no statutory role in the application of the DOE's siting guidelines and its site suitability decision, the Commission's criteria for concurrence were related to its separate regulatory responsibilities. The criteria were simple:

1. The siting guidelines must not be in conflict with 10 CFR Part 60.
2. The siting guidelines must not contain provisions that might lead the DOE to select sites that would not be reasonable alternatives for an environmental impact statement.
3. The siting guidelines should not contain provisions that are in conflict with the [Nuclear Waste Policy] Act.

The Commission also required that the guidelines recognize NRC's jurisdiction for the resolution of differences between the guidelines and 10 CFR Part 60, and that the Commission's concurrence must be secured for any amendment of the guidelines by DOE.

The Commission's only statutory duty regarding the DOE's site recommendation, other than concurrence in the guidelines used to determine site suitability, is stated in Section 114(a)(1) of the Nuclear Waste Policy Act:

"Together with any recommendation of a site under this paragraph, the Secretary shall make available to the public, and submit to the President, a comprehensive statement of the basis of such recommendation, including the following: ...

(E) preliminary comments of the Commission concerning the extent to which the at-depth site characterization analysis and the waste form proposal for such site seem to be sufficient for inclusion in any application to be submitted by the Secretary for licensing of such site as a repository."

For current purposes of its preliminary site suitability determinations under the Proposed Program Approach, DOE has decided that the guidelines will be applied as written, without amendment, therefore, NRC's only current role in DOE's site suitability / site recommendation process derives from Section E, above, and NRC's duties regarding site characterization under 10 CFR 60.

It appears from the July 1, 1994, staff memo to the Commission on its initial review of the Proposed Program Approach that the staff intends to review DOE's preliminary site suitability decisions. The memo states:

"To be prepared adequately for reviewing DOE's preliminary site suitability decisions, the staff would need to develop those individual review plans, in the License Application Review Plan, that are relevant to each site suitability decision. These review plans would need to be completed as soon before each decision as practical. The staff could then use them in providing guidance to DOE for collecting and analyzing data needed for each decision."

While the staff has certain pre-licensing duties to perform regarding site characterization pursuant to 10 CFR 60, it has no basis or authority to review DOE's site suitability decisions for any reason other than as part of its ongoing review and technical interaction with DOE over sufficiency of data and analyses for a license application. Neither the sufficiency of data and analyses for DOE's separate site suitability decisions, nor the decisions arising from DOE's application of the guidelines are within the purview of the NRC.

If the NRC associates itself with DOE's site suitability decisions, it will have the effect of inserting prejudgment into the licensing process, if the site becomes the subject of a repository license application. The reason for this lies in DOE's siting guidelines. The Qualifying Condition of the Postclosure System Guideline (10 CFR Part 960.4-1) requires a finding by DOE that the site meets the requirements of 10 CFR 60, and the Qualifying Condition of the Preclosure System Guideline (10 CFR Part 960.5-1) requires a finding by DOE that the site meets the requirements of both 10 CFR Part 60 and 10 CFR Part 20. Any association by NRC with these findings, or DOE decisions that contribute to these findings has the effect of the NRC announcing a licensing conclusion prior to a DOE license application and license proceeding.

For this reason, it is important, now, that the Commission make clear to the staff that the NRC has no role in DOE's site suitability decisions other than that for which it derives its authority from 10 CFR Part 60 regarding site characterization.

Conclusion:

The effect of the OCRWM's Proposed Program Approach is that it represents a significant high-level nuclear waste policy change. This is the reason that it is in conflict with the Commission's Waste Confidence Decision and repository licensing regulations, as well as the Nuclear Waste Policy Act.

The policy change is masked by use of the familiar language of the Commission's licensing regulation, 10 CFR Part 60, in a manner different from that intended by the regulation. A repository license from the Commission is intended to be a license for waste disposal. In practice, under the Proposed Program Approach, a repository license is intended by DOE to be a license to operate an underground spent fuel storage facility while site characterization is continued. It does not appear that DOE intends to fully comply with the Commission's expectations for a license application for waste disposal. Nevertheless, it expects the Commission to grant a repository license, while deferring the requisite basis for the license regarding waste disposal until after a long period of performance confirmation.

The DOE's use of an extended performance confirmation period as a means to continue site characterization is at odds with the Commission's intent in requiring a performance confirmation program to begin during site characterization and continue until some time after characterization is completed and a license is issued. It is this misapplication of performance confirmation by DOE that puts a decision many years into the future regarding whether disposal, in the meaning of the regulation, has been accomplished.

The policy shift induced by the OCRWM Proposed Program Approach also complicates the Commission's fulfilling its independent National Environmental Policy Act responsibilities. DOE's current NEPA strategy is driven by its intent for early deployment of the Multi-Purpose Container, before a Yucca Mountain site suitability determination is made and a license application is submitted. Because the MPC is the conceptual link that ties the waste management and disposal system together, the certification and deployment of the MPC are actions related to the selection and licensing of a repository site. Despite the intent to seek certification of the MPC only for spent fuel storage and transport, the MPC has become integral to repository site characterization and design. This likely will necessitate some consideration of the expected disposal system when the Commission is evaluating alternatives to the MPC and its design in its NEPA process associated with MPC certification for storage and transport.

The Commission stated in its 1990 Waste Confidence Decision:

"The Commission anticipates that such events as a major shift in national policy, a major unexpected institutional

development, and / or new technical information might cause the Commission to consider reevaluating its Waste Confidence Findings sooner than the scheduled ten-year review." 55 FR No. 181, September 18, 1990, p. 38475.

With the DOE's implementation of the Proposed Program Approach in its FY 1995 Nuclear Waste Policy Act program, there will have been, in effect, a major policy change, whether, or not, it has been understood or adopted by Congress. As we have described, the change invalidates the Commission's Waste Confidence Decision, and causes the need for the Commission to reconsider its Waste Confidence Decision at this time, as the OCRWM Proposed Program Approach is becoming the basis of a new national high-level nuclear waste policy.

The Proposed Program Approach also impacts the Commission's repository licensing basis to the extent that the original meaning and purpose of a repository license, as intended in the Commission's regulations and the Nuclear Waste Policy Act, will be significantly distorted unless there are adjustments either in the Proposed Program Approach, or in existing nuclear waste laws and regulations.



Department of Energy

Washington, DC 20585

June 30, 1994

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NUCLEAR WASTE T.R.B.

Dr. John E. Cantlon
Chairman
Nuclear Waste Technical Review Board
1100 Wilson Boulevard
Arlington, Virginia 22209

Dear Dr. Cantlon:

Enclosed is the Department of Energy's response to the questions contained in the Nuclear Waste Technical Review Board's letter dated May 17, 1994. To comply with your request for a timely response, we have attempted to capture the current state of the development of the Proposed Program Approach (previously referred to as Scenario A), which is still undergoing review and revision based upon further analysis and external comment.

One of the foremost strategic goals of the Department is to resolve the disconnect between the program's expectations and its ability to achieve them. As these expectations have evolved over the years, the program has lost its ability to meet the original intent of the Nuclear Waste Policy Act of 1982, as amended. Therefore, the Proposed Program Approach is an attempt to realign the program closer to the original intent of the legislative and regulatory framework, and to develop a set of goals and a schedule that has a reasonable probability of success and is consistent with the resources that can be allocated to it.

The Proposed Program Approach incorporates many of the Board's past recommendations and is also consistent with the recommendations made by the National Academy of Sciences in its 1990 report, *"Rethinking High-Level Waste."* That report stressed that it is not practical to assume that all information would be available prior to constructing a repository. The Proposed Program Approach lays out a stepwise approach to repository development through a series of decisions based on an increasing knowledge base that is fully consistent with the existing regulatory framework. The approach also addresses the realities of near-term storage of spent fuel.

As we continue to develop the Proposed Program Approach, we welcome the Board's specific comments and recommendations regarding our technical program.



We also intend to continue to inform the Board as we further refine the proposal in response to external comments and more detailed analysis. Please contact me at (202) 586-6842, if you wish to discuss the current status of the proposal further.

Sincerely,

A handwritten signature in black ink, appearing to read "Daniel A. Dreyfus". The signature is fluid and cursive, with a large initial "D" and "A".

Daniel A. Dreyfus, Director
Office of Civilian Radioactive
Waste Management

Enclosure

Department of Energy
Responses to Questions Contained
Nuclear Waste Technical Review Board's Letter
Dated May 17, 1994

In a letter to Daniel A. Dreyfus, the Director of the Office of Civilian Radioactive Waste Management (OCRWM) dated May 17, 1994, the Nuclear Waste Technical Review Board posed ten questions regarding Scenario A, currently referred to as the Proposed Program Approach. The Department of Energy's (DOE) response to these questions is provided below.

Question 1:

(a) What are the specific technical bases for the decisions that led to the development of Scenario A? (b) Will the *Site Characterization Plan* be modified to reflect the new program design? (c) If so, what process will be used to modify it? (d) If not, what will be the status of the existing *Site Characterization Plan* in structuring the technical investigations at Yucca Mountain?

Response:

The basis for the decisions that led to development of the Proposed Program Approach (the successor to "Scenario A") was the recognition by DOE that the expectations for the program could not be achieved given the historical funding levels. Specifically, the realities of the near-term, at reactor, storage of spent commercial fuel must be addressed, and a technical approach to the determination of the suitability of the candidate Yucca Mountain site for a geologic repository must be articulated. This approach must include the production of the requisite environmental and regulatory documents required to support decision making within both budget and schedule constraints. Additionally, DOE recognized that science could not meet unrealistic expectations regarding the level of knowledge and the uncertainty associated with the predictions of long-term repository performance required for licensing.

DOE believes that the Nuclear Waste Policy Act of 1982, as amended (NWPAA), intended that site characterization would provide sufficient information for decision making with an implicit understanding that significant uncertainties associated with the prediction of long-term performance of a repository system would remain. The NWPAA authorizes the development of geologic repositories through a process that includes a series of decisions which reflect an increasing base of knowledge. The Proposed Program Approach is a strategy to realign the program's direction with the original intent of the legislative/regulatory framework.

The Site Characterization Plan (SCP), issued in 1988, contained an extensive testing, design, and performance assessment program to acquire the data for decision making. The SCP was neither intended nor required to be revised, but, there was explicit recognition of the need to make specific revisions to the program as data is obtained. Implementation of the Proposed Program

Approach will not alter this premise. Changes to the site characterization program are reported semi-annually in the Site Characterization Progress Reports. Changes to the program are controlled through revisions to the Site Characterization Program Baseline and the Site Design and Test Requirements Document, as well as the supporting study plans. When the details of the Proposed Program Approach are further developed, resulting changes to the program will be documented in these and other documents using the program's baseline change control procedures. These changes will be identified over the next several months.

Question 2:

At the January 1994 Board meeting, you said that "institutionalizing stakeholder interaction" was one of the OCRWM program's important short-term goals. (a) How does the DOE decide which decisions are "key decisions," requiring stakeholder input? (b) How and to what extent did the DOE obtain stakeholder and public input prior to formulating Scenario A? (c) Which stakeholders were involved? (d) What specific mechanisms is the DOE using to obtain stakeholder and public input?

Response:

DOE's draft public participation policy recognizes public involvement as a fundamental component of program operations and directs program managers to identify "key decisions" (those where predecisional public input should be solicited) in consultation with their stakeholders. OCRWM is reviewing its plans to ensure they are consistent with the Department's proposed public involvement policy. DOE would welcome any suggestions the Board may have with respect to criteria that could be applied in determining the need for expanded stakeholder involvement.

To meet the time constraints of the Congressional budget cycle, DOE made a number of initial assumptions with regard to the framework of the Proposed Program Approach, which was supported by the Administration's Fiscal Year 1995 Budget Request. In making these assumptions, DOE considered the positions that its many stakeholders had communicated on a continuing basis to program officials. As the proposed strategy was being refined, DOE managers, both in Washington and in Las Vegas, interacted frequently with program stakeholders and Congressional staff. These interactions provided valuable input to the formulation of the Proposed Program Approach.

Specifically, DOE managers met with representatives from State, Tribal and local governments, industry groups and trade associations, regulatory agencies, professional societies, environmental organizations, and labor organizations. These meetings included discussions about development of the scenarios used in the planning process. In addition, the program hosted several stakeholder meetings to discuss aspects of the Proposed Program Approach. In February, meetings were held in Washington and in Las Vegas to discuss the Administration's Fiscal Year 1995 Budget Request, which included a broad description of the program's proposed direction. In May, the program sponsored a major stakeholder meeting in Las Vegas to discuss with the

Director the overall program direction, the Proposed Program Approach, and the site suitability evaluation process. Representatives of the OCRWM program also routinely participated in a variety of industry, governmental, and professional society meetings that provided opportunities to receive input and feedback regarding the program's plans and activities.

Once the program completed analysis of the strategic scenarios, a preferred approach was selected to propose to program stakeholders, the Congress, the Board, the Nuclear Regulatory Commission (NRC), and the public in the appropriate forums.

The identification of a preferred alternative does not predispose a decision to proceed. As the Board is aware, implementation of the Proposed Program Approach is predicated upon adequate funding. Securing this funding requires significant lead time and timely actions on the part of DOE. This will involve both Administration-wide and Congressional approval. The Congressional appropriation process is an open, public, and representative process, and the program's proposed approach in broad terms, was aired completely in that process in support of the funding request. Despite the preceding actions, DOE will continue to evaluate and refine elements of the Proposed Program Approach, based, in part, upon the input from its stakeholders and, of course, dependent upon the results of Congressional direction.

Question 3:

Scenario A calls for increased budgets, a decreased scope of near-term site characterization activities (e.g., potentially less tunneling), and a demanding schedule. (a) What specific studies previously planned under the SCP and in the study plans (i) will be completed before application for a license to begin repository construction, (ii) will be deferred until after repository construction, (iii) will be deferred until after repository operation begins, and (iv) will be deleted? (b) What criteria were used to assign particular studies to one of the four categories?

Response:

The detailed plans that identify which site characterization studies will be conducted, deferred, or eliminated are being developed and will be provided to the Board along with a description of the criteria used to make those determinations when they are available later this year. In general, however, such decisions will be consistent with the strategy articulated in the Proposed Program Approach, which recognizes the existing incremental process for repository licensing beginning with the submittal of the initial license application for construction authorization (10 CFR 60.24(a) and 60.31), followed by an updated application for authorization to receive and possess spent fuel and high-level waste (10 CFR 60.24(b) and 60.41), and a final application for an amendment to close the repository (10 CFR 60.51).

This strategy focuses near-term activities on the information required for determining the suitability of the candidate Yucca Mountain site, and if

suitable, the requirements for obtaining a repository construction authorization, including ensuring the safety of repository operations and providing an adequate basis for confidence in waste package containment. A lower priority will be given initially to those tests that support demonstration of compliance with requirements related to longer term radionuclide transport and release. Sufficient testing and modelling will be conducted in this latter category to develop bounding analyses for the license application. Further testing would be deferred and conducted as part of the performance confirmation program required by 10 CFR Part 60.

Question 4:

The OCRWM has asked for increased program funding because it believes that the scientific work has been under funded. (a) If Congress provides the requested funding for Scenario A, specifically how much will allocations to underground excavation, waste package and materials research, and other site-suitability activities be increased? (b) How much will be allocated to overhead and infrastructure? (c) Will these allocation priorities change if funding to the program is not increased to the level requested?

Response:

The details of the testing program that would support the Proposed Program Approach are being developed. Consequently, the allocation of budgets among the various elements of the repository program are not available at this time. The re-baselined budget information should be available in early Fiscal Year 1995 and will be provided to the Board at that time. The program has, however, stated that the proposed increase will predominately be allocated to work at Yucca Mountain. Compliance and management costs will be constrained.

The funding allocation will also reflect the program management improvements achieved in the reorganization of the Yucca Mountain Site Characterization Office, and the re-alignment of headquarters elements along with any recommendations or other actions resulting from the ongoing independent financial and management review of the Yucca Mountain Site Characterization Office. In any case, the funding allocation will be based on the program's priorities and will support only the minimum infrastructure and overhead required for achieving interim milestones and completing the program's mission.

As DOE reported to Congress, if the funding level in the Administration's Fiscal Year 1995 Budget Request is not obtained, and the prognosis for future budgets were to indicate that DOE will receive a level of funding consistent with past years, the entire OCRWM program will be re-evaluated. The resultant funding priorities for such a program would clearly be dependent on the nature of that program. Under such funding constraints, it is probable that a full program, carrying all licensing activities forward, would not be continued.

Question 5:

Scenario A calls for the completion of a five-mile main loop with additional drifting *only if necessary*. (a) What is the technical basis that supports this change from the current program design? (b) What technical criteria will the DOE use to decide whether the five-mile loop is sufficient for a decision on site suitability? (c) If a five-mile loop is insufficient, how will the DOE decide how much additional underground excavation will be needed?

Response:

The technical basis for reducing the amount of underground excavation to be conducted is an extension of underlying bases of the Proposed Program Approach, which was discussed in the response to Question 1. Our current thinking is that the site characterization program will be refocused to obtain the information that is critical to support DOE and NRC decisions pertaining to site suitability and licensing. In the Proposed Program Approach, the goal of the underground excavation program is not the completion of the five-mile (7.8 km) loop. Rather, emphasis is being placed on completing sufficient excavation to support two critical activities: (1) constructing at least two exploratory drifts off the main drift in the Topopah Spring Level to obtain information on the water content and age in the Ghost Dance Fault and (2) starting the Exploratory Studies Facility (ESF) heater tests in the North Ramp Extension as soon as possible. Depending on what is found in the Ghost Dance Fault, a decision will be made about the appropriate exploration of the Calico Hills unit. Such a decision would obviously impact the timing for the completion of the 7.8 km loop.

Further details on the proposed drifting sequence follow, keeping in mind that this is our current thinking subject to discussion with the Board and other stakeholders:

According to the strategy in the Proposed Program Approach, ESF excavation will begin in August 1994 in the North Ramp using the 7.6 meter tunnel-boring machine (TBM #1). Acquisition will be made of a second, smaller diameter TBM (TBM #2) during Fiscal Year 1995, concurrent with North Ramp excavation. Once TBM #1 has completed the North Ramp and "turned the corner" into the Topopah Spring Level main drift, TBM #2 will be erected, and the North Ramp Extension will be excavated. This will be concurrent with Topopah Spring Level main drift excavation by TBM #1.

TBM #1 will proceed south along the Topopah Spring Level main drift until it passes the northernmost of the two Ghost Dance Fault exploratory drifts. This drift will then be driven, approximately 120 to 150 meters, through the Ghost Dance Fault. TBM #1 will proceed south in the Topopah Spring Level main drift past the southernmost Ghost Dance Fault drift. Once again, TBM operations will be halted long enough to start the second Ghost Dance Fault exploratory drift. After completion of the second Ghost Dance Fault exploratory drift, TBM #1 will proceed with completion of the 7.8 km loop. The rate of advance will be dependent on resources needed for other ESF excavation activities. TBM #2 will finish the North Ramp Extension shortly after the time period that

the Ghost Dance Fault drifts are excavated. After completion of the North Ramp Extension, several parallel drifts will be driven to the north off the North Ramp Extension to house heater tests.

A decision on excavation into the Calico Hills unit will be made once information is available from the Ghost Dance Fault drifting described above. If Calico Hills drifting is needed, it will likely be driven using TBM #2. The point of access and ultimate configuration of Calico Hills drifting is the subject of a study to be performed in early Fiscal Year 1995.

The adequacy of the information obtained through an integrated exploration and testing program will be determined through suitability evaluations, design development, and in the preparation of the initial license application. If the geologic data is deemed insufficient to support decision making, additional excavation and testing will ensue. The criteria used to determine the adequacy of data are under development and will be provided to the Board when they are available.

Question 6:

Thermal-loading is a key parameter associated with various waste isolation strategies and repository/waste package designs. (a) Under Scenario A, when will a preliminary decision about thermal-loading be made? (b) When will a final decision be made? (c) What specific information does the DOE believe will be required to make sound technical decisions on (i) repository design and (ii) a waste package design that is compatible with the MPC? (d) How will the timing of the DOE's application to the NRC for a construction license affect the DOE's thermal-loading decision?

Response:

Under the Proposed Program Approach, the range or ranges of thermal-loadings will initially be bounded in 1998. As further information becomes available, the bounding evaluations will be reviewed and updated, and will be included in the license application to construct the repository, scheduled to be submitted in 2001.

The Proposed Program Approach calls for making the thermal-loading decision prior to the completion of the updated license application for receiving and possessing waste. This updated license application is scheduled to be submitted in 2008. Thermal-loading will be confirmed as a result of data collected during the performance confirmation program.

An understanding of the mechanisms which influence the coupled Thermal-Mechanical-Hydrologic-Chemical performance of the natural barriers is required to make sound technical decisions relative to thermal-loading for repository and waste package design. The development of a variety of sub-models and a testing of their validity is included in the program's scientific and engineering programs. These models will provide the basis for thermal loading decisions.

- (i) For repository design, the following are examples, and not necessarily a complete list, of the information being developed:

A description of thermal mechanisms for heat transfer, including the fraction of heat transferred by each mechanism (conduction, convection, and radiation).

A hydrologic model that will bound the hydrologic performance of the natural barriers. This model will incorporate information gathered on bulk permeabilities, saturation, fluid and vapor flow, and fracture/matrix coupling.

A model of the thermal-mechanical response of the host rock. This model will include data collected on rock compressive and tensile strength, thermal expansion coefficients, moduli (elastic, deformation, etc.), Poisson's ratio, and joint frequency and orientation.

A geochemical model of the response of the natural barriers will include information on reaction rates, water chemistry (Eh, pH) and the change with temperature, sorption coefficients, retardation rates, colloid formation, and dispersivity.

- (ii) For waste package design, these and other models will be used to address:

Hydrologic and geochemical responses of the potential site as they impact the waste package environment.

Geomechanical response of the near-field environment and the potential for rock falls within the emplacement openings.

Metallurgical, mechanical, and corrosion behavior of containment barriers in response to temperature.

Thermal stability of each waste package/engineered barrier system component during its proposed lifetime.

DOE's license application to construct the repository is scheduled for submittal to NRC in 2001. Prior to this submittal, the impacts of a range of thermal-loadings will be analyzed and the results of those analyses reported with the initial license application. The analyses will support the use of particular bounds for thermal-loading to justify reasonable assurance of meeting the performance objectives of 10 CFR Part 60.

Question 7:

Under Scenario A, the waste will "remain retrievable" for 100 years. (a) What contingency plans for retrieving the waste will be developed before deciding whether to adopt Scenario A? (b) When will retrieval plans be developed? (c)

How will these plans affect the total system life cycle cost (TSLCC) and the adequacy of the 1-mil-per-kilowatt-hour fee?

Response:

The criteria for retrievability of emplaced waste are under development. As part of the development process, different retrieval time periods and normal and abnormal retrieval conditions will be evaluated. To date, the program has developed a draft Concept of Retrieval Operations and revised the DOE Position on Retrievability and Retrieval for a Geologic Repository. That position was originally an appendix of the "Generic Requirements for a Mined Geologic Disposal System" (DOE OGR-B2) document produced in the mid- to late 1980s. The Concept of Operations addresses both normal and abnormal retrieval conditions.

To further examine this subject of extended retrievability, DOE has directed a study of the advantages and disadvantages of extended retrievability periods. The "Retrievability Period System Study" is scheduled to be completed by September 30, 1994, and will evaluate 50-, 100-, and 200-year retrieval periods, to focus the advanced conceptual design effort.

To maintain the option to retrieve for 100 years would mean extending the caretaker period by approximately 50 years. As used in the last published TSLCC analysis (DOE/RW-0236, May 1989), the caretaker period is the interval of time from the last waste package emplacement until the end of the retrieval period. Using the same cost model and assumptions as used in the May 1989 TSLCC analysis, the increased cost due to a 50-year extension of the caretaker period would be \$1224 million (in 1993 dollars). As with the May 1989 TSLCC analysis, this does not include retrieval costs, but does include costs for removing a small number of waste packages for performance confirmation testing. The Proposed Program Approach affects multiple aspects of the program scope (and costs) and hence the May 1989 TSLCC analysis and the December 1990 Addendum (DOE/RW-0295P) are out of date with respect to the Proposed Program Approach. An adequate revision to the TSLCC cannot be done until sufficient engineering design is completed in early Fiscal Year 1995. It is estimated that the next revision to the TSLCC will be completed by the end of Fiscal Year 1995. Upon completion of that effort, the fee adequacy issue can be addressed.

Question 8:

Descriptions of Scenario A refer to a "site suitability evaluation," "technical site suitability," and a "site recommendation report." (a) When and how will the DOE identify the specific tests and data necessary to support these site-suitability determinations? (b) Does the DOE believe the siting guidelines of 10 CFR Part 960 are adequate for determining site suitability under Scenario A? (c) If not, what amendments are envisioned and what process will be used to adopt them?

Response:

DOE is preparing Fiscal Year 1995 and out year planning guidance for project participants that will incorporate the concepts from the Proposed Program Approach, including proposed milestones for the suitability decision schedule. This guidance will start the process of identifying the specific tests and data necessary to support the site suitability determinations that were proposed in the Proposed Program Approach. The results of this planning will be documented in a Technical Implementation Plan for site investigations for Fiscal Year 1995 and in the long-range plan for the out years. The Fiscal Year 1995 Technical Implementation Plans will be finalized in September 1994. The Long-Range Plan should be finalized in mid-1995.

DOE believes that the siting guidelines are adequate for determining site suitability under the Proposed Program Approach. The Proposed Program Approach simply provides a phased schedule for a site suitability decision. This schedule allows DOE to evaluate specific guidelines or groups of guidelines when sufficient data and analyses are available for the evaluation. Using this phased approach, DOE has an opportunity to make earlier decisions on specific guidelines as the data become available, rather than waiting until 1998 or later to produce an overall evaluation of all guidelines.

Although DOE is not adapting the siting guidelines for the Proposed Program Approach, DOE has elected to re-examine the siting guidelines in light of past statutory and regulatory changes. The purpose of this initiative is to determine if sections of the guidelines might require formal clarification, or even revision, before suitability evaluations begin. DOE has requested input to this decision from program stakeholders in an April 25, 1994, Federal Register Notice of Inquiry, and at the May 21, 1994, stakeholders meeting. Once the public comment period has closed, DOE will review these comments and decide what process, if any, will be used to clarify or revise the siting guidelines.

Question 9:

The NRC's regulation (10 CFR Part 60) requires the DOE to demonstrate, prior to repository construction, that there is "reasonable assurance" that the facility will perform safely. The SCP outlines a testing plan that implies an agreement between the NRC and the DOE about how "reasonable assurance" will be demonstrated. Under Scenario A, some of the tests will be postponed until after repository operation begins. (a) How will the DOE demonstrate the level of assurance in the performance of the repository that would have been obtained under the SCP? (b) Will it be necessary to reinterpret or change the level of assurance? (c) If so, how will it change?

Response:

The extensive site characterization program originally outlined in the SCP, including subsequent changes, reflects the expectations of data and analyses required to predict long-term repository performance and go beyond what is actually needed to comply with the regulatory requirements. Our current

thinking is that the amount of information needed to support the decisions embodied in the Proposed Program Approach will provide a sufficient basis for a "reasonable assurance" finding. In developing the underlying rationale for the Proposed Program Approach, we evaluated both the letter and intent of 10 CFR Part 60 to ensure that the Proposed Program Approach was consistent with the flexibility already inherent in the existing regulation. For example, at the time of submittal of the license application, 10 CFR 60.24(a) requires that: *"The application shall be as complete as possible in the light of information that is reasonably available at the time of docketing."* Furthermore, DOE believes that NRC expects that the "reasonable assurance" finding will be based on limited information. 10 CFR 60.102 states:

While these performance objectives and criteria are generally stated in unqualified terms, it is not expected that complete assurance that they will be met can be presented....Proof of the future performance...over time periods of many hundreds of many thousands of years is not to be had in the ordinary sense of the word. For such long-term objectives and criteria, what is required is reasonable assurance, making allowance for the time period, hazards, and uncertainties involved, that the outcome will be in conformance with those objectives and criteria.

Question 10

According to presentations made at the panel meeting on March 22, 1994, by representatives of the Council on Environmental Quality and the DOE's General Counsel Office, the Yucca Mountain Environmental Impact Statement should include a discussion of various repository and waste package design alternatives. (a) Under Scenario A, what alternatives will be sufficiently well understood to be evaluated? (b) Will separate impact statements be prepared for MPC procurement, repository development, and transportation? (c) How will the interdependencies among those activities be analyzed?

Response

In response to the Secretary of Energy's June 1994 Policy on the National Environmental Policy Act (NEPA), and the suggestions made by interested parties in the past year, OCRWM is reviewing its NEPA strategy. This review will include an evaluation of alternative approaches for implementing the NEPA requirements for the various program activities and the proposed methodology to address the interdependencies among those activities. The issues raised by the Board will also be addressed in scoping activities that will be associated with implementation of NEPA requirements.

U.S. DEPARTMENT OF ENERGY
OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT

NUCLEAR WASTE TECHNICAL REVIEW BOARD
FULL BOARD MEETING

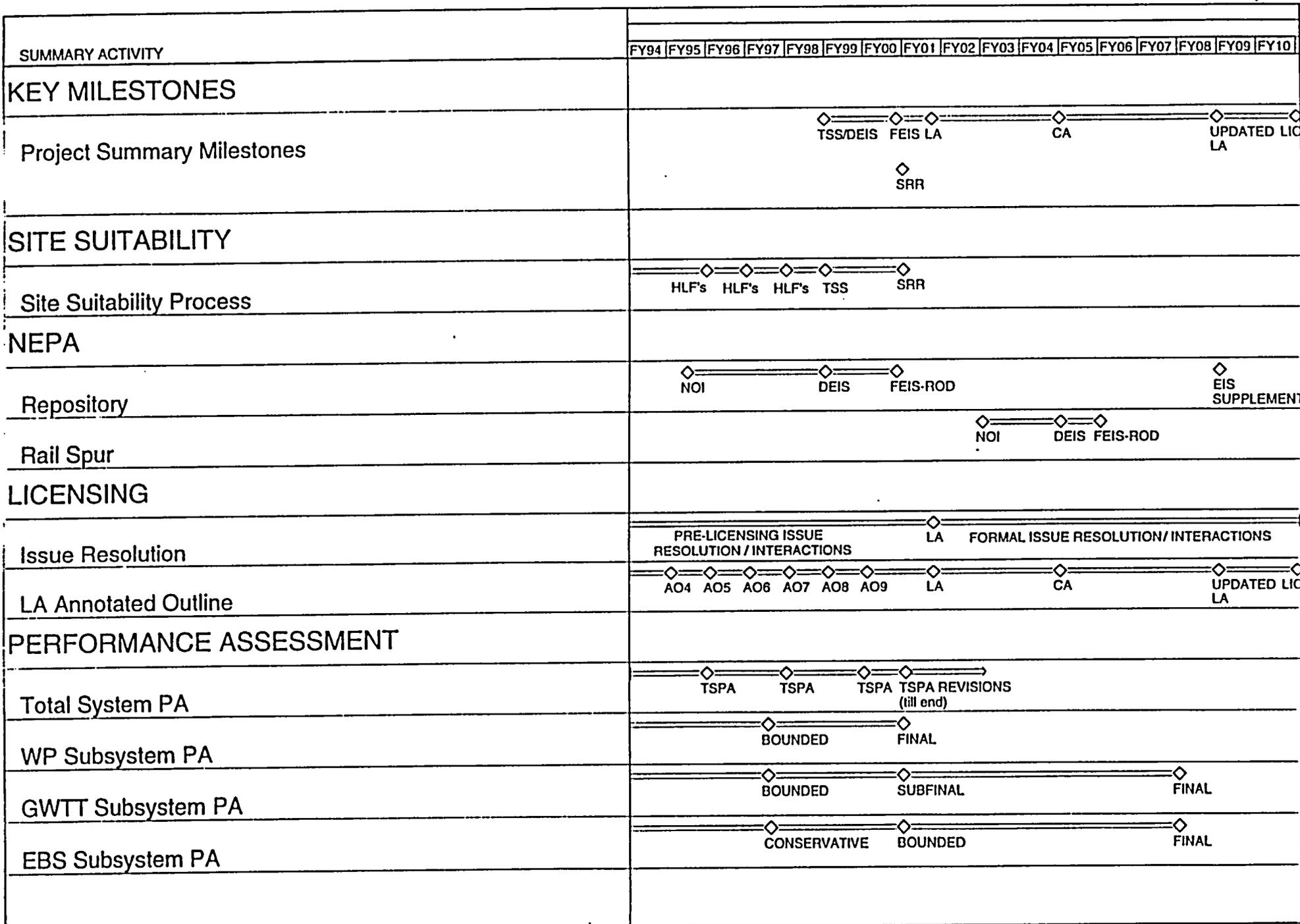
**SUBJECT: PROPOSED PROGRAM
 APPROACH**

PRESENTER: STEPHAN J. BROCOUM

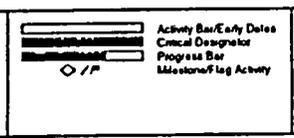
**PRESENTER'S TITLE
AND ORGANIZATION: ASSISTANT MANAGER FOR SUITABILITY AND LICENSING
 YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT OFFICE**

**PRESENTER'S
TELEPHONE NUMBER: (702) 794-7971**

JULY 12-13, 1994
DENVER, COLORADO



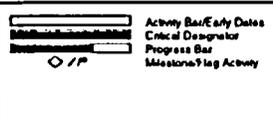
Plot Date 16MAY94
 Data Date 1OCT93
 Project Start 1OCT93
 Project Finish 20OCT10



Project Schedule			
Date	Revision	Checked	Approved

SUMMARY ACTIVITY	FY94	FY95	FY96	FY97	FY98	FY99	FY00	FY01	FY02	FY03	FY04	FY05	FY06	FY07	FY08	FY09	FY10	
SITE INVESTIGATIONS																		
3-D Geologic Description																		UPDATED
Climate Description																		SUBFINAL
Postclosure Tectonics Description																		SUBFINAL
UZ/SZ Geochemistry Description																		SUBFINAL
UZ Hydrologic Description																		SUBFINAL
SZ Hydrologic Description																		SUBFINAL
Thermal Effects Description																		FINAL
ESF CONSTRUCTION																		
7.8 Kilometer Loop																		COMPLETE 7.8K LOOP COMPLETE ACCESSES TO GDF
Calico Hills																		EVAL OPTS CH ACCESS(SL DRL/EXC) IMPLEMENT CH DECISION (SL DRL/EXC)
REPOSITORY / WASTE PACKAGE																		
Repository																		ACD TITLE I TITLE II CONSTRUCTION START OPERATIONS
Waste Package																		ACD TITLE I TITLE II TITLE III /PROTOTYPE FABRICATION
RAIL SPUR																		
Rail Spur																		ROUTE ANALYSIS/CD START TITLE I TITLE II CONST TITLE I

Plot Date 15MAY94
 Data Date 1OCT93
 Project Start 1OCT93
 Project Finish 20OCT10
 (c) Primavera Systems, Inc.



Yucca Mountain Site Characterization Project
 Proposed Program Approach
 Master Schedule

Sheet 2 of 2

----Project Schedule----

Date	Revision	Checked	Approved

NWTRB Question 3

Scenario A calls for increased budgets, a decreased scope of near-term site characterization activities (e.g., potentially less tunneling), and a demanding schedule. (a) What specific studies previously planned under the SCP and in the study plans (i) will be completed before application for a license to begin repository construction, (ii) will be deferred until after repository construction, (iii) will be deferred until after repository operation begins, and (iv) will be deleted? (b) What criteria were used to assign particular studies to one of the four categories?

DOE Response to Question 3

- **Decisions regarding timing of activities will be consistent with PPA strategy**
 - **Early focus on studies needed to determine site suitability**
 - **For initial license application for construction authorization**
 - **Primary focus on operational safety and waste package containment**
 - **Lower priority given to tests that support demonstration of long-term performance**
 - **Further testing deferred to performance confirmation program**

NWTRB Question 6

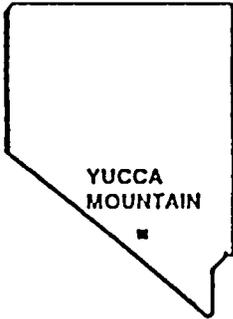
Thermal-loading is a key parameter associated with various waste isolation strategies and repository/waste package designs. (a) Under Scenario A, when will a preliminary decision about thermal-loading be made? (b) When will a final decision be made? (c) What specific information does the DOE believe will be required to make sound technical decisions on (i) repository design and (ii) a waste package design that is compatible with the MPC? (d) How will the timing of the DOE's application to the NRC for a construction license affect the DOE's thermal-loading decision?

DOE Response to Question 6

- **The range or ranges of thermal loadings will be initially bounded in 1998**
- **These ranges will be further evaluated prior to submittal of the initial license application in 2001**
- **An initial thermal loading decision will be made prior to submittal of the updated license application (2008) for the license to receive and possess waste**
- **The thermal loading will be confirmed using data obtained during performance confirmation**
- **Thermal loading systems study to be conducted in FY95**

U.S. DEPARTMENT OF ENERGY

**YUCCA
MOUNTAIN**



YUCCA MOUNTAIN

SITE CHARACTERIZATION

PROJECT

PROPOSED PROGRAM APPROACH

PRESENTED TO:

DOE-NRC MANAGEMENT MEETING

PRESENTED BY:

STEPHAN J. BROCOUM

ASSISTANT MANAGER FOR SUITABILITY AND LICENSING



ATTACHMENT 3

**JULY 26, 1994
ROCKVILLE, MD**

ATTACHMENT 3

License Application Sufficiency

DOE Feedback

- Doe agrees that there will be some uncertainties in the initial LA
- Level of detail proposed for initial LA reflects overall PPA compliance strategy and should provide adequate basis for NRC review
 - High confidence in operational safety and in waste package containment for at least 1,000 years
 - Bounding analyses for long-term performance
- This level of detail is appropriate for NRC reasonable assurance finding to authorize construction
- Prior to granting of the license to receive and possess waste, additional information would be available
- This stepwise increase in knowledge is consistent with the regulatory framework
- NRC will have ample opportunity to review evolving information through pre-licensing interactions