

STRATEGIC PROGRAMMATIC ISSUES AND RISKS RELATED TO COMPREHENSIVE PLANNING FOR THE HIGH-LEVEL WASTE PROGRAM

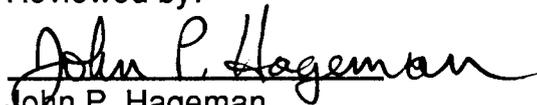
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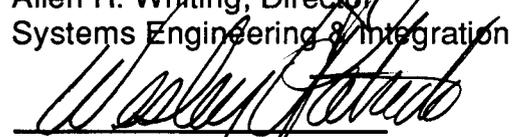
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STRATEGIC PROGRAMMATIC ISSUES AND RISKS RELATED TO COMPREHENSIVE PLANNING FOR THE HIGH-LEVEL WASTE PROGRAM

1. EXECUTIVE SUMMARY

The NRC, with technical support from the Center for Nuclear Waste Regulatory Analyses (Center), is responsible for licensing each element of the high-level waste management system. The NRC is committed to accomplishing these actions without delay to the program, provided that there are no unresolved safety concerns.

The task facing NRC is unprecedented. The program is the first-of-its kind. It poses unique technological challenges. The licensing environment is complicated by regulations and statutes previously formulated for other purposes, but now applicable to some degree to the waste management system, and the program is vulnerable to legal and political interventions.

In such an environment, planning of the work program takes on special significance. NRC and the Center can prepare now for their future tasks. They can, for example, streamline the licensing process, identify and reduce regulatory uncertainties, and provide guidance to DOE's efforts. They can also examine potential program problems or redirections, and make plans for appropriate responses. The procedure for organizing such anticipatory activities is to formulate long range plans (on the order of five years). In the case of the NRC and the Center, the purpose of such plans would be to help ensure the future availability of the necessary licensing procedures and staff resources.

The effort reported here is an important preliminary step in the Center's planning efforts to support the future needs of the NRC. It is intended to ensure consideration of program issues and risks as part of the Center's overall planning activities. It may be similarly useful to the NRC. The Task has two subtasks:

Subtask 1 – to explore, identify, and define events or developments that could affect the overall program; and

Subtask 2 – to assess the impacts of those events or developments on the work programs of the NRC and the Center.

This report is only concerned with Subtask 1.

All of the findings presented herein were derived from existing program documents, articles published in the open journals and periodicals, and discussions with members of the Center and the NRC. The reference documents (numbering more than 100) included the NWPA, NWPAA, DOE Management System Manual, DOE Draft 1988 Mission Plan Amendment, NRC policy papers related to HLW regulatory strategy and waste confidence findings, and the two most recent NRC Five-Year Plans. The report cites more than fifty of these documents.

The planning horizon for this task was divided into two time periods (1) the "Near Term" (i.e., FY 1990-1991), during which a number of important program milestones can be anticipated; and (2) the "Longer Term" (i.e., FY 1992 and beyond), where significant uncertainties can be perceived, but with only limited definition. Eight issues and associated risks were identified in the Near Term, and three in the Longer Term.

The eleven issues are tabulated below. They are listed in rough chronological order of their likely occurrence. Despite their number, all of the identified issues are believed to be manageable, given appropriate staff resources (i.e., both in numbers and skills mix) on a timely basis.

The next subtask in this two-step planning process (i.e., Subtask 2) is intended to estimate the timing and to quantify the resource requirements likely to be posed by these issues.

In addition to the issues and risks, Subtask 1 has provided a useful data base of references from which the issues were drawn (See Appendix A).

Based on the potential value to be derived from these planning subtasks, it is appropriate to incorporate them into the Center's annual planning activities.

ISSUE		RISK
<u>NEAR TERM (FY 1991-1992)</u>		
4.1	NRC Review and Analysis of the SCP	Cumulative program delays associated with issue(s) resolution and periodic reports
4.2	Report of the MRS Commission	Potential for changes to many program elements
4.3	Review of the Waste Confidence Findings	Little direct impact; requires effective coordination with the MRS Commission report
4.4	DOE and NRC Quality Assurance Activities	Potential real and perceived inadequacies in the QA program
4.5	Questions Concerning the Capacity of the Yucca Mountain Site	Adequacy of site could be controversial
4.6	Further Identification of Regulatory Uncertainties	NRC's timely performance requires early resolution of regulatory uncertainties
4.7	Unanticipated Issues Introduced by Credible Sources	New technical challenges can occur at any time
4.8	Legal Challenges and/or Interventions	Intervention should be expected when opposition groups are threatened
<u>LONGER TERM (FY 1992 and beyond)</u>		
5.1	Repromulgation of 40 CFR 191 Subpart B	Uncertainties as to the final regulation puts the repository program at considerable risk
5.2	Additional Efforts in the Event an MRS Option is Approved	Introduction of an MRS could significantly add to Center/NRC workloads
5.3	Next Review of the Waste Confidence Findings	Uncertain

2. INTRODUCTION

The high-level waste (HLW) repository program was formally initiated in 1982 with passage of the Nuclear Waste Policy Act. The act mandated the form, schedule, and procedures to be used in the program, and posed significant challenges to the agencies charged with its development, operation, and regulation. By the terms of the Act, it is a high-visibility program; in terms of national energy security, it is a program of the utmost importance. But it is also a controversial, first-of-its-kind program, that requires attention to both technological and regulatory details.

Since its inception in 1982, the program has been changed and redirected due to technical considerations and economic realities. The Nuclear Waste Policy Amendments Act (NWPAA) of 1987 acknowledged these difficulties and significantly realigned, extended, and down-scoped the program. It also set in motion procedures that will almost assuredly result in further redirections of the program [such as the Monitored Retrievable Storage (MRS) Commission], and additional regulatory requirements (e.g., to deal with accumulations of spent fuel beyond the originally contemplated 1998 repository operational date).

Relatively near-term milestones have been set by the NWPAA, and other approved program documents, for decisions that will affect the program. Already, some of these milestones have been found to be too ambitious, or have been delayed by other program activities.

For example, the MRS Commission was to issue a report on the need for an MRS in the program. The Act originally specified June 1989 for issuance of the report; it was subsequently deferred to 1 November 1989. In another instance, the NRC was prepared to review DOE's Site Characterization Plan within seven months of its acceptance in order to expedite the start of construction of the Exploratory Shaft Facility (ESF). However, incomplete SCP documentation threatened the schedule and, in any event, DOE unilaterally deferred the ESF start date to November 1989 (a five month slip) in order to put its Quality Assurance program in place. And NRC, which had planned to complete its required review of the Waste Confidence Findings before the end of FY 1989 has postponed its report date to 1 December 1989 in order to take under consideration the November report of the MRS Commission. Despite the obvious interdependencies of these activities, the timing of each task's completion and the range of possible program impacts are reasonably predictable.

In other cases, however, changes can be anticipated, but their timing, scope, and significance cannot be perceived clearly enough to predict programmatic consequences. These include the regulatory consequences of the final (and certainly to be litigated) form of 40 CFR 191 Subpart B, now being revised by EPA, or the consequences arising from the whole range of "intervenor" or State challenges that can be expected relative to the characterization of Yucca Mountain and the methods proposed for performance assessments. These changes can be expected at every step in the construction/licensing sequence.

The NRC, with technical support from the Center, is responsible for licensing elements of the high-level waste program. The NRC is committed to accomplishing this without delay to the program and meeting the statutory mandated time limit for license approval, provided that there are no unresolved health and safety concerns. Even without further program redirections, the list of required regulatory actions is formidable. These actions will include: (1) acceptance of the site for repository construction, operation, and decommissioning; (2) determination of the site's adequacy for waste isolation; (3) similar actions relative to an as yet undefined an MRS option (if any); (4) certification of waste packages for transportation; (5) licensing of a Federal Interim Storage or MRS facility; (6) licensing of expanded at-reactor storage facilities; etc. The problem is compounded by a maze of multi-agency regulations and statutes (see Appendix B), developed largely for other purposes, that are often not sufficient, consistent, nor explicit enough to unambiguously guide DOE's and other program participants' efforts.

As a result, NRC and the Center must identify and define means to reduce uncertainties, make recommendations to streamline the licensing process, and provide guidance and review to DOE's efforts. To meet the mandated schedule which can not be assured by acting purely in a reactive mode, they must also attempt to anticipate future program problems and to formulate long-range plans (on the order of five years and beyond) to ensure the future availability of the necessary technical and budgetary resources. These plans must be a part of the overall NRC budget and management process.

There are obvious difficulties in developing these long range plans. The NRC has a Five-Year Plan that is responsive to current NWPAA requirements. Similarly, the work programs of the Center are documented in its annual Operations Plans, which in turn are responsive to NRC's plan. What is lacking is some form of "strategic outlook" that identifies the potential future issues and risks that could impose further changes on the program. These could arise from:

- (1) technical difficulties (e.g., unacceptability of the DOE QA Program in the near-term, or inability to qualify Yucca Mountain in the intermediate-term);
- (2) program redirections (e.g., inclusion of an MRS option in the near-term, or identification of a new site by the Nuclear Waste Negotiator in the intermediate-term); or
- (3) political or legal interventions (e.g., inability of DOE to obtain necessary permits, amendments to the NWPAA in the near-term, or delayed or denied qualification of the Yucca Mountain site in the intermediate-term, or beyond).

The potential risks from such issues, as well as their possible timing and likelihoods of occurrence will vary, and all of which may affect the NRC's and the Center's multi-year plans.

Accordingly, the Center has developed Task 3, "Strategic Planning", under the Special Projects and Analytical Evaluations (SPAET) Subelement. Task 3 will provide considerations of program issues and risks within its overall planning activities. This Task, which is included in the SPAET Operations Plan, has two objectives: (1) to explore, identify, and define events or developments that could affect the program; and (2) to assess the impacts of those events or developments on the long-term work programs of the NRC and the Center. It is intended that this Task will be updated on an annual basis, or sooner when circumstances require, as part of its normal planning cycle.

Task 3 has been divided into two sequential Subtasks corresponding to the two objectives described above. Subtask 1 is to identify the program-related issues and risks that could affect NRC and CNWRA requirements. Subtask 2 would then estimate the timing and magnitude of the resultant impacts on the NRC/Center work programs. This report, however, is concerned only with Subtask 1; that is, the identification of programmatic issues and risks.

3. APPROACH

This first attempt at long-range planning was intentionally exploratory, rather than comprehensive. It was designed to test the feasibility of identifying potential problems that may be encountered as the program proceeds along current directions. The types of problems being sought include technical, institutional, and regulatory issues that may be found difficult to solve by program participants. Also, as new problems appear the long-range planning must develop procedures to consider and incorporate these new problems.

All of the findings presented herein were derived from existing program documents, articles published in the open journals, and periodicals. These reference documents included the NWPA, NWPAA, DOE Management System Manual, DOE Draft 1988 Mission Plan Amendment, NRC policy papers related to HLW regulatory strategy and waste confidence findings, and the two most recent NRC Five-Year Plans.

Some of the references reported adversarial or Federal/State political actions either in related programs, such as the Waste Isolation Pilot Plant (WIPP), or to certain provisions of NWPAA. Those reports provide some insight into the kinds of interventions that may come from those directions, but not in sufficient detail to predict specific interventions likely in the repository program. Documents generated by these action groups were not available for this initial review but should be examined in the future.

Prior to April 15, 1989, more than 100 documents were reviewed. Excerpts from these documents discuss potential program risks or nuclear waste issues relatable to the repository program that could affect NRC/Center planning needs. (A diligent effort was made to give attribution to the source of each excerpt.) These excerpts were then edited, correlated, and compiled into a single reference document, which is included in this report as Appendix A.

By its nature (i.e., its concentration on program issues and requirements, as opposed to success-oriented plans or progress reports), Appendix A presents a composite picture of the complex environment within which the HLW program must be conducted. This complex environment has the potential for adversely impacting the HLW program schedule, with the potential for severe schedule slippages.

The remainder of this report is organized into three sections.

- (1) Section 4 deals with the near-term outlook, essentially from the present through FY 1991. This section discusses the known and the potential programmatic and regulatory problem areas in this time period and the bases for their identification.
- (2) Section 5 then discusses potential issues and risks in the later time period, that is, FY 1992 and beyond. While it is difficult to forecast over that great a time span, some issues have been identified that are likely to arise or continue into the FY 92-95 period (which could affect the development of the NRC and Center five-year plans).
- (3) Section 6 recapitulates the results of the Subtask, and presents some observations about the relative significance of the identified issues and risks to the Center's five-year planning objective.

4. THE NEAR-TERM OUTLOOK (From the Present Through FY 91)

The near-term outlook for the repository program is likely to be relatively orderly, at least when compared with later time periods. It is a time for organizing resources, clarifying regulatory requirements, developing data bases, and formulating technical approaches. However, there are significant decisions and events scheduled in this period, and still others that may occur. Each of these is discussed below in what is likely to be an approximate chronological order.

It should be noted that in a number of cases, the potential risk(s) of a decision or event may be in the form of program delay or additional staff work-load, or both. Taken singly, they may not appear serious in either respect; but they should also be viewed in the context of possible combinations with other problems,

as they often occur, and with correspondingly greater risks to a program operating within statutorily mandated time constraints and within budget limitations.

ISSUE 4.1 – NRC Review and Analysis of the SCP and Characterization Activities

DOE is required to update and report on its site characterization activities every six months, and NRC plans to review and comment on these reports and the SCP. The current version of the SCP was delivered to NRC on December 1988 without a number of required supporting documents. NRC, which has committed to complete its Site Characterization Analysis (SCA) of the SCP within 7 months after its acceptance review, has informed DOE that without the required documentation the acceptance review could affect the start of construction of the ESF, which DOE has already slipped five months, to November 1989. (See Appendix A, References 9 and 33.) It is noteworthy that NRC's prior review of the 1987 Consultation Draft SCP resulted in 5 Objections, 110 Comments, and 52 Questions covering issues as significant as DOE's interpretation of "substantially complete containment". Over the past 15 months some, but not all of those issues have been resolved, but at the cost of time. This process of regular updates, reviews, comments, and resolution of issues can easily result in continued slippage of the program, especially as NRC refines its rulemakings, technical positions, regulatory uncertainties, and required elements of proof.

RISK – Program delays are likely to be associated with the near term periodic reviews of the reports on site characterization or with the acceptance of the SCP. The early effect is likely to be a delay in the start of construction of the Exploratory Shaft Facility. The technical staffs of NRC and the Center will be impacted, at least through the end of FY 89 and probably into FY 90, as they work to resolve remaining and new SCP issues.

ISSUE 4.2 – Report of the MRS Commission

The MRS Commission report is due to be released on 1 November 1989 (Reference 2). The Commission has indicated that it is considering four options:

- (1) no MRS, with at-reactor storage until the repository is available;
- (2) hybrid solutions, comprising a mix of at-reactor storage and regional MRSs until a repository is ready;
- (3) a centralized MRS facility for storage only until a repository is available; and
- (4) a centralized multi-function MRS with both processing and storage capabilities until a repository is ready (Reference 41).

DOE plans to contribute to the number of possible options by reporting the results of a study of nine options for handling HLW with or without an MRS in the system (Reference 24). The study was to be available in early 1989.

Any MRS Commission option, even the first, could add to the workload or change the workload distribution of the NRC and Center. However, NRC believes that an MRS license application is unlikely until at least 1994 (Reference 5). Consequently, the workload impacts in FY 90 most likely will be concerned with setting plans to accommodate MRS licensing requirements, if applicable. By FY 91 those activities will likely have been initiated, and they can be expected to increase thereafter up to and

beyond license application. The possible nature of those activities is more applicable to the later time period, and is discussed more in Section 5.2.

Since its inception, the MRS Commission has held public meetings; met with representatives of DOE, NRC, and utilities; and surveyed related foreign activities.

In its meetings with DOE and NRC in September 1988, the Commission's comments suggested that (among other things) they will be considering legislative recommendations with the potential for broad impact on the HLW program (Reference 40). Such a comment takes on added significance in light of the following two paragraphs.

(1) In a February 1989 status report (see Reference 41), the MRS Commission reported that public feelings on the MRS are mixed, but that the nuclear industry strongly supports it (motivated by their need for DOE to take custody of spent fuel at the earliest date). The industry also felt that the MRS/Repository linkage in NWPAA should be removed (probably for the same reason). Most states' and local governments' representatives refrained from taking a position on MRS but expressed concerns with transportation of wastes through their regions, and inadequate emergency response capabilities of local communities.

(2) In their June 1988 Mission Plan Amendments (Reference 21) DOE discusses the need for resolution of a number of issues, some related to an MRS. The issues include:

- The current plan, which calls for a two-phased startup of operations of the repository, was due to the absence of an approved MRS. Under NWPAA, and with an MRS, a single-phased development may be preferable.
- The need for a second repository needs to be reconsidered.
- The need for and the location of an MRS needs to be resolved because it affects other program elements.
- A number of other issues need resolution, such as the allocation of functions to the MRS, if and where spent fuel should be consolidated, and what waste acceptance rates the program should accommodate.

RISK – The MRS Commission's report has the potential to change many elements of the program. Many issues have now been suggested for inclusion in the MRS decision, such as a second repository, fuel rod consolidation, at-reactor storage, transportation regulations and emergency preparedness. These are not new; they have simply been deferred by the language of NWPAA. In any event, the impacts of the MRS Commission's report will be felt primarily in the period following the near-term.

ISSUE 4.3 – Review of the Waste Confidence Findings

In August 1988, the NRC constituted a review group to reassess the 1984 Waste Confidence Findings. The Review Group plans to issue its report on 1 December 1989 (Reference 36).

The Waste Confidence proceeding originated in 1979 in response to court direction when the NRC initiated a generic rulemaking to assess the degree of assurance that radioactive waste could be disposed of safely. When such disposal or off-site storage would be available, if it can be done safely, and if such on-site storage extended beyond the licensed period of reactor operation (Reference 34) were questions asked that are related to Waste Confidence.

The NRC issued a preliminary positive finding in May 1983, but by then the NWPA of 1982 had been enacted, necessitating the review of the previous findings (Reference 36). No reason to change was found, and a positive finding on five specific points was issued on August 31, 1984. Those points were:

- (1) Safe disposal of HLW and spent fuel in a mined geologic repository is technically feasible;
- (2) One or more repositories will be available by the years 2007-2009 and that sufficient capacity for storage of high-level wastes will be available within 30 years of expiration of operating licenses;
- (3) HLW and spent fuel can be managed safely until sufficient repository capacity becomes available;
- (4) Spent fuel from reactors can be stored safely without significant environmental impact at the reactors' storage basins (or at independent on- or off-site storage installations) for at least 30 years beyond expiration of their operating licenses; and
- (5) Safe independent on-site or off-site spent fuel storage will be made available to the extent needed.

The Commission recognized that circumstances could change and decided to review its conclusions if significant events occurred, or at least every 5 years until a HLW repository became available. The new Review Group, to serve that purpose, will recommend new decisions or rulemakings if appropriate.

Of particular interest to this review are the new considerations that have arisen since the first findings. An abbreviated and small sampling of those cited in Reference 36 include:

- (1) What are the impacts of technology developments?
- (2) Will the reduction to one site undermine the confidence that one or more sites will be available when needed?
- (3) Will the suspension of a second repository and the delays in the first repository undermine the belief that there will be adequate disposal capacity within 30 years from reactor license expirations?
- (4) If NRC proceeds to extend existing licenses, will more waste be generated than expected, would a second repository be needed earlier, or would additional on-site storage be needed?

Clearly some of these issues are also involved in the MRS decision. Consequently, the Waste Confidence Review Group has chosen its 1 December 1989 report date to give themselves the opportunity to first review the MRS Commission report.

RISKS – The Waste Confidence Findings Review should have little, if any, direct impact on the near-term activities of the HLW Program. Indirectly, however, it could impact later activities by supporting legislative actions to adjust program schedules, by including an MRS or the need for

a second repository (some or all of which may also be suggested in the MRS Commission report). However, due to the tight schedule coupling of the Waste Confidence Findings and the MRS Commission report, there is some risk to the findings themselves. Unless the NRC staff works closely with the MRS Commission staff, the findings may be vulnerable to challenge on the grounds that the full ramifications of the MRS Commission's report were not included in the Waste Confidence Review.

ISSUE 4.4 – DOE and NRC Quality Assurance Activities

GAO has recently issued a report entitled "Nuclear Waste: Repository Work Should Not Proceed Until Quality Assurance is Adequate" (Reference 32). The report criticizes both DOE and NRC relative to QA activities on the Yucca Mountain site. Specifically, GAO says "In the area of quality assurance, . . . the timely identification of potential problems has not been realized because NRC has not had sufficient, early program involvement. Also, NRC has not been aggressive in ensuring that it receives adequate opportunities to assess DOE's program."

While the GAO concerns may be overstated, it is undeniable that an acceptable QA program is not only essential during site characterization activities, but also throughout the design, development, and construction activities of the program. In May 1988, NRC emphasized this point to DOE with respect to site characterization (Reference 32b), and DOE subsequently decided to delay the start of ESF construction for five months in order to put its QA program in place (References 9 and 33).

But there is also enough past and present evidence to cause concern to a qualified observer. For example:

- (1) Between August 1988 and February 1989, a series of USGS and DOE communications documented the concerns of the on-site USGS hydrologists (Reference 31). Their concerns centered on conflicts between the priorities in the on-site QA procedures, the inclinations of on-site management, and the geoscience quality sought by the hydrologists. Remedial actions have been developed, but the episode gives the perception that DOE has not yet put QA into proper balance with technical goals.
- (2) The latest NRC Five-Year Plan (Reference 5) indicates an intention to observe a minimum of seven DOE QA audits annually during FY 1989-1993, and to conduct two independent audits annually. However, the previous Five-Year Plan (Reference 4) included provisions for seven audits in FY 1989 and twelve annually thereafter. The perception could be given that NRC will not be auditing DOE's program as aggressively as originally planned.
- (3) DOE has recently compromised with NRC's plans to perform QA audits of on-site contractors. While the compromise provides NRC with 37 days to complete each audit (compared to the seven days proposed by DOE), it is also substantially less than the 12 weeks originally proposed by NRC (Reference 32b).

These kinds of events lend credibility to other observations in the GAO report that although NRC and DOE agreed in 1983 to a proactive consultation relationship, the agreement ". . . has not been effective in identifying and resolving problems early in the program." Further, the report notes that despite NRC's intention to "aggressively" oversee DOE's program, its oversight has largely been reactive, and although NRC has raised concerns about DOE's activities, most of the concerns remain unresolved.

RISK – The risk to the HLW program from a QA program perceived as being inadequate cannot be overstated, considering the degree of public and political participation that can be expected during the licensing process. The impact of this risk is largely on NRC, but will likely spill over to the Center in the form of technical staff requirements to support NRC QA audit and surveillance activities.

ISSUE 4.5 – Questions Concerning the Capacity of the Yucca Mountain Site

DOE has the responsibility to track and project the inventories of HLW and spent fuel, which is essential to such questions as the needs for on-site storage capabilities, repository (and possibly MRS) design acceptance rates, the trade-offs between on-site storage requirements and repository operational date, etc. Their Draft 1988 Mission Plan Amendment includes a projection of HLW and spent fuel discharges (Reference 22). It shows that with a Year 2003 operational date, the repository will not reach its statutory cap of 70,000 MTHM until Year 2026.

The actual outlook may be less reassuring. Nevada claims that DOE's projection grossly underestimates the amount and types of waste that need to be accepted at the repository (Reference 23). It is based on a "no new orders" case, and fails to include significant categories of waste such as transuranics from West Valley and commercial facilities, reactor decommissioning wastes, and Greater Than Class C (GTCC) wastes. It also does not account for the increased wastes anticipated from extended reactor operating lives, or some wastes from national laboratories. In total, Nevada estimates that these wastes could be between 16,800 to 20,600 canisters to be added to the repository (Reference 23).

Problems of increased waste volume may be compounded by the fact that the Yucca Mountain may be too small to emplace even the 70,000 MTHM planned for the repository (Reference 23). It is claimed that DOE acknowledges that there is little flexibility for lateral expansion of the 1,850 acres constituting the "primary site", that 1,420 acres will be required to emplace 70,000 MTHM, and that all space in the primary area may not be homogeneously usable.

OTA has further compounded this issue. They have reported a study indicating that the Yucca Mountain Site would be the best disposal site for GTCC wastes (Reference 28). GTCC wastes emit approximately the same radiation as HLW and would fill only 0.1% of the planned HLW repository. DOE objects to this idea on the grounds that GTCC wastes would have adverse impacts on repository design, cost, schedule, performance, and licensing (Reference 29). They also point out the potential problems arising from the character and quantities of the wastes involved and that these wastes might be subject to RCRA requirements.

RISK – The adequacy of the capacity available at Yucca Mountain could become a major issue during the near-term period. NRC, with support from the Center, should satisfy itself quickly on these conflicting claims. Continued program slippage, with further accumulations of waste, exacerbates the problem, unless planning for a second repository is reinstated. Such a reinstatement has its own impacts as well.

ISSUE 4.6 – Further Identification of Regulatory Uncertainties

One of the major contributions of the Center to the HLW repository program has been its systematic approach to the regulatory process through the Program Architecture and the associated ability to identify regulatory uncertainties. To date, the Center has demonstrated this capability on 10 CFR 60 Subparts B and E, which have been central to NRC's HLW rulemaking requirements.

Furthermore, in light of the above discussions of the MRS Commission and of the Waste Confidence Findings review, NWPA may be further amended in scope during the near-term period. Should that happen, a number of other regulations may require analysis by the Program Architecture procedure. Depending on the specific program changes, the regulations and statutes might involve 10 CFR 2, 20, 21, 61, 70, 71, 72, 100, and/or 960, and others, as covered in Appendix B. In any event 10 CFR 60 should be further examined for conformity with other regulations and statutes.

The remainder of 10 CFR 60 and numerous other regulations should also be subjected to analyses to reduce regulatory uncertainties and to ensure conformity with other regulations and statutes. Numerous candidates for such treatment have already been identified and prioritized by the Center. Priority will require revision in the event the MRS Commission Report or the Waste Confidence Findings initiate further program redirections.

Furthermore, EPA must revise and repromulgate 40 CFR 191 Subpart B as early as possible. Although the revised proposal may be offered for comment during the near-term period, it is unlikely to be finalized in that time frame. However, the final form of 40 CFR 191 Subpart B is so important to the repository program that NRC and the Center should posture themselves to be aware of, and contribute appropriately to the development of a revised rule that conforms as much as possible to other predecessor HLW regulations.

RISK – Without early identification of regulatory uncertainties, coupled with corresponding rulemakings or other actions, NRC's timely licensing performance will be at risk. In this regard, 40 CFR 191 Subpart B is of special importance, as is the assurance of conformity of 10 CFR 60 with related statutes and the reduction of regulatory uncertainties over the entire range of regulations that will govern the licensing of HLW system elements.

ISSUE 4.7 – Issues Introduced by Credible Sources

In a program of such high visibility and potential for controversy, there is a seemingly unlimited opportunity to be surprised by unexpected contributions from credible sources and at any time during the program. Some of the contributions will be supportive, others will not; all of them must be understood. The following examples illustrate the possibilities.

- (1) The National Research Council will report, this Spring, the results of an 18-month study on the utility of groundwater models for regulatory purposes (Reference 19). The report is expected to address the limitations of such models.
- (2) The Swedish Consultative Committee for Nuclear Waste Management has concluded that as the radionuclides decay over a long period of time, the chemical toxicity of stable (non-radioactive) components may become the dominant issue (Reference 17).

(3) The Canadian Technical Advisory Committee, made up of representatives from 8 Canadian technical and scientific societies, has endorsed the general concept of a multi-barrier isolation system for HLW (Reference 18). The Canadian HLWM program intends to emplace HLW in the stable Canadian Shield at depths of 500 to 1000 meters.

RISK – These issues and others can introduce or re-enforce new disruptive challenges to the program at any time. It impacts both the NRC and the Center in that it requires continuing identification of and interaction with other groups that are performing work related to elements of the program.

ISSUE 4.8 – Legal Challenges and/or Interventions

There are many possibilities and precedents for legal challenges and/or interventions in this program. Examples directly and indirectly related to this program follow:

(1) DOE has entered into contracts with the nuclear electric utilities in which DOE will assume ownership of spent fuel on 1 January 1998. Due to program slippages, DOE may be unable to do so, and there is the potential for a law suit to enforce DOE's performance (Reference 21) or to modify payments into the Waste Fund.

(2) In January 1989, DOE filed application for an administrative land withdrawal of the WIPP site as a step preparatory to opening the WIPP (Reference 44). The administrative procedure would be used only if Congress failed to legislatively withdraw the land (possibly out of concern over the potential for legal intervention).

(3) About the same time, a bill was introduced in Congress to withdraw the land needed for the WIPP and to allow its opening (Reference 45). A final version of the bill may include compensation for safeguarding the transportation of wastes through the affected states (see related comments under Issue 4.2). This proposal was met almost immediately with the threat of a lawsuit from five environmental groups, along with the Texas Attorney General (Reference 46). They assert that the WIPP site is not in compliance with RCRA or the nonexistent provisions of 40 CFR 191 Subpart B.

(4) DOE has requested that DOT rule Colorado's transportation requirements to be inconsistent with the Hazardous Materials Transportation Act (Reference 47). Colorado is requiring a fee, driver training certification, proof of liability insurance, nuclear incident plan, etc. DOE believes it is only a means to delay DOE's WIPP and NWPA shipments.

(5) The Nevada Agency for Nuclear Projects/Nuclear Waste Project Office (NWPO) has assembled a team of at least 150 engineers and scientists to review DOE's work and conduct independent research (Reference 50). Disciplines represented include the sciences and engineering, as well as financial, socioeconomic, transportation, and legal analysts.

It is obvious that there are numerous interest groups affected by this program, and they are prepared to enforce their interests by legal actions.

RISK – Legal intervention should be expected at any time in the program that opposition groups feel threatened by a proposed action. The impact of this issue is largely on NRC's Office of the General Counsel, who must attempt to guide the program's activities around such intervention to

the extent possible. Experience derived from earlier programs is important in this process. Also, another impact could result in programmatic scheduling delay due to these legal interventions.

5. THE LONGER-TERM OUTLOOK (FY 92 and Beyond)

The character of the HLW regulatory program can be expected to change dramatically as it proceeds from the near-term to the longer-term period. Work on site characterization, repository design and safety analysis will be coming to closure. Efforts will begin on license application design, the draft EIS, identification of candidate MRS sites (if any), integrated system cask program and cask certification. Further into the longer-term period, the program will be focused on convergence on approvals for all program elements – repository site approval and license application and transportation system approval and acquisition. It will likely be a chaotic period with issues emerging from the conflicting pressures to maintain program progress, or from attempts to stop it.

Nevertheless, a few issues can be perceived even at this time for the early part of this period. They are addressed below in the same manner as was done for near-term issues.

ISSUE 5.1 – Repromulgation of 40 CFR 191 Subpart B

The subject of 40 CFR 191 Subpart B was introduced earlier under Issue 4.6 as part of the expected need for continued analysis of regulatory uncertainties during the near-term period. However, the issues associated with 40 CFR 191 are likely to be more intensely contested at the beginning of the longer-term than the end of the near-term period, so they are discussed here.

EPA promulgated 40 CFR 191 in August 1985. It was challenged by several states and environmental groups. Two years later, in July 1987, the US Court of Appeals for the First Circuit agreed with the plaintiffs on two sections of the standards: (1) that they violated the Safe Drinking Water Act (SDWA) underground injection control (UIC) provisions; and (2) that certain containment standards appeared to be arbitrary or inadequately explained. The court vacated all of 40 CFR 191, and remanded it to the EPA for further consideration. In September 1987, the court agreed to reinstate all of the rule except for the two portions of Subpart B (the disposal standards) that had been previously found to be defective.

EPA is now revising these standards, and is committed to repromulgating 40 CFR 191 Subpart B as early as possible (Reference 14). It hopes to establish the rationale for the underground emplacement of nuclear wastes in Low-Level Waste regulations now being prepared and, by extension, decouple 40 CFR 191 from the UIC provisions of SDWA. It is also reassessing the original release and exposure standards in order to develop supportable standards that conform to other regulations.

Nevertheless, all of this will take time and will most probably again be challenged in Court. Consequently, it is unlikely to be settled in the near-term. When finally settled, it will have to conform with other regulations applicable to the HLW program, and it should be free of regulatory uncertainties. As a result, it is likely that NRC and, particularly, the Center will have to do a thorough uncertainty analysis, and retroactively determine that prior program activities were in compliance with the new rules.

Incidentally, this issue is also relevant to pending decisions on the WIPP. If Congress approves, DOE may begin to experimentally store TRU wastes in 1989. Within five years, DOE must find that the site is suitable for final disposal (rather than R&D and storage), and demonstrate compliance with 40 CFR 191. Otherwise, DOE will have to withdraw all wastes and decommission the facility.

RISK – The current uncertainty surrounding repromulgation of 10 CFR 191 Part B places the HLW repository program at considerable risk and requires continuous attention by the NRC and Center. At the least, it will require an analysis of regulatory uncertainties and regulatory conformity; at the worst, it could necessitate redoing significant portions of the site characterization. NRC and the Center need to monitor EPA's progress and contribute, to the extent possible, to the final form of the rule.

ISSUE 5.2 – Additional Efforts in the Event an MRS Option is Approved

Inclusion of an MRS in the HLW management program would significantly increase the demands on the NRC and the Center. Virtually all of the near- and longer-term functions performed for the repository would have to be done for the MRS as well. There might be some lag between the MRS activities and the corresponding ones for the repository, but only if the current MRS/repository linkage is left intact.

The functions involved would be expected to include: (1) clarification of siting issues or regulatory uncertainties; (2) ensuring that NRC regulations applicable to the facility conform with other statutes and regulations; (3) pre-license application guidance to DOE; (4) transportation issues (some of which may have arisen from DOE's proposed opening of WIPP); and (5) review and licensing of a possibly new or additional waste transportation cask, as required for MRS operations.

Depending on the chosen MRS option, the regulations that may require review and analysis of uncertainties include 10 CFR Parts 20, 21, 50, 51, 61, 70, 71, 72, 73, 100 Appendix A, and 960, and 40 CFR 191 (Reference 8). Other regulations related to transportation and containers may also require review.

An indirect impact of the addition of an MRS is that it may be accompanied by other program redirections as discussed under Issues 4.2 and 4.3. Such impacts are more likely to involve schedule than structural (i.e., HLW system elements) adjustments to the program.

RISK – Introduction of an MRS into the program could significantly add to the NRC/Center work program. Depending on whether there are other simultaneous program changes in scope or schedule, NRC might not be able to prepare to exercise its regulatory functions in a timely manner.

ISSUE 5.3 – Next Review of the Waste Confidence Findings

This issue is intended as a reminder that the next review of Waste Confidence Findings will take place in 1994, if not precipitated sooner by events deemed to be significant by the Commission. It seems clear that the next waste confidence review will be conducted at a critical time in the program, especially, if only limited progress has been made against the then mandated NWPAA requirements.

RISK – Too uncertain to project.

6. SUMMARY AND OBSERVATIONS

From its inception, the High-Level Radioactive Waste Management Program has been the subject of research, controversy, and political action. Most recently and significantly, the NWPAA realigned, extended,

and down-scoped the program. It also set in motion procedures that will almost assuredly result in further redirections of the program and additional regulatory requirements.

However, the NRC, with technical support from the Center, is responsible for the timely licensing of each element of the high-level waste management system. In such a dynamic environment, long range planning of the work program takes on special significance. With proper planning, NRC and the Center can start now to streamline the licensing process, identify and reduce regulatory uncertainties, and provide guidance and review to DOE's efforts. They can also examine potential program problems or redirections, and make plans for appropriate responses.

The Center has developed a Task intended to ensure consideration of program issues and risks within its overall planning activities. The task has two subtasks:

- Subtask 1 – Explore, identify, and define events or developments that could affect the overall program; and
- Subtask 2 – Assess the impacts of those events or developments on the work programs of the NRC and the Center.

The effort reported here is the first of the two subtasks above. It is intended for use by the Center in developing its Five-Year Plan. It may also be useful to the NRC for similar purposes.

The planning horizon for this first Subtask was divided into two time periods: (1) the "Near-Term" (i.e., FY 1990-1991); and (2) the "Longer-Term" (i.e., FY 1992 and beyond). Both of these periods are within the projected time frame of the Center's Five-Year Plan (FY 1990-1995)

Eight issues and associated risks were identified in the Near-Term, and three in the Longer-Term. All eleven issues and risks are tabulated on page 2. They are listed in approximate chronological order of their likely occurrence. Despite their number, all of the identified issues are believed to be manageable, given appropriate staff resources on a timely basis (i.e., both in numbers and skills mix). The next subtask in this two-step planning process (i.e., Subtask 2) is intended to estimate the timing and quantify the resource requirements likely to be posed by these issues.

In addition to identifying issues and risks, Subtask 1 has provided a useful data base of references from which the issues were drawn (see Appendix A). The data base is limited only by its time frame (essentially from NWPAA forward) and by the absence of source materials from adversarial or special interest groups.

Based on the apparent value of these planning subtasks, it is appropriate to incorporate them into the Center's annual planning activities.

APPENDIX A – REFERENCES

EXCERPTS FROM REFERENCES RELATED TO LONG-RANGE PLANNING FOR THE HIGH LEVEL WASTE MANAGEMENT PROGRAM

This Appendix is a compilation of excerpts taken from references related to the High-Level Waste Management (HLWM) Program. The references were tabulated by the Center for Nuclear Waste Regulatory Analyses (CNWRA) and, in general, post-date the passage of the Nuclear Waste Policy Amendments Act (NWPAA) of 1987.

The excerpts were chosen either for their significance to near- or long-term program planning needs, or to the early identification of potential program risks. Occasionally, an excerpt is included for its particular background value. The excerpts attempt to capture the essence of the referenced materials but may not precisely reflect the intent or the underlying technical, regulatory, or institutional details which may actually have originated in another document. There are occasional editorial comments; these are delineated by []s. In its present form, the document should be used as a source of program information.

There is a general order for the arrangement of the excerpts, which can be seen from the list of References beginning on page A-36. It begins with excerpts related to the NWPAA, followed by NRC Five-Year Plans and DOE Mission Plan issues, programmatic responsibilities, the Waste Confidence Findings review, the Monitored Retrievable Storage (MRS) Commission, the Waste Isolation Pilot Project (WIPP), and other topics of general interest.

Reference 1 – Nuclear Waste Policy Amendments Act of 1987

This Act amends the NWPA of 1982 in a number of significant respects. Principal changes are as follows:

Repository

- Elimination of all but the Yucca Mountain site.
- Termination provisions if the site is unsuitable.
- Requirements for EIS submission simultaneous with site recommendation to the President.
- No second repository site-specific work without specific congressional authorization.
- DOE will report on the need for a second repository between January 2007 and January 2010.

MRS

- The proposed MRS site at Oak Ridge is “annulled and revoked”. [However, the site is not disqualified.]
- Work on one MRS is authorized, but on a schedule relative to the repository such that a de facto surface repository is precluded.
- A 3-member MRS Review Commission is established, appointed by heads of the Senate and the House.

- The commission will prepare a report on the need for an MRS by June 1989.
- DOE may then conduct a survey of sites using such criteria as enhancement of system reliability and flexibility; impacts on transportation and handling of fuel and waste; improvement of public confidence; minimization of adverse effects; etc.
- Site-specific activities and selection will only require an environmental assessment, not an EIS.

Nuclear Waste Negotiator

- The Office of Waste Negotiator will be established within the Executive Office of the President; the office will expire 5 years after NWPA enactment.
- The negotiator will attempt to find and negotiate an agreement with a State or Indian Tribe willing to host a repository or an MRS at a technically qualified site.

Nuclear Waste Technical Review Board

- An 11-member technical review board is to be formed; candidates are to be submitted by the National Academy of Sciences.
- The board will review the technical and scientific validity of activities including site characterization and packaging or transportation of HLW or spent nuclear fuel.

Transportation

- No spent nuclear fuel or HLW may be transported except in packages certified by NRC.
- No plutonium may be carried by aircraft through US airspace unless using a container certified by NRC.

Subseabed Disposal

- Within 270 days of NWPA, DOE will report to congress on the current state of knowledge of subseabed disposal, cost estimate, institutional factors, public health and safety considerations, recommended further research, etc.
- An Office of Subseabed Disposal Research is established within the DOE Office of Energy Research.
- Within 60 days, DOE will establish a university-based "subseabed consortium" to investigate the technical and institutional feasibility of such disposal. The consortium is to develop a research plan and budget for (1) identifying and characterizing potential disposal sites, (2) developing conceptual disposal system designs, and (3) assessing the potential impacts of such disposal on human and marine environments. Progress reports are due to Congress in 1990 and 1995.

The program element schedules established by NWPA are presented in Tables I through III (pages A3-A5) and were taken from the DOE Systems Engineering and Development and Management (SEDM) Request for Proposals.

Table I
FIRST REPOSITORY SCHEDULE^a

<u>MILESTONE</u>	<u>CURRENT SCHEDULE</u>
Start of exploratory shaft construction	Second quarter 1989
Start advanced conceptual design	Fourth quarter 1989
Start of in-situ testing	Fourth quarter 1990
Start license application design	First quarter 1992
Draft environmental impact statement	1993
Final environmental impact statement	1994
Submittal of the site-selection report to the President	1994
Submittal of the license application to the Nuclear Regulatory Commission ^b	1995
Receipt of a construction authorization from the Nuclear Regulatory Commission	1998
Start of construction	1998
Start of phase 1 operations	2003
Start of phase 2 operations	2006

^aThe schedule is given in calendar years.

^bIt is assumed that the President's recommendation of the site to the Congress is submitted without delay, that no notice of disapproval is filed, and that the site designation becomes effective within 60 days of the President's recommendation.

Reference 2 – Minor Amendments to NWPAA Passed, Public Law 100-507. 18 Oct 88.

On 18 October 88, Congress amended two aspects of NWPAA:

1. The Office of the Nuclear Waste Negotiator was made an independent entity within the executive branch and
2. The MRS Commission report date was delayed to 1 November 1989.

Reference 3 – Nuclear Waste Policy Amendments Act of 1987, CNWRA, 22 Jan 88

This reference report, performed under the CNWRA Operations Plans, examines the content and potential planning consequences of the NWPAA. In addition to the NWPAA, the work refers to: (a) 10 CFR 50/51 Waste Confidence Decision, Federal Register, 31 Aug 84; (b) Mission Plan for the Civilian Radioactive Waste Management Program, Vol. 1, DOE; (c) OCRWM draft Mission Plan Amendment, DOE, Jan 87; (d) OCRWM Mission Plan Amendment, DOE, Jun 87; and (e) Proposed Rulemaking on Storage and Disposal of Nuclear Waste, DOE, NE/007, 15 Apr 80.

Table II
MRS PROGRAM SCHEDULE^a

<u>MILESTONE</u>	<u>CURRENT SCHEDULE</u>
MRS Review Commission appointed	First quarter 1998
Draft revised MRS Program Plan	First quarter 1989
MRS Review Commission Report	Second quarter 1989
Revised MRS Program Plan	Third quarter 1989
Start definitive MRS design	1990
Identify candidate MRS sites	1992
Select MRS site	1994 ^b
Submit license application to Nuclear Regulatory Commission	1995 ^b
Receive MRS authorization from Nuclear Regulatory Commission	1997 ^b
Start MRS construction	1998 ^b
Start MRS operation	TBD ^c

^aThis schedule, given in calendar years, assumes that DOE selects the site for the MRS (see Section 145 NWPA as amended). The conditions regarding MRS implementation and the MRS schedule could change if the MRS site is designated by enactment of a proposed agreement reached by the Nuclear Waste Negotiator and a State or Indian Tribe.

^bThe NWPA as amended (Sections 145-149) placed the following conditions on MRS implementation at a DOE selected site: The DOE cannot begin MRS siting activities until after the MRS Review Commission submits its report to Congress (June 1989); the DOE cannot select the MRS site until after the DOE recommends to the President the approval of a site for development as a repository; the DOE cannot submit the MRS license application to the Nuclear Regulatory Commission (NRC) until the MRS site selection becomes effective; and DOE cannot begin construction of the MRS until after NRC has authorized construction of the repository. The dates included in this schedule correspond to the above specified events in the repository schedule.

^cThe MRS facility will be made operational as soon as practicable; the date will depend on the specific MRS configuration and implementation strategy adopted.

Table III
TRANSPORTATION PROGRAM SCHEDULE^a

<u>MILESTONE</u>	<u>CURRENT SCHEDULE^b</u>
Award first cask development contract (from-reactor cask)	First quarter 1988
Issue transportation system requirements and description document	Second quarter 1988
Issue draft comprehensive transportation plan	Third quarter 1988
Complete management configuration decision strategy development	Third quarter 1988
Complete final cask designs	1991
Prepare conceptual design for cask maintenance facility	1990
Issue operating plan	1990
Cask prototypes available	1994
Initiate acquisition of service contractor for operations	1994
Begin cask fleet fabrication	1996
Begin operations	1998

^aThe schedule is given in calendar years.

^bThe transportation program with this schedule is designed to have an adequate operational transportation system available in 1988. As the revised dates of Nuclear Waste Management System facility availability are developed, the transportation program and schedule will be modified.

Reference 3 – Cont'd.

The report presents program timelines (seen in many other reports, and possibly of CNWRA origin) for the repository, the MRS and other program elements, drawn from NWPA and NWPAA. The report then discusses direct and indirect impacts of the NWPAA, as well as a number of unresolved issues.

- Direct Impacts – Typical impacts are discussed as follows: (1) a single site makes the program more vulnerable to delay if the site fails to be qualified (probably between now and 1993); (2) the State of Nevada could delay the program by exploiting the negotiating authority of the Nuclear Waste Negotiator; (3) delay of construction authorization of the repository will also delay construction of the MRS, even though MRS authorization may have been obtained; (4) late negotiations with a State other than Nevada could produce confusions not addressed in NWPAA; (5) reducing the program to one site impacts the NRC's ability to make its mandatory Waste Confidence decision in general, and to be sure of a site's availability by 2007; and (6) a variety of "also rans" could impact NRC/Center activities such as air- and ground-transport waste containers, subseabed disposal, and dry cask storage.

- Indirect Impacts – In this category, the primary impacts are on NRC in supporting data requirements of the Waste Negotiator, MRS Commission, and the Nuclear Waste Technical Review Board.
- Risk Management – The document notes that despite (or because of) the reduction in candidate repository sites and the inclusion of provisions for an MRS, the NRC should have contingency plans to reduce the risk and/or reallocate resources for such alternative scenarios as:
 1. Repository on schedule [with or without an MRS]
 2. Repository behind schedule; no alternative site under negotiation [with or without an MRS]
 3. Repository behind schedule; alternative site under negotiation [with or without an MRS]
 4. Repository on schedule and alternative site under negotiation [with or without an MRS]

Similarly, new risks are introduced to the cask design/development/certification program scheduled for completion by 4th quarter 1992. Rather than develop a single design compatible with any of the three previous sites, DOE can now optimize the cask for Yucca Mountain, with potentially serious problems, if that site is disqualified.

Still another risk is associated with the availability of an MRS. Since MRS construction cannot precede construction authorization of the repository, the MRS may not be available before operations begin at the repository.

Reference 4 – NRC Five-Year Plan, FY 88-92, March 88

These excerpts deal with two portions of the NRC's five-year plan. The portions cover the High-Level and Low-Level Waste Programs and the Transportation and Safeguards Programs.

For the High- and Low-Level Waste Programs, the resources assigned are:

	FY 1988 Estimate	FY 1989 Estimate	FY 1990 Estimate	FY 1991 Estimate	FY 1992 Estimate
Program Support	\$ 9,421	\$ 9,825	\$ 11,250	\$ 10,700	\$ 10,700
Travel	324	334	340	340	340
(NRC Staff)	(140)	(141)	(140)	(140)	(146)
In thousands of dollars					

The mission area includes a number of Elements: (1) HLW storage and disposal; (2) low-level wastes; (3) uranium recovery activities; and (4) related remedial actions. The total mission area is mandated by the NWPA and NWPAA, the Low-Level Radioactive Waste Policy Act (LLRWPA) of 1980, the Low-Level Radioactive Waste Policy Amendments Act of 1985, and the Uranium Mill Tailings Radiation Control Act (UMTRCA) of 1978. Only the first element is discussed below.

HLW Disposal Facility Licensing Program Element – CNWRA is described as an NRC resource only under this Program Element. It is described as being established in FY 88 and being fully

operational by FY 89. "It will provide support . . . for NRC activities related to geologic repository and monitored retrievable storage facilities, transportation, and environmental and other activities associated with the storage and disposal of nuclear waste under the NWPA. More specifically the CNWRA's staff will: (1) provide expertise and timely advice and recommendations to the NRC to enable judicious and timely program decisions; (2) provide timely advice and recommendations to the NRC concerning technical problems and solutions, significant technical advancements, applicability to NRC's program, and integration of such activities with the NRC program; (3) conduct a program of regulatory research to provide technical support to NRC's regulatory decisions under the NWPA, and (4) provide technical assistance to the NRC in activities that cut across all elements of the waste management program, including quality assurance and performance assessment."

The resources allocated to the HLW Disposal Facility Licensing Program Element are shown on the following table. This is a success oriented plan. There is no acknowledgement in the plan for anything going wrong with respect to site qualification, meeting reasonable assurance requirements, legal interventions, complications related to an MRS (or no MRS), schedule delays and utility demands for relief, etc.

HLW Licensing Program Resources

	FY 1988 Estimate	FY 1989 Estimate	FY 1990 Estimate	FY 1991 Estimate	FY 1992 Estimate
Program Support (NRC Staff)	\$ 7,226 (69)	\$ 6,845 (69)	\$ 8,000 (69)	\$ 7,750 (69)	\$ 7,750 (69)
In thousands of dollars					

The other excerpt directly related to the CNWRA work program is in the Nuclear Material Transportation and Safeguards Program. This program is concerned with the safety of packages used to transport SNM, and with threats of radiological sabotage or theft. From FY 88 through 92 this program will emphasize the review of transport package designs required to satisfy NWPA, cooperate in strengthening International Atomic Energy Agency safeguards, and develop review criteria related to certification of plutonium air shipment packages.

Resources allocated to this program are relatively unchanged:

Transportation and Safeguards Resources

	FY 1988 Estimate	FY 1989 Estimate	FY 1990 Estimate	FY 1991 Estimate	FY 1992 Estimate
Program Support (NRC Staff)	\$ 2,430 (89)	\$ 4,595 (86)	\$ 3,600 (87)	\$ 3,100 (87)	\$ 3,100 (87)
In thousands of dollars					

Reference 5 – NRC Five-Year Plan, FY 89-93, Feb 89

This five year plan differs significantly from the preceding year's. It is responsive to the detailed guidance given by Jesse Funches in a "Revised Mission Area Narrative for the FY 89-93 Five Year Plan", dated 12 Jan 89. In particular, and in response to OMB guidance, it consolidates all activities for the NWPA into a "High-Level Nuclear Waste Regulation Mission Area". This mission area includes three major programs, and a number of Program Elements:

1. High-Level Waste Licensing Program;
 - HLW Repository Licensing (Element), and
 - HLW Storage and Transportation (Element)
2. Confirming the Safety of High-Level Waste Disposal Program
 - (No Elements)
3. Independent Safety Advice and Adjudicatory Reviews Program
 - Advisory Committee on Nuclear Waste (Element)
 - Atomic Safety and Licensing Board Panel (Element)
 - Atomic Safety and Licensing Appeal Panel (Element)
 - Office of the General Counsel (Element)
 - Governmental and Public Affairs (Element)

The resources allocated to this mission area are higher (\$1.5 to 4.5M) than in the previous plan, due almost entirely to the addition of the second and third programs, and deletion of the Low Level Waste and the Transportation and Safeguards programs from this mission area.

HLW Regulation Mission Area Resources

	FY 1989 Estimate	FY 1990 Estimate	FY 1991 Estimate	FY 1992 Estimate	FY 1993 Estimate
Program Support	\$ 11,352	\$ 13,822	\$ 14,622	\$ 15,237	\$ 15,737
Travel	220	220	220	220	220
(NRC Staff)	(95)	(102)	(104)	(109)	(110)
In thousands of dollars					

Each of the three program areas is addressed exhaustively, with descriptions of goals, planning assumptions, objectives and guidance, and program elements and activities. Highlights of each follow.

High-Level Waste Licensing Program – is concerned with the timely implementation of NRC's responsibilities for (1) repository licensing and (2) waste storage and transportation. Its goal is to provide DOE with necessary guidance; identify and resolve licensing issues; and enable the Commission to perform its appropriate functions. Resources for this program are stated as follows:

High Level Waste Licensing Program Resources

	FY 1989 Estimate	FY 1990 Estimate	FY 1991 Estimate	FY 1992 Estimate	FY 1993 Estimate
Program Support (NRC Staff)	\$ 7,385 (75)	\$ 8,750 (78)	\$ 8,750 (75)	\$ 8,650 (76)	\$ 8,650 (77)
In thousands of dollars					

The allocation of resources is essentially the same as in the previous plan, primarily due to deletions of Independent Spent-Fuel Storage and MRS licensing and addition of High Level Waste Storage and Transportation. It is noted that NRC faces increased requirements for (1) developing Technical Positions and Rulemakings, (2) closer observation of DOE QA audits, and (3) development of independent assessment capabilities. Other factors cited, (most of which appeared in the previous plan), follow.

NRC will be involved in iterative reviews of DOE's work

- DOE will issue approximately 30 study plans in FY 89 (70 more later). NRC will review selected study plans.
- NRC actions under NWPA will be narrowly interpreted and will not include oversight of all DOE actions.
- NRC's rulemaking on radioactive waste disposal (SECY-88-51) is expected to encompass DOE's reprocessing waste streams. This could significantly impact NRC's tasks; no resources have yet been allocated.
- An MRS facility application is not likely before FY 94.
- Consequently, utility applications for dry and other storage additions are likely in the 1991-1993 time period, and from DOE for Federal Interim Storage later. NRC must be prepared to conduct such licensing activities, preferably on a non site-specific
- The CNWRA will continue to provide limited technical assistance during FY 89 and will be fully operational in FY 90. [This represents a one year slip from the corresponding statement in the prior year's plan.]
- The NRC staff will interact with the Office of the Nuclear Waste Negotiator, the Nuclear Waste Technical Review Board, and the MRS Commission; and with Nevada, affected Indian tribes, and other interest groups.
- NRC will continue to develop the regulatory framework, criteria and evaluation methods necessary to establish reasonable assurance of waste isolation, and will support the resolution of technical and quality assurance or control issues. It will also continue to develop an appropriate system for the definition and categorization of wastes.
- NRC will continue to review and streamline the repository licensing processes (e.g., rulemakings, safety and safeguards review plans, format and guide for the license application, etc.).
- NRC will implement a quality assurance requirement/ guidance based on reactor licensing that will be adequate for use by DOE.

- System development required under NWPAA is the responsibility of DOE and will not be duplicated by NRC.
- NRC will implement an inspection program to support review of the repository from site characterization through closure. [Does this mean an on-site Las Vegas presence for the Center?
- NRC will continue efforts for early outreach to other jurisdictions, interested parties, etc.
- NRC will continue monitoring DOE's inventory and projection of waste generation to ensure early identification of capacity problems
- NRC will continue to develop its ability to review package designs for the transportation of spent fuel and high-level wastes, to develop appropriate regulatory approaches, and to coordinate its transportation responsibilities with other federal agencies.
- The commission has approved the concept of NRC administrating the LSS, once developed by DOE. No resources for this are included in the plan. (Reference pg VI-2)

The "charter" of CNWRA is described on pg VI-9, within the discussion of the HLW Repository Licensing (Program Element). Resources for this element are shown on the next page, and are virtually unchanged from the previous plan.

Activities within this program element are described under the headings of (1) NWPAA Regulatory Requirements and Technical Guidance; (2) Technical Assessment Capability for Repository Licensing Reviews; (3) Quality Assurance; and (4) Site Characterization Review. Representative new activities under the first (and largest) heading follow.

High Level Waste Licensing Program Element Resources

	FY 1989 Estimate	FY 1990 Estimate	FY 1991 Estimate	FY 1992 Estimate	FY 1993 Estimate
Program Support (NRC Staff)	\$ 6,945 (69)	\$ 8,000 (69)	\$ 7,750 (66)	\$ 7,650 (67)	\$ 7,650 (68)
In thousands of dollars					

- Technical positions will be developed to clarify certain requirements of 10 CFR 60 or to demonstrate compliance with NRC regulations. (Approximately 22 technical positions will be developed during the five year period.)
- NRC staff will support HLW rulemaking activities; the waste confidence findings review; the revision of 10 CFR Parts 2, 51 and 60 to bring them into conformity with NWPAA, NWPAA and NEPA; and further to conform 10 CFR 60 to 40 CFR 191 Part B, now under revision by EPA.
- NRC will develop review plans for the DOE's semiannual SCP progress reports, for DOE's Study Plans, and for the License Application. Additionally, NRC's intention to develop independent assessment modeling capabilities has been down-scoped to use available codes where possible.

- NRC will observe at least 7 DOE QA audits, and independently conduct 2 audits annually, down from the prior plan of 5 audits in FY 88, 7 audits in FY 89, and 12/yr thereafter, all of them independent.
- Much of the above work is likely to involve CNWRA. In addition this section of the Five Year Plan states . . .

“During this [five year] period, CNWRA will identify for each requirement of 10 CFR 60 and other federal statutes and regulations the findings needed to demonstrate compliance with each requirement; the regulatory, technical, and institutional uncertainties; the information needed to reduce uncertainties; and the regulatory guidance and license review capability needed. In addition to the activity, in FY 1989 the CNWRA will support the NRC’s review of DOE’s statutory site characterization plan and study plans and will begin to support NRC’s development of technical positions and assessment methods. The CNWRA phase-in will be complete by the end of FY 1990, at which time essentially all High-Level Waste program technical assistance will be performed through the CNWRA.”

Confirming the Safety of HLW Disposal Program – is concerned with the acquisition of technical data and independent assessment methods for evaluating the claims made by licensees and applicants that their disposal facility will isolate radioactive materials over the specified periods of time. Typical issues of concern are (1) the applicability of short-term small-scale tests, (2) the adequacy of the geologic/hydrologic characterization of the Yucca Mountain Site, and (3) the acceptability of the performance assessment modeling proposed by DOE. Resources allocated to this program are:

Confirming the Safety of HLW Disposal Program Resources

	FY 1989 Estimate	FY 1990 Estimate	FY 1991 Estimate	FY 1992 Estimate	FY 1993 Estimate
Program Support (NRC Staff)	\$ 3,900 (10)	\$ 5,000 (10)	\$ 5,800 (10)	\$ 6,500 (10)	\$ 7,000 (10)
In thousands of dollars					

Independent Safety Advice and Adjudicatory Reviews Program – It is concerned with providing the Commission with independent technical review of and advice on the management and disposal of nuclear waste, independent adjudicatory reviews of NRC HLW regulatory activities, legal advice and assistance on HLW management issues, and effective liaison with outside organizations. This program supports the activities of a number of boards and panels including the Advisory Committee on Nuclear Waste (ACNW), the Atomic Safety and Licensing Board Panel (ASLBP), and the Pre-License Application Licensing Board. The substantial growth in this program is attributable to the support expected to be required by the latter board. Program resources are:

Independent Safety Advice and Adjudicatory Reviews
Program Resources

	FY 1989 Estimate	FY 1990 Estimate	FY 1991 Estimate	FY 1992 Estimate	FY 1993 Estimate
Program Support (NRC Staff)	\$ 67 (10)	\$ 72 (14)	\$ 72 (19)	\$ 87 (25)	\$ 87 (23)

In thousands of dollars

Reference 6 – NRC Budget by Mission Area, Inside NRC, 16 Jan 89

The preceding budget data is different (and certainly more official) than the FY 89 budget estimated in this earlier reference. As in the previous reference, the NRC Mission area related to NWPAA activities is carried on one line.

Reference 7 – Regulatory Strategy and Schedules for the HLW Repository Program, NRC [Policy Issue] SECY-88-285, 5 Oct 88

This is a comprehensive paper that provides background and status of NRC staff plans and actions related to licensing the HLW repository. Some noteworthy portions:

- A prior paper (SECY-88-227) covered the rulemaking actions previously approved (the specific rulemakings, as well as potential additional rulemakings are listed in enclosures 7 and 8). An earlier paper (SECY-86-323, dated 30 Oct 86) described alternative approaches for streamlining the licensing of a geologic repository. Overall program schedules are given as an enclosure.
- The licensing process is characterized as five distinct phases (enclosure 4); (1) prelicense application involving both informal reviews and consultation with DOE's SCP, and formal reviews of DOE's SCP and semi-annual progress reports; (2) formal licensing activities related to construction authorization; (3) actions leading to NRC's license to receive waste; (4) license amendments related to permanent closure; and (5) eventual license termination.
- The existing regulatory framework (pg. 4) consists of (1) 10 CFR 60, "Disposal of High Level Radioactive Wastes in Geologic Repositories"; (2) 10 CFR Part 2, "Rules for Domestic Licensing Proceedings"; and (3) 10 CFR Part 51, "Environmental Protection Regulation for Domestic Licensing and Regulatory Functions." Additional regulations are incorporated by reference into the above regulations, viz., the Commission's 1981 "Licensing Procedures for HLW in Geologic Repositories (46 FR 13980) and its 1983 "Technical Criteria for HLW in Geologic Repositories" (48 FR 28204). Additional guidance to DOE exists in the form of Technical Positions and a Regulatory Guide.
- NRC staff have been concentrating since 1986 on defining the regulatory framework needed to resolve regulatory, technical and institutional uncertainties. For example, staff review of DOE's CDSCP resulted in concern over DOE's interpretation of "substantially complete containment" in 10 CFR 60, and is therefore considering a rulemaking to clarify the terms in question. Similarly, a perceived lack of compatibility of storage containers for on-site storage and for transportation and final disposal suggests the need for another rulemaking.

NRC BUDGET BY MISSION AREA
(Dollars in Millions)

	FY-89 (Estimate)	FY-90 (Estimate)	% Change (FY-89 to FY-90)	FY-91 (Estimate)	% Change (FY-90 to FY-91)
Direct Program:					
Reactor safety and safeguards regulation	157.0	175.7	11.9	176.9	0.7
Nuclear safety research	111.1	124.0	11.6	111.1	9.4
Nuclear material and low-level waste and safeguards regulation ⁽²⁾	37.5	40.9	9.0	135.7	-0.2
High-level nuclear waste regulation ⁽³⁾	19.4	23.2	19.6	40.8	4.3
Special and independent reviews, investigations, and enforcement	35.7	36.6	2.5	24.2	-2.2
Nuclear safety management and support	65.3	71.7	9.8	72.3	0.8
Office of the Inspector General ⁽⁴⁾	0.0	2.9	100.0	2.95	1.7
Total Obligations:	426.0	472.1		485.8	
Direct program	2.5	2.5		2.5	
Reimbursable program					
Offsetting collections from federal funds	-2.5	-2.5		-2.5	
Recovery of prior year obligations	0.0	0.0		0.0	
Unobligated balance, start of year	6.0	0.0		0.0	
Unobligated balance, end of year	0.0	0.0		0.0	
Budget authority (appropriated funds)	420.0	472.1	12.4	485.8	2.9
User fees (amount, % of budget recovered)	124.0 (45%) ⁽⁵⁾	156.8 (33%) ⁽⁶⁾			

(1) NRC estimate, not approved by the administration.

(2) New budget category in FY-90. In previous years, both low-and high-level nuclear waste were funded under one budget category. This year, low-level waste was added to nuclear material safety and safeguards regulation category.

(3) New budget category in FY-90. Represents receipts from the Nuclear Waste Fund to reimburse NRC for its expenses in licensing a high-level waste repository in Yucca Mountain, Nevada, as well as other licensing, inspection, environmental reviews, storage, transportation, and disposal activities and independent safety and adjudicatory reviews of NRC regulatory actions.

(4) Separate appropriation account fund, as required under public law 100-504, although the money is counted under NRC's overall budget.

(5) Projected actual total. User fee base is calculated by using 45% of NRC's budget (\$189 million), and subtracting \$15 million for reimbursements from the Nuclear Waste Fund and about \$50 million in general licensing fees.

(6) High-level waste reimbursements would be excluded from user fee base. Actual amount to be collected will depend on NRC's final FY-90 appropriation and the final percent of the agency's budget that Congress determines must be collected from user fees.

Source: NRC

- There is general discussion under the heading of Reducing Uncertainties. In the case of Regulatory uncertainty the approach is to use rulemakings, Technical Positions, and at least one regulatory guide. The advantage cited for rulemakings is that under 10 CFR Section 2.758 the Commission's rules cannot be challenged in a licensing proceeding. Nine new rulemakings are under consideration (enclosure 8 of the reference). To their credit, they acknowledge that rulemaking may be inappropriate where technology is still evolving.
- In the case of reducing technical uncertainties, NRC believes DOE has primary responsibility for that, including prelicensing consultation with NRC, Nevada and other interested parties. However, NRC will prepare Technical Positions (with criteria) for DOE's guidance where standard testing or analysis methods are not available or are controversial. The criteria will also facilitate NRC's review of DOE work. A similar mechanism planned to be used is through comment and objection to DOE Topical Reports and Issue Resolution Reports, which will also facilitate early resolution of differences.
- In the case of institutional uncertainties, four rulemakings have been suggested. These deal with the Waste Confidence issue, NWPA provisions related to DOE's EIS, Licensing Support System requirements and operations, and possible revisions to the content requirements for a license application.

The conclusions given in the report are:

- The regulatory framework for licensing a repository is in place.
- In order to identify Uncertainties and to refine this framework the staff has scheduled the following activities:
 - Nine potential new rulemakings and one regulatory guide are planned to reduce regulatory uncertainties. If rulemakings are inappropriate, Technical Positions will be issued.
 - Four ongoing and potential rulemakings are planned to resolve institutional uncertainties.
 - Twenty-two Technical Positions are planned to provide guidance for DOE's reduction of major technical uncertainties.
- The pre-licensing application review and consultation will complement Technical Positions in resolving issues before license application.
- No additional resources are needed in FY 89 for the potential rulemakings.

Reference 8 – Regulatory and Statutory Uncertainties, CNWRA memos dated 2 Sept through 1 Nov 88

This is a collection of four unpublished inter-office communications between Spector/Brown and Patrick/Whiting dealing with work instructions and related discussions associated with the identification of Regulatory and Institutional Uncertainties. These memos were work directions to try to begin or expedite work/planning tasks for specific areas within the Center. The original request prioritized interests (in descending order) as follows:

- Regulations (etc) of historical significance, such as the Atomic Energy Act of 1954, Energy Reorganization Act of 74, NWPA of 82 and NWPA of 87, 10 CFR 60, 10 CFR 960 and 40 CFR 191;

- Others related to siting and site characterization, such as 10 CFR 100 Appendix A, 10 CFR 50 Appendix F and 10 CFR 61.55;
- Those related to public concerns and likelihood of controversy, such as 10 CFR 51 and 10 CFR 71; and
- Regulations which must be reviewed, but can be delayed, such as 10 CFR 20, 21, 70 and 72.

Motivation for the effort was related to the accelerated delivery of products under Mod. 12 of the contract, scheduled for 12/21/88, and the need for a report on recommended rulemakings. The reviewers make interesting points such as the fact that the original Atomic Energy Act does not deal with waste but is instead concerned with source, special, and by-product materials; that the NWPA and the NWPAA are ambiguous about MRS; that the NWPA poses a supremacy conflict between federal and state powers; that NWPAA may experience conflicts with SDWA, CWA, CERCLA, and RCRA; that DOE regulations in 10 CFR 960 predated NWPAA and therefore are concerned with site selection rather than characterization; and that EPA's 40 CFR 191 was in conflict with SDWA.

Patrick/Whiting requested studies in somewhat different directions. For example, they wanted to know if regulations (such as 10 CFR 60) have completely picked up subsequent requirements (such as 42 USC 5842), or if the agencies affected by NWPAA's inclusion of an MRS option has been accommodated by corresponding adjustments to their regulations, or if an equivalent to 10 CFR 960 is needed for the MRS, etc. There also was the suggestion for more focus, specifically that the Center "needs to strike a balance between identifying the 'sleeper' issues while not finding an uncertainty behind every bush"

Reference 9 – Briefing to ACNW on HLW Management Regulatory Strategy and FY 89 Program, 23 Jan 89

This briefing was given to the ACNW on 1/23/89. It discusses the current strategy for evaluating and refining the existing regulatory framework given in SEC-88-285. Official NWPAA timelines are given, including description of the five sequential phases of the repository licensing process.

The primary licensing regulations are discussed:

(1) 10 CFR 60 for disposal of HLW in repositories; (2) 10 CFR Part 2, rules of practice for licensing procedures; (3) 10 CFR Part 51, environmental protection regulation; and (4) numerous technical positions and one regulatory guide. There is also discussion of the processes planned for reducing regulatory uncertainty, technical uncertainty and institutional uncertainty.

The briefing concludes with a detailed work breakdown, staffing and budget plan for FY 89; a detailed timeline for NRC's Phase II licensing activities; a collection of rulemakings to reduce regulatory uncertainties; and a letter from Thompson (NRC) to Rousso (DOE) which contains a reference to a March 1986 Project Decision Schedule (PDS).

(See also Reference 10 for a memo report of ACNW remarks)

Reference 10 – Meeting Report, Briefing to ACNW on HLW Management Strategy and the FY 89 Program, dated 2 Feb 89

The following observations were made by ACNW members during the course of the meeting:

- The time line of major milestones is of concern to the ACNW (i.e., DOE application to construct – 3/95; construction authorization – 3/98; all NRC guidance on license application to be in place by early 93)
- The current regulatory framework includes (1) doubtful interpretation of regulations, (2) ambiguities in what is required through technical demonstration, and (3) unclear institutional roles and schedules.
- The ACNW expressed some concern that there is only one regulatory guide (4.17) but 17 technical positions.
- The CNWRA Program Architecture was questioned by the ACNW. It was defended as being the learning process of a new contractor, that the PA has already proven useful, and that it is being used primarily to research Subparts B and E of Part 60.

NMSS plans to develop its own Performance Assessment capability; ACNW questioned this approach suggesting instead that NRC and DOE arrive at common models.

ACNW recognizes the issues and hazards of site characterization. Some of them seem to prefer rulemaking, whereas the NRC staff prefers “technical positions” for greater flexibility. [There seems to be a basic disconnect here. Program Architecture could get caught in the crossfire, unless it is accepted as credible and useful.]

Reference 11 – Regulations and Statutes Having Potential to the Repository Program, NRC letter from J. Bunting to J. Latz, dated 19 Feb 88

Letter response to CNWRA regarding a draft listing of regulations and statutes of programmatic concern. The letter includes a similar document from the Nevada Project Office which lists numerous regulations and statutes, and examines their applicability to the HLWM program.

Reference 12 – Final Specification/Acceptance Criteria for... Milestones R7,...R8 and R9..., W. Patrick, CNWRA, 12 Aug 88

This document provides a description of the referenced deliverables, which include the accelerated delivery of (1) the proof-of-system for the Program Architecture, (2) items recommended for rulemaking, and (3) areas of recommended staff emphasis for review of the Yucca Mountain SCP. It explicitly describes the purposes of R8 and R9 as follows:

“(1) an analysis and evaluation of those regulatory, institutional and technical uncertainties pertaining to siting, identifying those recommended for resolution by rulemaking, and their relative priority, together with supporting rationale; and

(2) an analysis and evaluation of the regulatory requirements and their relative importance to siting that could be an aid to identifying those aspects of the SCP that should have priority consideration in the NRC staff review”.

Included as Attachment 2 to the document is a listing and categorization of those statutes and regulations identified to date as having potential application to the NRC HLW program. That listing is reproduced in this document as Appendix B. [Note: The materials shown in Appendix B were under revision at the time this document was prepared and will change somewhat.]

Reference 13 – Environmental Documents Pursuant to 10 CFR 51, CNWRA memo, dated 18 Jan 89

This memo describes the procedural requirements in 10 CFR Part 51 for environmental assessments, environmental reports, environmental impact statements, finding of no significant impacts, and supplements to or comments upon those documents and notices of intent.

Reference 14 – Regulatory Responsibilities and Issues Associated with the HLW Program; Attribution and date missing, but believed to have been an EPA presentation at the Tucson Waste Management Meeting, Feb 1989, 11 pages

This document discusses the background of current institutional responsibilities and regulations. Current issues whose resolution could affect the NRC/CNWRA program are identified. The following describes the most salient issues.

EPA promulgated 40 CFR 191 in August 1985; it deals with the management and disposal of spent nuclear reactor fuel and high-level and transuranic radioactive wastes. It was challenged by several states and environmental groups, and in July 1987 the US Court of Appeals for the First Circuit agreed with the plaintiffs on two sections of the standards, vacated all of 40 CFR 191, and remanded it to the EPA for further consideration. In September 1987, the court agreed with EPA's request to reinstate all of the rule except for the two portions of Subpart B (the disposal standards) that had been found by the court to be defective. EPA is now revising these standards, and will proceed with the process of repromulgating them after public comment.

This issue is particularly relevant to pending decisions on the Waste Isolation Pilot Plant (WIPP). WIPP is a DOE R&D facility. If congress approves, DOE may begin to experimentally store (in a retrievable form) TRU wastes in 1989. Within five years of such storage DOE must either find that the site is or is not suitable for disposal of such materials. If it is suitable DOE must declare it to be a disposal (rather than R&D) facility, and must comply with 40 CFR 191. If not, all wastes must be withdrawn, and the facility decommissioned.

Subpart B of 191 deals with the disposal of nuclear wastes. The significant parts at issue are:

- Section 191.15 defines a "significant source of groundwater" as an aquifer and specifies allowable dissolved solids, depth and pumping capacity, and that it "... provides the primary source of water for a community water system ..."
- Section 191.16 defines a "special source of ground water" as an aquifer within the controlled area of a disposal system (or less than 5 km outside) that is supplying drinking water for thousands of people at the time the site is designated for nuclear waste disposal, and is an irreplaceable source of drinking water for that population.
- Section 191.13 sets cumulative limits on radionuclide releases to the accessible environment for the first 10,000 years; Section 191.14 identifies "assurance requirements"; Section 191.15 sets annual dose limits for individuals consuming water from a "significant source of drinking water"; and 191.16 sets radionuclide limits for water withdrawn from a "special source of ground water".

The main challenges originally filed against 40 CFR 191 were (1) violation of the Safe Drinking Water Act's (SWDA) underground injection control (UIC) section; (2) inadequate notice and comment opportunity on the groundwater protection requirements; and (3) certain standards which were felt to be arbitrary or inadequately explained.

The court found that the DOE method for disposing of nuclear waste in geologic repositories might fit the SDWA definition of underground injection. On the issue of standards, the court felt that NWPA had allowed endangerment of ground water within the controlled area, and thereby validated EPA's consideration of the geologic setting to be part of the containment system. Outside the controlled area, however, the court found that 191.15 would allow endangerment of drinking water supplies. Further, since 191.15 only applies for 1,000 years, the court observed that apparently unlimited degradation is allowed thereafter. Specifically, then, the court concluded that (1) 191 be consistent with SDWA standards (or that differences be justified); (2) the 1,000 year standard appeared to be arbitrary and required reconsideration and justification.

EPA's current plans reflect the following beliefs:

- They do not agree that underground disposal is at odds with UIC provision of SDWA. It is incorporating its rationale in LLW regulations to be released shortly and, if promulgated, will be the basis for decoupling 191 from the UIC provisions of SDWA.
- EPA acknowledges the need for consistency among related rules and is looking at the new LLW standards, the Uranium Mill Tailings standards, the Wellhead Protection Program (1986 amendments to SDWA), the SDWA standards, and relevant rules under the Resource Conservation and Recovery Act (RCRA).
- EPA also plans to review the proposed time period standard for individual exposure. Rather than focus on 1,000 years, EPA will consider time frames from 1,000 to 10,000 years. EPA will also reexamine recent changes in radiation dosimetry factors, risk coefficients, etc. to see if the containment release requirements should be altered.

Reference 15 – Application of Resource Conservation and Recovery Act (RCRA) to Geologic Repositories, James Wolf, NRC, date unknown

A letter analysis of RCRA to Stuart Treby which acknowledges the applicability of RCRA to the HLW program. Previous lack of attention by NRC staff is explained by:

- (1) HLW wastes may not be "hazardous" according to the terms of RCRA;
- (2) even if they are, the responsibility for complying with RCRA rests with DOE;
- (3) practical considerations (viz. DOE compliance initiatives) preclude effective NRC policy-making action on RCRA;
- (4) since DOE is aware of RCRA requirements it would be gratuitous for NRC to initiate compliance measures; and
- (5) NRC will have opportunity to address RCRA implications when it considers amending 10 CFR Part 61 to require disposal of Greater Than Class-C wastes in a deep geologic repository.

Reference 16 – Re-Authorization of the Resource Conservation and Recovery Act (RCRA); Excerpt from Nuclear Waste News, 11 Aug 88 and 3 Nov 88; CNWRA PIS 9-88 and 13-88

Capitol hill staffers predict that congress will need the whole session to consider a RCRA bill, since it is likely to contain controversial solid waste provisions. They also predict that the Senate is

likely to tack onto a RCRA reauthorization five federal facility bills, rather than pass them in free-standing form. The bills would extend federal and state environmental laws to federal facilities. It would clarify the applicability of RCRA to mixed hazardous and low-level radioactive wastes, and ensure that federal agencies are treated the same as private industry under environmental laws. A sticking point to some members of congress is the limitation of sovereign immunity for federal facilities.

Reference 17 – Swedish Study Suggests Chemical Risks from Waste Repositories, Excerpt from Nuclear Waste News, 9 Jan 89; CNWRA PIS 3-89

The Swedish Consultative Committee for Nuclear Waste Management has concluded that as the radionuclides decay over a long period of time, the toxic effects from stable non-radioactive components may become the dominant issue. The ultimate effect may be small but it should be considered in the course of hazards assessments. The chemical contaminants of potential concern include: boron, bromine, cadmium, chromium, cesium, lead, samarium and others.

Reference 18 – Canadian Group Approves Multibarrier System for HLW, Excerpt from Nuclear Waste News, 16 Feb 89; CNWRA PIS 5-89

The Canadian Technical Advisory Committee (TAC), made up of representatives from 8 Canadian technical and scientific societies, has endorsed the general concept of a multi-barrier isolation system for HLW. The Canadian HLWM program intends to emplace HLW in the stable Canadian Shield at depths of 500 to 1000 m.

Reference 19 – Panel to Report on Utility of Ground Water Models; Excerpt from Nuclear Waste News, 2 Feb 89; CNWRA PIS 4-89

Results of an 18-month study by a panel of the National Research Council will be reported out this Spring. The report will probably recommend that in considering the limitations of models, they can be useful in studying processes, designing remedial strategies, and establishing appropriate regulations. The panel is still determining whether ground water models are dependable enough for assigning liability for specific ground water incidents.

Reference 20 – DOE Program Management System Manual, Jan 86

This PMS describes the plans, policies, procedures, systems, and processes that serve as the basis for managing the HLW program in compliance with NWPA and the original DOE Mission Plan (DOE/RW-005). It is primarily a directory of documentation requirements, information and resource management procedures, quality assurance plans, health and safety procedures, institutional activity plans, and the assignment of responsibilities for these functions. The appendices include Program Organization, Acronyms, and List of Management Documents.

Reference 21 – Draft 1988 Mission Plan Amendment, DOE, June 88

This document responds to NWPAA with a revised strategy, technical plans, an institutional program, and a program management plan. Good background discussion of NWPA, its objectives, schedules, plans and accomplishments up to the enactment of NWPAA. It lists 9 states as original candidates in 1983 for the first repository (reference pg. 1), and 7 states in 1986 for the second repository (pg. 2). In June 1987 DOE sent to congress a revised mission plan indicating that repository operations would start in 2003 rather than 1998, and that decreased estimates of HLW suggested indefinite

postponement of site-specific work on a second repository (pg. 2). All of these considerations are claimed to have prompted enactment of NWPA.

The document presents an overall schedule (see below) for the waste management development program (reference pg. 17). It also presents an estimated waste acceptance schedule (see next page) consistent with NWPA and their belief that repository operations are not likely to start before 2003 (pg. 19).

Overall Program Schedule

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Monitored retrievable storage	Begin site surveys ▽		Identify candidate sites ▽			Submit LA to NRC ▽			Begin construction ▽							
	Begin site-specific design △				Select MRS site △		NRC issues license △			Begin waste acceptance △						
Repository	Issue SCP ▽		Begin <i>in-situ</i> testing ▽		Recommend site to President ↓			Submit LA to NRC ▽		NRC issues construction authorization ▽						
	Start exploratory shaft △		Issue DEIS △		Issue FEIS △		Begin construction △			Begin phase I operations △						
Transportation	Cask preliminary design review ▽			Submit safety analysis report ▽			Transport capability established ▽									
	NRC certification △					Fleet operational △										
<p>Note: This schedule is preliminary and approximate. Single milestones are centered on the year for simplicity. When two milestones occur in the same year, their positions indicate only their sequence, not the interval of time between them.</p> <p>Acronyms: DEIS, draft environmental impact statement; FEIS, final environmental impact statement; LA, license application; SCP, site characterization plan.</p>																
	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003

A number of questions requiring resolution are discussed (reference pg. 21). The current plan, which calls for a two-phased startup of operations of the repository was due to the absence of an approved MRS; under NWPA, a single phased development may be preferable. The need for a second repository needs to be reconsidered. The need for, and especially the location of an MRS needs to be resolved as it affects other program elements. Finally, a number of technology and engineering issues need resolution such as the allocation of functions to the MRS, whether or not (and where) spent fuel should be consolidated, the role of robotics, waste acceptance rates, and the need for buffer storage.

Waste Acceptance Schedule

Year	MRS facility			First repository			Total acceptance by the system	
	Spent fuel received	In storage	Spent fuel shipped	Spent fuel	High-level waste	Inventory	Annual	Cumulative
2003*	1200	800	400	400		400	1200	1,200
2004	1200	1600	400	400		800	1200	2,400
2005	2000	3200	400	400		1,200	2000	4,400
2006	2000	4300	900	900		2,100	2000	6,400
2007	2700	5200	1800	1800		3,900	2700	9,100
2008	2700	5200	2700	3000†	400	7,300	3400	12,500
2009	2700	5200	2700	3000	400	10,700	3400	15,900
2010	2700	5200	2700	3000	400	14,100	3400	19,300
2011	2700	5200	2700	3000	400	17,500	3400	22,700
2012	2700	5200	2700	3000	400	20,900	3400	26,100
2013	2700	5200	2700	3000	400	24,300	3400	29,500
2014	2700	5200	2700	3000	400	27,700	3400	32,900
2015	2700	5200	2700	3000	400	31,100	3400	36,300
2016	2700	5200	2700	3000	400	34,500	3400	39,700
2017	2700	5200	2700	3000	400	37,900	3400	43,100
2018	2700	5200	2700	3000	400	41,300	3400	46,500
2019	2700	5200	2700	3000	400	44,700	3400	49,900
2020	2700	5200	2700	3000	400	48,100	3400	53,300
2021	2700	5200	2700	3000	400	51,500	3400	56,700
2022	2700	5200	2700	3000	400	54,900	3400	60,100
2023	2700	5200	2700	3000	400	58,300	3400	63,500
2024	2700	5200	2700	3000	400	61,700	3400	65,100
2025	2700	5120	2700	3000	180	64,880	3100	68,000
2026		2420	2700	2700		67,580		70,000
2027			2420	2420		70,000		70,000
Total	57,620		57,620	63,020	6980†	70,000		70,000

*It may be possible to start limited waste acceptance at the MRS facility before the year 2003. This cannot be determined until engineering studies have been completed and additional siting information is available.

†In years when waste acceptance at the repository does not match shipments from the MRS facility, the difference is attributable to shipments from nearby reactors directly to the repository.

Potential problems with standards and criteria are discussed. For example, the US Court of Appeals has vacated and remanded to the EPA for further proceedings Subpart B of 40 CFR Part 191 (pg.44). Other possible problems are related to the introduction of an MRS commission, the Nuclear Waste technical Review Board, Repository and MRS Review Panels, and the Nuclear waste Negotiator (pg.56).

Finally (pg.75), there is discussion of the DOE/Utility contract(s) which provide for the transfer of ownership of spent fuel to the DOE, the expected rate of receiving the waste, and the order for its receipt. Potential problems related to program slippages are being discussed by the Utility Nuclear Waste Management Group (UNWGM), the US Council for Energy Awareness (USCEA), and the DOE.

Reference 22 – Projection of Spent fuel Discharges, Attachment to the DOE Draft 1988 Mission Plan Amendment, June 1988

This brief, undated document presents spent fuel projections through the year 2020. Data source was DOE's Energy Information Administration. Four cases in descending order of nuclear development are described:

- (1) "optimistic" case – US would have 341 gigawatts nuclear electric capacity in 2020, with cumulative spent fuel discharges by 2020 of 126,200 MTHM
- (2) "upper" case – US will have 199 gigawatts nuclear electric capacity in 2020
- (3) "lower" case – US will have 130 gigawatts nuclear in 2020
- (4) "no new orders" case – 51 gigawatts in 2020; spent fuel discharges of 77,800 MTHM

Reference 23 – Storage Capacity at Yucca Mountain May be Insufficient; Excerpt from Nuclear Waste News, 6 Oct 88

Nevada claims that DOE's Draft Mission Plan Amendment of June 1988 grossly underestimates the amount and types of waste which will need to be accepted at the repository. The worst omission, they state, is a category called "other radioactive wastes"; other omissions include commercial spent nuclear fuel (SF) and vitrified defense and commercial HLW. Citing an Oak Ridge report, Nevada identifies five "miscellaneous wastes": (1) wastes from rod consolidation at an MRS; (2) transuranics from West Valley, commercial reactors and industrial and institutional facilities; (3) reactor decommissioning wastes; (4) radioisotope capsules; and (5) Greater Than Class C (GTCC) wastes from routine reactor operations, which were made a federal responsibility under the Low-Level Radioactive Waste Policy Act Amendments of 1985. In total, Nevada estimates that these "miscellaneous wastes" could add between 16,800 to 20,600 canisters to the waste intended to go to the repository, and is neither acknowledged nor evaluated in the DOE Draft Mission Plan Amendments.

Other factors that could increase the amount of waste to be accommodated by the repository were identified as (1) extended operating lives of nuclear reactors from 40 to 50 years, (2) vitrification of Idaho Nuclear Engineering Laboratory wastes without prior removal of inert material, and (3) vitrification of wastes now in the Hanford single-shell tanks.

Problems of increased waste volume may be compounded by the fact that Yucca Mountain may be too small to emplace even the 70,000 MTHM planned for the repository. Even DOE acknowledges

that there is little flexibility for lateral expansion of the 1,850 acres constituting the "primary site", that 1,420 acres will be required to emplace 70,000 MTHM, and that all space in the primary area may not be homogeneously usable.

Reference 24 – DOE Studies HLW Management With or Without an MRS; Excerpt from High-Level Radioactive Waste Newsletter, Nov 88, National Conference of state Legislatures

DOE expects to issue a report in early 1989 suggesting nine possible alternatives for handling HLW with or without an MRS as part of the system. The nine alternatives consider MRS locations, waste consolidation and repackaging, "hot cell" checks and repairs, and phase-in of the MRS into the repository schedule. The report will also consider design of the waste package and transportation issues.

Reference 25 – DOE Issues 6th Federal Interim Storage (FIS) Report; Excerpt from Radwaste News, 9 Feb 89

DOE has issued its 6th annual report to congress on the federal interim storage plan. The plan is required by NWPA since DOE is required to fully recover the cost of the FIS from its utility users. The language of the law suggests that if only one utility requested FIS service, it might be required to pay for the entire program. No utility has yet requested FIS services.

DOE now predicts that by the year 2000 the need for additional at-reactor storage may reach 3700 metric tons of uranium. If spent fuel was shipped among reactors the needed capacity would be reduced to 2000 MTU. This latest FIS estimate is the lowest to date, reflecting DOE's use of the "no new orders case".

DOE feels that this storage requirement will be satisfied by life extension of in-reactor fuel (more burn-up), extension of current pool, and dry storage facilities. The report to congress does not specifically call out the future role of dry cask storage. DOE believes that such casks provide maximum flexibility for storage, shipment, treatment at an MRS, and shipment to the repository.

Reference 26 – NRC Plans Rulemaking for Dry Cask Storage; Excerpts from Nuclear Waste News, 12 Jan 89

The NRC may complete a rulemaking for licensing dry cask fuel storage at reactor sites by mid-1989. Such a rule would alleviate the backlog of site-specific license applications now pending. In 1989 NRC is expecting dry fuel storage applications from Carolina Power and Light, Baltimore Gas and Electric, and possible from Consumers Power Company and Wisconsin Electric.

The same issue of Nuclear Waste News carries an overview of the DOE nuclear waste budget (see below).

OVERVIEW OF THE DOE NUCLEAR WASTE BUDGET

WASTE, REMEDIAL ACTIVITIES AND ENVIRONMENTAL OVERSIGHT	Budget Authority (in millions)	
	FY 1989 <u>Estimate</u>	FY 1990 <u>Request</u>
Nuclear waste fund	\$ 363.8	\$ 500.0
Civilian Waste R&D	2.5	1.0
Remedial Action & Waste Technology	255.3	238.6
Environment, Safety and Health	91.0	124.6
Defense Waste and Environmental Restoration	<u>974.9</u>	<u>1,145.3</u>
Total	\$1,687.5	2,009.5

Reference 27 – Utilities Decide Not to Sue DOE for Delays; Excerpt from The Radioactive Exchange, 31 Jan 89

On 12 Jan, the American Committee on Radioactive Waste Disposal (a utility organization) voted against litigation against DOE for changing the project repository start-up from 1998 to 2003.

Reference 28 – Office of Technology Assessment (OTA) Chooses Yucca Mountain as Best Site for Greater Than Class C (GTCC) Nuclear Waste; Excerpt from High-Level Radioactive Waste Newsletter, Nov 88, National Conference of state Legislatures

OTA has issued a report indicating that Yucca Mountain would be the best disposal site for GTCC wastes. GTCC waste emits approximately the same radiation as HLW and results from the use of radioactive materials by universities, hospitals and other industries. OTA projects that 170,000 cubic feet of GTCC would fill approximately 0.1% of the space planned for the HLW repository, and that the relatively small amount of space required would make a separate facility uneconomical and politically infeasible.

Reference 29 – DOE Objects to NRC Redefinition of Greater Than Class C (GTCC) Wastes; Excerpt from The Radioactive Exchange, 14 Sept 88

In a letter to NRC, DOE has objected to NRC's intention to redefine GTCC wastes, and instead recommends continued development of a definition for HLW. DOE's concern centers on the potential requirement to emplace GTCC waste in the repository and suggests adverse impacts on repository design, cost, schedule, performance, and licensing. They also point out the potential problems arising from the "character and quantities" of the wastes involved, and that these wastes could be mixed wastes and subject to RCRA requirements.

Reference 30 – DOE Plans for Two Mixed Waste Facilities by 1990; Excerpt from Nuclear Waste News, 15 Sept 88

Two mixed waste (i.e., hazardous and radioactive) disposal facilities are planned by DOE to be on-line by 1990. One is planned for Savannah River (SRP), and is expected to comply with both types of relevant waste regulations. However, SRP is seeking exemption from ground water monitoring requirements because of its above ground, reinforced concrete vault design. SRP will also comply with RCRA requirements, except for ground water. The other mixed waste facility, at Nevada Test Site (NTS), is envisioned as a shallow land burial site. It will be seeking waivers from all liner, leachate collection and ground water monitoring requirements due to its arid, remote location and a ground water table 800 feet below the surface.

Reference 31 – Concerns of USGS Hydrologists at Yucca Mountain, Letter from Ralph Stein (DOE) to B. Youngblood (NRC) with letter attachments, 2 Feb 89

This series of letters documents the concerns of the on-site USGS hydrologists about the quality of the geoscience site characterization investigations. Specific concerns center on the potentially irretrievable loss of data due to procedural and paperwork requirements prior to experimental actions. They also complain that the QA program is engineering oriented, having been derived from reactor facility QA guidelines, and restricts scientific investigation. The referenced DOE letter indicates that the problems have been, or are being addressed. [Note – This item, while lacking specific details, indicates the vulnerability of this program to QA criticisms both from within and outside the program.]

Reference 32 – DOE Quality Assurance Program Criticized by GAO; Excerpts from Nuclear Waste News, 17 Nov 88, Inside Energy 21 Nov 88, and Radioactive Exchange 21 Nov 88

A recent GAO study entitled "Nuclear Waste: Repository Work Should Not Proceed Until Quality Assurance is Adequate" criticizes both DOE and NRC relative to QA activities on the Yucca Mountain site. Specifically, GAO says "In the area of quality assurance,...the timely identification of potential problems has not been realized because NRC has not had sufficient, early program involvement. Also, NRC has not been aggressive in ensuring that it receives adequate opportunities to assess DOE's program." An acceptable QA program during site characterization is essential, according to the GAO, if data collected is to be reliable during the licensing process. Although NRC and DOE agreed in 1983 to a proactive consultation relationship, the agreement "...has not been effective in identifying and resolving problems early in the program." The report suggests that the agreement has been ineffective because it lacks procedures for resolving issues. Further, the report notes that despite NRC's intention to "aggressively" oversee DOE's program, its oversight has largely been reactive, and although NRC has raised concerns about DOE's activities, most of the concerns remain unresolved. The named report, referenced as (GAO/ RCED-88-159) can be obtained free from the US GAO, P.O. Box 6015; Gaithersburg, MD 20877.

According to the Radioactive Exchange, since release of the GAO report, NRC staff and the Commission have apparently taken steps to strengthen their oversight activities. At a recent briefing on the HLW ESF, Chairman Zech gave such direction to the staff, and recent staff reports reflect a more intense scrutiny of the program.

Reference 32a – NRC Review of DOE’s Consultation Draft Site Characterization Plan, letter dated 11 May 1988 from R. Browning, NRC to R. Stein, DOE

By this communication, NRC formally delivered to DOE the results of its review of DOE’s December 88 Consultation Draft Site Characterization Plan. The results, based on NRC review, and NRC-DOE workshops in March and April resulted in NRC’s identifying 5 Objections, 110 Comments, and 52 Questions. Two Objections were stressed. In the first, NRC was concerned that DOE has not reflected in the CDSCP the range of conceptual models necessary to support full characterization of the site. The second objection was concerned that DOE’s QA program, then under revision, was not addressing previously stated NRC comments, and was going forward without NRC review. The letter asked that DOE perform in accordance with previously agreed upon commitments.

Reference 32b – NRC Agrees to QA Acceptance Schedule for ESF Work; Excerpt from the Radioactive Exchange, 31 Jan 89

On January 25, 1989, NRC and DOE compromised on a schedule for NRC’s evaluation of Quality Assurance programs planned by contractors participating in site characterization activities. The agreement calls for NRC to provide DOE with its evaluation within 37 days from the start of a qualification audit, or essentially 7 days after completion of the DOE-conducted audit at which NRC would participate as an observer. Originally, NRC proposed a twelve week schedule for acceptance of a contractor’s QA program, whereas DOE had suggested 30 days.

Reference 33 – Exploratory Shaft Construction Slipped Back to November 89; Excerpt from Nuclear Waste News, 3 Nov 88

DOE officials say that start of construction on the two exploratory shafts at Yucca Mountain has slipped five months to November 89, so that DOE can put its QA program in place. Data obtained from ESF tests will deal with geologic, hydrologic, geo-engineering and geochemical characteristics of the host medium. Tests will be performed in an upper room (relative to rock response) and on the main level (for engineering and scientific data).

Reference 34 – NRC Plan for Five-Year Review of Waste Confidence Findings, ca. October 1988

A detailed review by the Waste Confidence Review Group of the origin and ongoing requirements of the waste confidence process.

A generic rulemaking was initiated by the Commission in 1979, in response to the remand of the US court of Appeals for the District of Columbia. The proceeding was to assess the degree of assurance then available that radioactive waste could be safely disposed of, as well as when, and until such time if storage could be continued at the sites of creation even if such continued storage extended beyond the licensed period of operation. The proceeding came to be known as the “Waste Confidence” proceeding.

In 1984, the Commission made findings of reasonable assurance on five points:

1. . . . safe disposal of HL radioactive waste and spent fuel in a mined geologic repository is technically feasible;

2. . . . one or more repositories will be available by the years 2007-2009 and that sufficient capacity will be available within 30 years beyond operating license periods to accommodate HL wastes;
3. . . . HL waste and spent fuel will be managed in a safe manner until sufficient capacity is available in a repository;
4. . . . spent fuel from reactors can be stored safely without significant environmental impact at the reactors' storage basins (or at independent on- or off-site storage installations) for at least 30 years beyond expiration of their operating licenses; and
5. . . . safe independent on-site spent fuel storage or offsite spent fuel storage will be made available as such storage capacity is needed.

The memo describes a newly constituted Review Group of NRC principals and their intended program to review the past findings in the light of subsequent HLW research and the NWPA. Specific issues that may put some of the past findings in doubt are described. The Group intends to review the validity of the Commission's past findings, and to recommend new decisions or rulemakings if appropriate.

Reference 35 – Summary Report of the State of Knowledge of Waste Confidence, CNWRA memo, ca. September 1988

An in-depth summary of the background to the 1984 waste confidence finding, and the factors that may affect the 1989 reassessment of that finding. A particularly interesting paragraph noted that:

“Both the original NWPA of 1982 and the Act as amended press the Congressional finding the ‘long term storage of high level radioactive waste of spent nuclear fuel in monitored retrievable storage facilities is an option for providing safe and reliable management of such waste or spent fuel’ (Section 1). There is, in the legislative history of the NWPA, a long standing discussion of MRS facilities and repositories as alternative options. The question whether to ‘dispose’ or ‘manage’ may not be finally settled and the (NRC) Commission’s first finding (in 1984) appears flexible in that regard.”

Reference 36 – Plan for Five-Year Review of Waste Confidence Findings, NRC [Policy Issue] SECY-88-343, 15 Dec 88

Good background to the waste confidence issue. Referring back to 1979, when the Commission initiated a proceeding to “...assess generically the degree of assurance now available that radioactive waste can be safely disposed of, to determine when such disposal or off-site storage will be available, and to determine whether radioactive wastes can be safely stored on-site past the expiration of existing facility licenses until off-site disposal or storage is available.” A preliminary positive finding was issued in May 1983, but by then NWPA of 1982 had been enacted, requiring the review of previous findings. No reasons to alter previous findings were noted and the Commission formalized its five findings on 31 Aug 84 and codified at 10 CFR 51.23. The Commission recognized the possibility of changing circumstances and stated that it would review its conclusions should significant events occur, or at least every 5 years until a repository of high-level radioactive waste became available. On 23 Aug 88 the Commission authorized a group to review the Waste Confidence findings. This reference describes the group and its intended approach and plan to conclude its review by 1 Dec 89.

Of particular interest are the identified new issues arising since the first 5 findings. Examples are:

- With respect to reasonable assurance that safe disposal in a mined repository is technically feasible
 - Does NWPAA reduce the confidence that one or more satisfactory sites will be identified?
 - Could a negotiated site undermine confidence in the site's acceptability?
 - What is the impact of foreign technology developments (viz., Swedish waste package designs)?
- With respect to the confidence of finding one or more mined geologic sites that will be available by the years 2007-2009
 - Will the reduction to one site undermine this prospect?
 - Will the indefinite suspension of a second repository and the unlikelihood of the first repository being available by 2007-09 change the belief that there will be adequate disposal capacity within 30 years after reactor license expiration?
 - Is the 2007-09 schedule reasonable in light of DOE slippages?
- With respect to the confidence that HLW and spent fuel will be managed in a safe manner until sufficient repository capacity is available
 - DOE cannot accept HLW by 1998, as "promised" to the utilities. Might a last minute dispute over responsibility for storage after 1998 undermine confidence in safe storage?
 - NWPAA and NWPAA cap the first repository at 70,000 MTHM, which will not handle even the lowest HLW inventories projected by 2020. But DOE is not required to report the need for a second repository to Congress until 2007-2010, making the earliest availability of a second repository around 2035. Will these built-in delays undermine confidence that HLW will be safely stored until final emplacement?
 - If NRC proceeds to extend existing licenses, will more waste be generated than expected, and would a second repository be needed earlier, or would additional on-site storage be needed?
- With respect to the confidence that spent fuel can be safely stored for a least 30 years beyond license expiration, either on-site or at an independent site
 - Will program or repository availability delays require that spent fuel be stored more than 30 years?
 - Will dry cask storage ease this problem?
 - Would longer on-site storage affect confidence regarding environmental impacts?
- With respect to on-site or off-site storage being made available if necessary
 - Will a dispute between DOE and the utilities upset confidence in continued and expanded on-site storage? Might this be mitigated by advances in dry cask storage?
 - Will license extensions exacerbate the increased on-site or offsite storage problem?

Reference 37 – Waste Confidence Rulemaking Review at NRC, CNWRA memo dated 19 Dec 88

This is a transmittal memo (w/o attachments) of NRC plans for completing the 1989 Waste Confidence Review. There is a strong suggestion that CNWRA may be drawn into the effort, and some cautionary statements that SCP controversies or the potential for a utility lawsuit over DOE acceptance of spent fuel by 31 Jan 98 could complicate a simple reendorsement of the Commissions findings in 1984. It makes the point that the Review Group is aiming for a final rule in December 89, only one month after the MRS commission is to publish its findings (if they hold to their schedule).

Reference 38 – Status of [Waste Confidence] Review Effort, NRC, 1 Feb 89

Virtually identical to Reference 36 confirming that the staff is responding to the latter Policy instruction.

Reference 39 – MRS Commission Members Appointed; Excerpt from The Radioactive Exchange, 31 May 88

The MRS Commission membership has been established as follows:

Dr. Frank Parker	Vanderbilt University Chairman, National Academy of Sciences Radioactive Waste Review Board
Dr. Dale Klein	University of Texas
Alex Raden	American Public Power Association

Reference 40 – Briefings to the MRS Commission, 22-23 Sept 88

NRC and DOE briefings on “Cask certification and licensing responsibilities for independent fuel storage facilities” and “Engineering studies, rod consolidation equipment development and transportation cask development”, respectively.

The NRC briefing covered Cask certification in technical terms rather than policy-making, although NRC had recently promulgated a final rule concerning licensing requirement for independent storage of spent nuclear fuel and high-level waste (Federal Register 53 FR 35241, 12 Sept 88). The Commission’s questions were significant: (1) in the short term (without transportation considerations) is rod consolidation or expansion of existing spent fuel pool capacity more cost effective? and (2) what systems engineering considerations are being given to the configuration at the interface between dry cask storage and transportation?

The DOE presentations concerned “MRS Systems Study”, “Transportation Cask Development”, and “Rod Consolidation Development”. (The more detailed breakdown of the MRS study is given in the reference.)

The MRS commission comments suggest that: (1) they are contemplating legislative recommendations with the potential for broad impact on the HLW program; and (2) they realize that both NRC and DOE do not fully utilize systems engineering methods. Surprisingly, the commission did not discuss

recent NRC amendments to 10 CFR Parts 2,19-21, 51 70,72-3,75 and 150 (requirements for Independent Storage of Spent Nuclear Fuel and HL radioactive Waste).

Reference 41 – Status Report on the Activities of the Monitored Retrievable Storage Review Commission, MRS Commission, 22 Feb 89

A status report of activities to date, plans and strategies. To date they have held numerous meetings around the country (time and place announced in the Federal Register). They have visited facilities in Sweden, Germany, France and Switzerland; and have examined dry storage facilities in Germany and underground facilities in Switzerland. At meetings with the public, most want a repository but feelings on an MRS are mixed (of 63 speakers at one meeting, 18 spoke in favor, 34 against). At meetings with the nuclear industry, support ran strong for an MRS so that DOE could meet its statutory obligation to accept spent fuel by January 31, 1998. They also felt that the MRS/Repository linkage in NWPA was removed, and that while a lot of money has been spent on the disposal problem there is still no solution in sight. Most state and local government representatives refrained from taking a position on MRS but expressed concerns about (1) transportation of nuclear wastes through their regions, and (2) the lack of emergency response capabilities of local communities along transportation routes.

The Commission intends to consider four options:

- No MRS (on site storage until the repository is available)
- Hybrid solutions of a mix of on-site storage and regional MRSs until a repository is ready
- Storage at a central facility until a repository is ready (MRS-storage only)
- Processing and storage at a central facility until a repository is ready (multi-function MRS)

The options will be evaluated with the assistance of \$827,836 of contractor support from:

ICF Technology, Inc.; Fairfax, VA
Golder Associates; Redmond, WA (and assisted by
TASC, Edlow International, and Ralph Parsons)
EBASCO Services Inc.; New York

Reference 42 – Status and Projected Activities of the Monitored Retrievable Storage Review Commission, Dr. Dale Klein, MRS Commissioner, 26 Feb 89

Essentially the same as the preceding Reference 41 but with a series of attachments covering:

- MRS Chronology;
- Interested parties and issues;
- Commission membership and staff; and
- Evaluation criteria for judging alternative strategies

Reference 43 – 1988 Land Withdrawal Bills for WIPP Killed in Senate; Excerpt from Nuclear Waste News, 6 Oct 88

Land withdrawal legislation for WIPP was dropped before coming to the Senate floor due to increasing concerns about safety problems. Some members of the Senate say they will take legal action

if DOE attempts administrative withdrawal. The Senate bill would have allowed DOE to place 3% of defense wastes in the WIPP to test if WIPP can comply with EPA standards; the House bill would have barred any waste storage until DOE could certify compliance.

In January, DOE filed application with the DOI Bureau of Land Management for administrative withdrawal of 4,255.5 acres of land in the vicinity of the Yucca Mountain site. Although this action does not authorize DOE to use the land, it closes it for up to 2 years from surface entry, mining, and mineral leasing. DOE is seeking to "... use the land for site characterization activities; and to maintain the physical integrity of the subsurface environment from unplanned or unknown intrusions in order to ensure that scientific studies for site characterizations are not invalidated." The comment period extends to 13 April 89.

Reference 44 – DOE Files Application for Administrative Land Withdrawal for WIPP, Excerpt from Nuclear Waste News and The Radioactive Exchange, 19 Jan 89

On 19 January, Troy Wade (DOE Acting Assistant Secretary for Defense) filed application for administrative land withdrawal with DOI to withdraw the 10,240 acre near the Carlsbad, New Mexico WIPP site. The administrative procedure would take effect only if congress fails to legislatively withdraw the land. (See Reference 28.)

Reference 45 – Bill Introduced to Allow Opening WIPP; Excerpt from Inside Energy, 13 Feb 89

Congressmen Joe Skeen (R-New Mexico) and Richard Stallings (D-Idaho) have introduced a bill to allow DOE to open the WIPP site in New Mexico. The bill calls for Interior to withdraw from public use more than 10,000 acres of federal lands around the site, a necessary step before the site can be opened. A final version may include compensation for safeguarding the transportation of wastes through the affected states. An advantage cited for legislative withdrawal is that congress could then stipulate the conditions for DOE operations at the site.

Reference 46 – Nuclear [WIPP] Site Faces New Obstacles, New York Times, 21 Mar 89

Five environmental groups, along with the Texas Attorney General, have prepared a lawsuit claiming that the WIPP site should not be opened for years because it is not in compliance with federal environmental laws. RCRA is cited, as well as a non-specific reference to the past court rejection of EPA's 40 CFR 191 Part B. The group is expected to notify DOE shortly of their intent to sue. [Note – This may be an example of how ready the intervenors are to challenge any forward movement of the HLWM program.]

Reference 47 – DOE Requests DOT Review of Colorado Transportation Requirements; Excerpt from Nuclear Waste News, 18 Aug 88

DOE has requested that DOT rule Colorado's fee requirement to be inconsistent with the Hazardous Materials Transportation Act. Colorado is also requiring driver training certification, proof of liability insurance, nuclear incident plan, etc. DOE believes it is only a means to hold up shipments to its WIPP site. Requirements may cause problems for DOE' WIPP and NWPA shipments.

Reference 48 – DOE Files Application for Administrative Land Withdrawal for YUCCA MOUNTAIN Site, Excerpts from Nuclear Waste News and The Radioactive Exchange, 19 Jan 89

In January, DOE filed application with the DOI Bureau of Land Management for administrative withdrawal of 4,255.5 acres of land in the vicinity of the Yucca Mountain site. Although this action does not authorize DOE to use the land, it closes it for up to 2 years from surface entry, mining, and mineral leasing. DOE is seeking to "...use the land for site characterization activities; and to maintain the physical integrity of the subsurface environment from unplanned or unknown intrusions in order to ensure that scientific studies for site characterizations are not invalidated." The comment period extends to 13 April 89.

Reference 49 – Nevada Urges NRC to Consider System-wide Licensing of HLW Repository Program; Excerpt from Nuclear Waste News, 8 Dec 88

Robert Loux, director of the Nevada Nuclear Waste Office, told the NRC that the commission should broaden its perspective when licensing the repository. It should also include all aspects of the NWM system from reactor to repository, such as the transportation of materials to the repository and the overall waste management system. Otherwise, the commission will likely consider each piece of the system independently, with consequent difficulty in achieving design compatibility and an integrated system.

Another difficulty stated by Loux was the compressed schedule for site characterization and resolution of long-standing geotechnical issues at Yucca Mountain "...to the point that it allows for no contingencies, and...sufficient time..." for development of a confident understanding of critical site attributes.

Reference 50 – Nevada Creates Team of Expert Advisors; Excerpt from Nevada Nuclear Waste Newsletter, Nov 88

The Nevada Agency for Nuclear Projects/Nuclear Waste Project Office (NWPO) has assembled a team of at least 150 engineers and scientists to review DOE's work and conduct independent research. Disciplines represented include the expected sciences, but also financial, socioeconomic, transportation and legal analysts as well. More than half hold Ph.Ds, and many are department heads or key faculty members from institutions such as Cal Tech, UC Berkeley, MIT, etc, as well as members of the National Academy of Sciences. Other professionals are under contract from Mifflin & Associates, SEA Engineers, H. Platt Thompson Engineering, and others.

Reference 51 – US Energy Policy and the Nuclear Option in the 1990s; presented by Cordell Hull, president, Bechtel Power Corp, at the McGraw-Hill Nuclear Publications' Decision makers Forum, 31 Jan 89

US energy policy must consider the global concerns of energy requirements, economies, fuel supplies, and the environment. Oil and gas are critical to the US national security; domestic supplies and industries are threatened by the current low prices worldwide. Electricity consumption is expected to grow at a rate greater than the real GNP; meeting this need requires management of both demand and supply, as well as conservation and load management. Environmental concerns require the development of new technologies which balance benefits and costs. Nuclear power should be restored as a viable option for the US. "The facts are that nuclear power is safe, reliable, secure, . . . has minimal environmental impact, and . . . is economical. Radioactive waste disposal requires only political

resolution inasmuch as technologies for safe radioactive waste disposal already exist and are being used elsewhere in the world." Public information, reflecting full consideration of all public requirements and concerns, is essential to foster public confidence and support of a comprehensive policy.

Reference 52 – US Energy Policy and the Nuclear Option in the 1990s; A summary prepared for the McGraw-Hill Nuclear Publications' Decisionmakers Forum, 31 Jan 89

Some interesting, and often conflicting estimates of future electric energy needs and policy options.

- The North American Electric Reliability Council (NERC), formed by US and Canadian utilities, estimates peak demand growth of 2%/yr between 1988 and 1997. Peak summer demand will grow from 500 gigawatts (1988) to 594 (1997). Total installed capacity by 1997 would be 727 GW, reflecting 610 GW available (84% of capacity), and 73.4 GW in new additions.
- Normal practice suggests that 7.1 GW will be retired in this time period but (1) 14.6 GW would be lost if coal emission standards are tightened due to acid rain legislation; (2) approximately 48 GW of oil and coal capacity may not be economical to maintain; and (3) nuclear capacity,(94 to 107 GW, or 15%) is vulnerable to political action.
- NERC forecasts other gloomy prospects for load management, and Non-Utility Generators (NUGs).

One other source tends to support the NERC view, but two sources are more optimistic. They are: Charles Komanoff (consultant), who is more upbeat about conservation and NUGs; and the Applied Economic Research Co. (AER) for the Utility Data Institute, who feel that NUGs will do better.

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APPENDIX B

REGULATIONS AND STATUTES RELATED OR POTENTIALLY RELATED TO THE HIGH-LEVEL WASTE PROGRAM*

CATEGORY 1A – SITING RELATED, DIRECTLY

10 CFR Part 60	Disposal of High-Level Radioactive Waste in Geologic Repositories
10 CFR Part 960	General Guidelines for the Recommendation of Sites for Nuclear Waste Repositories
40 CFR Part 191	Environmental Radiation Protection Standards for Management and Disposal of Spent Nuclear Fuel, High-Level and Transuranic Radioactive Wastes
Pub Law 97-425	Nuclear Waste Policy Act of 1982
Pub Law 100-203	Nuclear Waste Policy Act Amendments of 1987
43 U.S.C. 1701 et seq.	Federal Land Policy and Management Act
Pub Law 99-240	Low-Level Radioactive waste Policy Amendments Act of 1985 (Federal responsibility for greater-than-class-“C” wastes)

CATEGORY 1B – SITING-RELATED: ENVIRONMENTAL POLICY AND IMPACTS

10 CFR Part 51	Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions
10 CFR Part 1021	Compliance with the National Environmental Policy Act
10 CFR Part 131	Water Quality Standards
40 CFR Part 141	National Primary Drinking Water Regulations
40 CFR Part 306 Subchapter J	Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Arbitration Procedures (Superfund Program, Emergency Planning, and Community Right-To-Know Programs)
40 CFR Part 1502 Chapter V	Environmental Impact Statement (Council on Environmental Quality)
40 CFR Part 1506 Chapter V	Other Requirements of NEPA (Council on Environmental Quality)

*Under revision at this writing.

Pub Law 91-190	National Environmental Policy Act of 1969 as amended
33 U.S.C. 1251-1376 (see 1311(F))	Federal Water Pollution Control Act (Clean Water Act)
42 U.S.C. 300 g-1, g-3,j-4,j-9	Safe Drinking Water Act
42 U.S.C. 6901 et seq.	Resource Conservation and Recovery Act of 1976
Pub Law 98-616	The Hazardous and Solid Waste Amendment of 1984 (to the Resource Conservation and Recovery Act; RCRA)

CATEGORY 2 – FACILITY AND CONSTRUCTION RELATED

10 CFR Part 20	Standards for Protection Against Radiation
10 CFR Part 72	Licensing Requirements for the Storage of Spent Fuel in an Independent Spent Fuel Storage Installation (ISFSI)
10 CFR Part 73	Safeguards Requirements for Fuel Facilities Processing Formula Quantities of Strategic Special Nuclear Material (Sec. 73.25-73.37 includes requirement for the physical protection of spent nuclear fuel in transit)
10 CFR Part 100 Appendix A	Reactor Site Criteria (Seismic and Geologic Siting Criteria for Nuclear Power Plants) (Siting criteria in 10 CFR 70 rely upon this citation)
29 CFR Part 1926	Safety and Health Regulations for Construction
30 CFR Part 56	Safety and Health Standards – Surface Metal and Nonmetal Mines
30 CFR Part 57	Safety and Health Standards – Underground Metal and Nonmetal Mines
30 CFR Part 740	General Requirements for Surface Coal Mining and Reclamation Operations on Federal Lands
30 CFR Part 746	Review and Approval of Mining Plans
30 CFR Part 750	Requirements for Surface Coal Mining and Reclamation Operations on Indian Lands
40 CFR Part 61	National Emission Standards for Hazardous Air Pollutants
40 CFR Part 300 Subchapter J	National Oil and Hazardous Substances Pollution Contingency Plan (Superfund Program, Emergency Planning, and Community Right-To-Know Programs)

44 CFR Part 351 Radiological Emergency Planning and Preparedness Pub Law 96-368 West Valley Demonstration Project Act

Pub Law 91-173 Federal Mine safety and Health Act of 1977, as amended (previously known as the Federal Coal Mine Health and Safety Act of 1969)

CATEGORY 3 – TRANSPORTATION RELATED

10 CFR Part 71 Packing and Transportation of radioactive Material

49 CFR Part 173 Subpart H Shippers – General Requirements for Shipments and Packaging (Poisonous Materials, Etiological Agents, and Radioactive Materials; Definition and Preparation)

49 CFR Part 173 Subpart I Shippers – General Requirements for Shipments and Packaging (Radioactive Material)

49 CFR Part 173 Subpart A Carriage by Rail (Hazardous Materials Regulations – General Requirements)

49 CFR Part 173 Subpart B Carriage by Rail (Hazardous Materials Regulations – General Operating Requirements)

49 CFR Part 173 Subpart C Carriage by Rail (Hazardous Materials Regulations – General Handling and Loading Requirements)

49 CFR Part 173 Subpart D Carriage by Rail (Hazardous Materials Regulations – General Operating Requirements)

49 CFR Part 173 Subpart K Carriage by Rail (Hazardous Materials Regulations – Detailed Requirements for Radioactive Materials)

49 CFR Part 175 Subpart C Carriage by Aircraft (Hazardous Materials Regulations – Specific Regulations Applicable According to Classification of Material)

49 CFR Part 176 Subpart A Carriage by Vessel (Hazardous Materials Regulations – General)

49 CFR Part 176 Subpart B Carriage by Vessel (Hazardous Materials Regulations – General Operating Requirements)

49 CFR Part 176 Subpart C Carriage by Vessel (Hazardous Materials Regulations – General Handling and Storage)

49 CFR Part 176 Subpart D Carriage by Vessel (Hazardous Materials Regulations – General Segregation Requirements)

49 CFR Part 176 Subpart M Carriage by Vessel (Hazardous Materials Regulations – Detailed Requirements for Radioactive Materials)

- 49 CFR Part 177 Carriage by Public Highway (Hazardous Materials Regulations)
- 49 CFR Part 178 Shipping Container Specifications
- 49 U.S.C. 1761-62 Hazardous Materials Transportation Act
& 1801-1812

CATEGORY 4 – ADMINISTRATION AND INFORMATION RELATED

- 10 CFR Sec.1.6 Statement of Organization – Office of Nuclear Material Safety and Safeguards
- 10 CFR Part 2 Rules of Practice for Domestic Licensing Proceedings
- 10 CFR Part 4 Nondiscrimination in Federally Assisted Commission Programs
- 10 CFR Part 9 Public Records
- 10 CFR Part 10 Criteria and Procedures for Determining Eligibility for Access to Restricted Data or National Security Information of an Employment Clearance
- 10 CFR Part 11 Criteria and Procedures for Determining Eligibility for Access to or Control Over Special Nuclear Material
- 10 CFR Part 19 Notices, Instruction, and Reports to Workers; Inspections
- 10 CFR Part 50 Domestic Licensing of Production and Utilization Facilities (Policy relating to the siting of fuel reprocessing plants and related waste management facilities) (Original Appendix F definition of HLW)
- 10 CFR Part 70 Domestic Licensing of Special Nuclear Material
- 10 CFR Part 961 Standard Contract for Disposal of Spent Nuclear Fuel and/or High-Level Radioactive Waste
- 10 CFR Part 1005 Intergovernmental Review of Department of Energy Programs and Activities
- 10 CFR Part 1008 Records Maintained on Individuals (Privacy Act)
- 10 CFR Part 1016 Safeguarding of Restricted Data
- 30 CFR Part 43 Procedures for Processing Hazardous Conditions Complaints
- 30 CFR Part 48 Training and Retraining of Miners
- 30 CFR Part 745 State-Federal Cooperative Agreements

40 CFR Part 302 Subchapter J	Designation Reportable Quantities, and Notification (Superfund Program, Emergency Planning, and Community Right-To-Know Programs)
40 CFR Part 305 Subchapter J	Comprehensive Environmental Response Compensation and Liability Act (CERCLA) Arbitration Procedures (Superfund Program, Emergency Planning, and Community Right-To-Know Programs)
40 CFR Part 1500 Chapter V	Purpose, Policy and Mandate (Council on Environmental Quality)
40 CFR Part 1501 Chapter V	NEPA and Agency Planning (Council on Environmental Quality)
40 CFR Part 1503 Chapter V	Commenting (Council on Environmental Quality)
40 CFR Part 1504 Chapter V	Predecision Referrals to the Council of Proposed Federal Actions Determined to be Environmentally Unsatisfactory (Council on Environmental Quality)
40 CFR Part 1505 Chapter V	NEPA, and Agency Decisionmaking (Council on Environmental Quality)
40 CFR Part 1507 Chapter V	Agency Compliance (Council on Environmental Quality)
40 CFR Part 1508 Chapter V	Terminology and Index (Council on Environmental Quality)
49 CFR Part 107	Hazardous Materials Program Procedures
49 CFR Part 171	General Information, Regulations, and Definitions (Hazardous Materials Regulations)
49 CFR Part 172 Subpart D	Hazardous Materials Tables and Hazardous Materials Communications and Regulations (Marking)
Pub Law 96-164	Department of Energy National Security and Military Applications of Nuclear Energy Authorization Act of 1980 (Section 210 bars the use of funds for licensing defense activities of facilities)
Pub Law 83-703	Atomic Energy Act of 1954, as Amended
Pub Law 93-438	Energy Reorganization Act of 1974, as Amended
5 U.S.C. 4701-4771	Intergovernmental Personnel Program
42 U.S.C. 961	Superfund

CATEGORY 5 – QUALITY ASSURANCE RELATED

10 CFR Part 21 Reporting of Defects and Noncompliance

10 CFR Part 50 Domestic Licensing of Production and Utilization Facilities (Quality Assurance
Appendix B Criteria for Nuclear Power Plants and Fuel Reprocessing Plants)