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MINUTES OF THE WORKING GROUP ON SYSTEMS ANALYSIS APPLICABILITY TO REVIEWING OVERALL HIGH-LEVEL WASTE PROGRAM
February 19-20, 1992

The Advisory Committee on Nuclear Waste (ACNW) working group on Systems Analysis Applicability to Reviewing the Overall High-Level Waste Program was convened by Working Group Chairman Martin J. Steindler at 8:30 a.m. on Wednesday, February 19, 1992, at 7920 Norfolk Avenue, Bethesda, Maryland.

[N.B.: For a list of attendees, see Appendix A. ACNW Members Drs. William J. Hinze, Dade W. Moeller and Paul Pomeroy were present. ACNW Consultant Dr. Ruth F. Weiner was also present.]

The Chairman stated that the meeting was being held in conformance with the provisions of the Federal Advisory Committee Act, and that portions of the meeting were being transcribed.

[Giorgio Gnugnoli was the Designated Federal Official for the Meeting]

Speakers at the meeting included: J. Roberts, Department of Energy (DOE); R. Robertson (TRW); T. Isaacs (DOE); R. Milner (DOE); D. Kocher (ORNL); R. Bishop (NUMARC); S. Frishman (Nevada); L. Desell (DOE); S. Brocoum (DOE); J. Younker (SAIC); and R. Mussler, Office of the Nuclear Waste Negotiator (ONWN).

Dr. Steindler remarked that the meeting was convened in order to understand the systems analysis for the DOE Civilian Radioactive Waste Management Program, as well as to discuss the DOE's Mission Plan for High-Level Waste (HLW) Management. Furthermore, the Working Group would hear discussions on the analysis of the HLW

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disposal regulation system and lessons learned from the experiences at the Waste Isolation Pilot Project (WIPP). Dr. Steindler then invited the participants to introduce themselves.

Prior to the formal presentations, Dr. Steindler made additional opening comments regarding the charge from Chairman Selin. He characterized the charge as "Is the present approach to HLW disposal -- from beginning to end -- being addressed in a seamless fashion, as far as the health and safety of the public is concerned?" Dr. Steindler indicated that the ACNW intended to address that question through a systems analysis (SA) approach. He noted that the goal was to find any missing and important links now, as opposed to later at perhaps a more critical point in the program. He suggested that SA coupled with performance assessments may uncover all the significant missing links. International perspectives would also be considered by the Working Group in order to take advantage of any lessons to be learned.

<u>R. Robertson, General Manager, Civilian Radioactive Waste Management System (CRWMS), TRW</u>

Mr. Robertson is the general manager of the Management and Operating (M&O) Contractor. His presentation addressed the present systems analysis work being done by CRWMS. He stressed understanding of the role of the M&O in the overall responsibility for integration of the DOE HLW program. The following points were raised during his presentation:

1. DOE designated TRW as the DOE surrogate in order to provide the M&O Contractor (M&OC) the authority and capability to achieve a seamless program integration.
2. The M&OC is responsible for Dr. Bartlett's initiative for the management systems improvement strategy.
3. Mr. Robertson briefly catalogued the different activities in the Office of Civilian Radioactive Waste Management (OCRWM) in which the M&OC is involved; e.g., outreach efforts, systems

engineering, strategic and contingency planning, overall systems PA, licensing, etc. The M&OC works for all radioactive waste (RW) organizations, and even bridges several of them.

4. Research does not appear to directly feed back into the systems integration.

5. The M&O management team involves other private organizations besides TRW, such as Morrison Knudsen, Babcock & Wilcox, INTERA, etc. - ten in all.

6. Regulatory requirements do not necessarily reflect the mission needs; there is expectation that those setting requirements will allow sufficient flexibility to meet the mission needs. The international approach is just the opposite: after mission evaluation -- including research and development (R&D) -- compliance requirements are set.

7. In order to address necessary changes and modifications in the construction and operation phases, the regulations need to be sufficiently flexible to permit resolution of any "surprises", which are not necessarily associated with safety issues.

8. The dilemma of a desirable solution which may be prohibited by law or regulation was briefly discussed; the question is whether it is fruitful to pursue a technically feasible option with the likelihood of rejection of the license application.

9. The DOE/TRW HLW program control structure involves four levels of board review; these boards span the program structure from the DOE Secretary's office level down to the contractor design level. Whether an item or change is presented to any one or more boards is determined by cost, schedule, and degree of impact on the functional requirements.

10. In response to questions with respect to the priority in selecting which system studies to perform, the TRW representatives described a "concept of operations" approach involving crude estimations of the logistics in moving an inventory from the utility to the Monitored Retrievable

Storage (MRS) facility, for example. Then the logic is refined by investigating the decisions needed to implement the logic, which in turn lead to the establishment of a priority of needed studies. In the process, contingencies are developed as the various decision points -- and their possible implications -- are identified.

11. The "iterative" process described in item 10 above presents a problem of when to stop. Mr. Robertson indicated that a priori agreements regarding a set of parameters and methodologies are negotiated to establish the acceptable criteria for issue closure; continual interaction with the NRC is necessary.

12. The DOE/TRW parallel progress strategy was frequently cited as the driving force for the program; instead of addressing the DOE siting requirements (10 CFR Part 960) versus the NRC performance requirements (10 CFR Part 60, §60.111-113), the DOE is doing both concurrently, in order to minimize future impacts, typical of sequential processes.

13. The program utilizes an annotated license application (LA) outline, which serves three purposes:
    i) it identifies the necessary references
    ii) it identifies the required program deliverables and schedule milestones, as well as the responsible entities, and
    iii) it becomes the framework for dialog between the DOE license development team and the NRC licensing entity.

14. Mr. Robertson observed that data collection strategies need to consider the timing of the program needs. Data which will not be available in time to satisfy the milestone schedules may be effectively useless. Limits to program budgets would dictate efforts which have a reasonably good chance of being merged into the system engineering/site evaluation process.

15. Program convergence is attained by moving through data cycles

(feedback to the site characterization/data collection process), interactively within the PA, the design and the annotated outline/issue resolution processes. In effect, as the program proceeds, the necessary cycling will be reduced, thus bringing about program closure with confidence.

John Roberts, Acting Associate Director for Systems and Compliance, OCRWM, DOE.

Mr. Roberts underscored the parallel efforts of data collection, permit acquisition and site characterization with the contingency planning effort. Furthermore, the program is moving forward on the issues related to transportation and the MRS. The M&OC provides the integration of all the program efforts, along with maintenance of a corporate memory.

Thomas Isaacs, Director, Office of Strategic Planning and International Programs.

Mr. Isaacs stated that he intended to include in his discussion the status of the Mission Plan amendment and the related international program and relationships. As a background to his presentation he noted that 35 years ago the National Academy of Sciences suggested deep geologic disposal as the preferred method for handling HLW. He observed that this recommendation is still valid, not only in the U. S., but essentially in every other country that is seriously addressing this problem. The following points were made during his presentation:

1. The Nuclear Waste Policy Act (NWPA) was one of the most prescriptive laws ever passed. It mandated that a deep geologic repository was to be the basic disposal mechanism. DOE was also instructed to forward a proposal for an MRS facility as well. Funding via a fee system was authorized and imposed on the nuclear utilities.

2. The 1987 Amendments Act focused the repository program on one

site-Yucca Mountain-and placed a second repository as a longer-term issue. An integral MRS was authorized as was the Office of the Nuclear Waste Negotiator and the Nuclear Waste Technical Review Board (NWTRB).

3. The Act, as passed by Congress, indicates that as a matter of public policy, long-term storage is not acceptable.

4. Public acceptability, external involvement, the involvement of the NRC, a comprehensive quality assurance program, and technical peer review are all program conditions.

5. DOE must develop a timely, credible disposal capability. Currently, the program has the repository scheduled to open in 2010 with a capability to handle 70,000 metric tonnes of spent fuel in combination with certain amounts of vitrified Defense HLW. An important element of the program is contingency planning, which for this program is an attempt to envision future strategic changes and the necessary related accommodations. (In response to a question from Dr. Steindler, Mr. Issacs noted that the intent of the program is neither research nor technology, but rather, a service; i.e., providing a demonstrated HLW disposal capability.)

6. DOE's Mission Plan document is based on the National Energy Strategy (NES). An important principle in the NES is the direct tie between solving the waste problem and the future viability of nuclear power. The nature of the Mission Plan will change in the future in that it is to be more generic and less subject to budget, schedule,and other constraints that in the past have necessitated that it be amended often. The Mission Plan, which lays out how the program will integrate the MRS, transportation and disposal capabilities, was put together based on both internal as well as external input from a variety of sources. These same groups were then asked to critique the final product, which should be ready in April.

7. The details of implementation of the Mission Plan will be

contained in another document. That document should be published by the end of the year.

8. Key near-term objectives of the program are:
   a. Obtain full access to the Yucca Mountain site
   b. Prioritize activities to determine site suitability as early as possible
   c. Work with the Negotiator to secure an MRS site
   d. Coordinate licensing efforts to ensure timely issuance of a license
   e. Maintain focus on agreed-upon management, technical and institutional principles
   f. Develop strategic contingency plans (a recent workshop on the topic was discussed; the example given was a finding that Yucca Mountain was an unsuitable site).

9. The international program (which was deemed as "crucial" to the program's success) was next described. It was noted that in the early days of the program when the U.S. was looking at several sites, there was excellent synergism between the technical specialties at the various sites. Such interaction no longer exists as the US has only 1 site under consideration. A certain amount of synergism, however, is now coming from the international interfacing. One example given was the Swedish Stripa mine effort which brought home to the 8 participating countries the extensive effort necessary to properly characterize a site. Also, while many things are site specific, there are data acquisition techniques, models, instrumentation, and collective issues resolutions and consensus building efforts that are generically accepted.

10. Several specific bilateral (Switzerland, Canada, Sweden) and multinational activities/agreements were noted. These projects encompass the range from relatively technical efforts, such as performance assessment modeling, to more physical activities, such as fracture flow measurements and

underground testing. The importance, use and translation (for assisting general public understanding) of natural analogs was discussed, as was the international aspects of the operation of DOE's Program Support Office. In response to a question from Dr. Pomeroy, the selection of natural analogs was discussed, it being noted that now there is an international committee specifically dedicated to this effort.

11. Insofar as the accessibility by electronic means of the "gray" literature (in response to a question from Dr. Hinze), it was noted that other than direct exchanges between the technical people involved, through conferences, meetings, workshops, and the like, there is no particular system. The LSS, by definition, is directly related to support of the licensing process, and would generally not be a source for up-to-date technical information exchanges.

12. In summary, Mr. Issacs noted: a.) there is a consensus in the international community that deep geologic disposal is the proper approach; b.) it must be recognized that the relationship between the developer and the regulator is different in every country; c.) other countries focus less on the natural barrier (and more on the engineered barrier) than does the US, and d.) in addition to performance assessment, other features of the facility, such as redundancy, conservatism, insights gained from natural analogs, etc., should be factored into the overall acceptability evaluation.

13. DOE's perspective as to the value of US participation in international activities related to human intrusion was questioned by Dr. Hinze. It was believed that while the questions in the US would not be solved internationally, it was considered worthwhile for the experts in the field to share developments.

The impact of funding limitations on several aspects of the US program was discussed, particularly insofar as some of the earlier

planned tuff research. (Dr. Hinze specifically raised the question of the G tunnel research.)

Ronald A. Milner, Associate Director for Storage and Transportation, DOE

After describing briefly the organization of his group, Mr. Milner next addressed the findings of the MRS Commission. He noted that although there was general agreement between the Commission and DOE in most areas, there were a few disagreements. For example, DOE believes that the MRS should be larger than the 5000 MTU proposed by the MRS Commission, that it should be integral with the repository and that it should be funded by the utility contributions to the Nuclear Waste Fund. During his presentation, the following points were made:

1. NWPA permits an MRS to be located either through the efforts of the Negotiator or via a DOE national survey, siting and location process. DOE favors the negotiated route.
2. Indian Nations are considered sovereign and the state in which they are located does not have a veto power over their ability to accept an MRS facility.
3. To date, DOE has received seven requests for MRS feasibility study grants and has awarded five. Granting of another is imminent.
4. In August 1991, DOE issued an RFP for fixed price proposals for the MRS. Thus far they have received nine responses, covering a variety of technologies (metal casks, dual purpose casks, vertical concrete casks, horizontal modules and modular vault dry storage.) While none of the proposals were from foreign entities, some are using foreign technology. DOE will accept a technology that has either received a Part 72 license and is in use at a utility, or one for which a topical report has been submitted and accepted by the NRC.

5. In response to a question from Dr. Steindler, it was stated

that the design horizon of the MRS is 50 years and that the technology is proven. The participation by Duke Power Company on the DOE evaluation/design "team" is also judged to be a significant benefit. (It was noted that their evaluation was consistent with DOE's: every one of the technical options has been demonstrated not only in the US, but also overseas.)

6. NWPA requires that DOE submit an Environmental Impact Statement (EIS) for the MRS. Since there is not yet a site, such a document, which drives the whole schedule, has yet to be started. The scheduled date for operation of the MRS is still 1998.

(It is estimated that the construction time for the MRS would be about 18 months. License application is planned for 1995 with a 1 year review/approval time for NRC approval). DOE is attempting to expedite the licensing approval process by frequently interacting with the NRC. For example, agreement has been reached with the NRC staff that the Safety Analysis Report (SAR) could be submitted a year before the EIS and review would begin at that time.

7. Planning for the MRS will include related transportation system considerations. Consistent with the current schedule, the initial casks considered for use would be those designs currently in use/approved. An RFP for cask acquisition is scheduled to be issued in May, but procurement will not be authorized until the MRS is located. It is anticipated that higher capacity casks would become available in "Phase 2" of the cask system development program (CSDP).

8. DOE has entered into a number of agreements with national, regional and technical organizations in an effort to minimize misunderstandings and obtain the best advice possible. A forum, consisting of state, tribal and local governments and various associations has been formed and comprises the membership of DOE's external Transportation Coordination Group.

9. In response to Dr. Steindler's question regarding the testing of casks, DOE believes that, for the types of casks to be procured, scale model testing is adequate.
10. Insofar as routes, new transportation links, etc, DOE has yet to get to that point in its evaluations, since the end destination for the spent fuel is still undefined. Insofar as transportation risks, in addition to current models DOE is considering the use of RADTRAN.
11. Although the schedule for the MRS is tight, DOE believes that it is possible to meet the associated milestone dates if an MRS site can be identified by December 1992.

Mr. Roberts concluded the morning session by noting his belief that the planning and development of an MRS, and its eventual emergence as an operating facility, should do much to relieve possible public concerns that DOE is being pressured to develop a suitable repository.

Dr. David C. Kocher, Oak Ridge National Laboratory, (ORNL)

Dr. Kocher addressed the development of the applicable HLW regulations, some particularly troublesome aspects of the regulations and the impact of these upon the NRC programs. He particularly pointed out that the disposal of HLW should not be considered in isolation from the disposal of other wastes. Particular points of interest noted in his presentation:

1. Originally, in the US, waste classes were defined strictly on the basis of operational requirements. In the original definitions, there was no explicit consideration of protecting public health and the environment from the permanent disposal of these materials.

1 In the late 50's the AEC proposed three categories of liquid
2 waste from the reprocessing of fuel. Specifications for these
3 categories were different at different government sites.
4 However, these categories did serve as the basis for the kind
5 of legal and regulatory definitions of HLW that exist today.
6 2. A brief history of the definition of HLW, from Part 50,
7 Appendix F, through the NWPA of 1982 (and the subsequent 1987
8 Amendments Act) was provided. This Act added to the earlier
9 definition by including as HLW other highly radioactive
10 material that the NRC determined required permanent isolation.
11 The significant point is the specification of the kind of
12 system required to achieve permanent isolation since it is
13 recognized that all waste requires permanent isolation.
14 3. In 1985 the NRC staff published a review and evaluation of
15 radionuclide concentrations in civilian and defense HLW. That
16 report suggested that concentrations greater than 30 times the
17 Class C limits for near-surface disposal could be classified
18 as HLW. DOE reacted, indicating that this could result in the
19 reclassification of some of the defense transuranic waste.
20 DOE authorized an ORNL study for a risk-based classification
21 system for radioactive waste. NRC followed this effort
22 closely and in 1987 published a proposed amendment to Part 60
23 indicating that the agency would develop a quantitative and
24 generally applicable definition of HLW. Over the next several
25 years the NRC staff worked on this definition but abandoned
26 the effort in 1989. Currently NRC definitions of waste apply
27 only to the waste generated in fuel reprocessing.
28 4. In 1990 the states of Washington and Oregon petitioned the NRC
29 to clarify the definition of HLW as it applies to the Hanford
30 tank wastes. The petition requested that, if the largest
31 technically achievable amount of radioactive material was
32 removed from these wastes, then the residual should be
33 considered as incidental waste and not HLW. Dr. Kocher

indicated his belief that the classification should be based on risks from disposal, rather than on how well the technology functions.

5. In summarizing the current definition and classification status of HLW, Dr. Kocher noted that there are no specifications anywhere of the minimum concentrations of either fission products or transuranics that constitute HLW. He interpreted this as meaning that the kind of reprocessing technologies and capabilities for removing radioactive material that have existed in the past will continue, unimproved, into the future. Such an attitude would seem to preclude new and innovative approaches. Since the properties of spent fuel and reprocessed waste are so similar, they will need to be handled in the same manner (even though the definitions may differ, depending upon the document). HLW does not include waste from any other source that might have equivalent levels of decay heat or external radiation and would require an equivalent degree of waste isolation for protection of public health.

6. The NWPA authorizes, but does not require, disposal of HLW in a repository. While DOE is explicitly directed by the Act to investigate alternatives, it is doing little in that regard (particularly since the only authorization it currently has is for the repository). Another feature of the NWPA is the co-disposal of defense HLW. This is both reasonable and economically sound.

7. The current EPA standards would probably have to be modified, if the disposal technology were other than a repository. Also noted was that EPA does not regulate disposal <u>technologies</u>; rather, it regulates disposal of <u>waste classes</u>.

8. The proposal by EPA to possibly apply drinking water standards to the protection of groundwater near disposal sites is extremely contentious.

9. NRC's Part 60 is a licensing criteria document for geologic

repositories. It is not, strictly speaking, an HLW standard. Since co-disposal of wastes will occur, it should be noted that NRC will also be regulating defense wastes as well. Elaborating further, Dr. Kocher pointed out that the NRC does not require that waste go to a repository nor does it require that the only waste that is placed in a repository be HLW.

10. Significant discussion and background interchange occurred on greater-than-Class-C (GTCC) wastes, with Dr. Kocher stressing his point that, while such wastes are low-level wastes, the NRC has indicated that near-surface disposal is not generally acceptable and that civilian GTCC should be disposed of in the repository.

11. EPA's role is to establish general environmental standards for disposal of particular waste classes without regard to the disposal system, while the NRC's function is exactly the opposite-to establish licensing criteria for particular disposal systems without regard for the waste that will be placed in them. The system functions satisfactorily because waste definitions have been decoupled from the requirements for disposal. This allows selection of whatever technology is appropriate for the particular waste. Dr. Moeller commented that a change in the technology could result in EPA being required to rewrite their regulations.

12. Among the advantages of a system of waste classification based on risk from disposal was the belief of Dr. Kocher that many petitions and case-by-case actions could be eliminated as would the artificial distinction between fuel cycle and NARM wastes. Upon further questioning by Dr. Steindler, it was agreed that, at the time the regulations were initially issued, the approach was reasonable. Furthermore, although a proposed "solution" may solve many of the problems, one must also recognize that the new "fix" may have some difficulties of its own. Dr. Steindler expressed his belief that what should be used is a disposal system based on risk instead of

a classification system based on risk. The difference between these two approaches is significant. Dr. Weiner inserted her perceptions of some of the problems with various EPA standards; e.g., there being no acceptable threshold value in their hazardous materials regulation and the failure of their air quality standards to identify means of control. The analogy and caution pertaining to HLW standards-setting was noted.

13. Insofar as GTCC wastes, it was noted that currently the classification of GTCC wastes is imprecise. While the NRC has decided it should be disposed in a repository, EPA's earlier draft of Part 193 (LLW standard) indirectly included it as low-level waste. The bottom line of the discussion on this topic was that it appears possible that different wastes could be placed in the same facility but yet be subject to quite different criteria. Dr. Kocher pointed out that the ORNL study suggested that calling GTCC wastes HLW is the most sensible alternative and would resolve many of the perceptions of confusion.

14. Some of the problems associated with groundwater protection and analyses were discussed. It was noted that some 28,000 public water supplies are impacted by exceeding the EPA limits due to natural radionuclide concentrations in the area. The necessity to spend large sums to meet a 4 mrem/year dose limit that is not required to protect public health was questioned. Dr. Moeller commented that meeting a drinking water limit was tantamount to apportioning dose to various pathways. He pointed out that the National Academy of Science urged that such not be done.

15. The differences between the way human intrusion is considered in the high and low level waste scenarios was discussed. It was noted that, insofar as intrusion into a low-level waste disposal facility is considered an accident, it has no effect

on the facility. Also, because of the low concentration limits, the intruder is considered protected.

16. Dr. Kocher discussed credit for passive controls at a LLW facility, noting the French have assumed control for 300 years while the US assumes active control for only 100 years. He believes the answer is "wide open."

17. The last proposition for consideration was whether RCRA poses a problem for a repository. For HLW and spent fuel the hazard is such that RCRA restrictions on leachability should not cause a problem. However, such a case cannot be made as clearly for Class C wastes.

The concluding discussion concerned byproduct material, noting that the Atomic Energy Act excluded source, special and byproduct material from being regulated under RCRA and the Solid Waste Disposal Act. That while a controlled release is legally acceptable for a low-level waste facility, it is not permissible under RCRA.

<u>Robert W. Bishop, former member, DOE WIPP Blue Ribbon Panel</u>

Mr. Bishop indicated that he would be presenting his own perspectives on the nation's HLW program and Part 191, based upon his experiences as a member of the WIPP Blue Ribbon panel. After discussing the background and formation of the five person WIPP Blue Ribbon Panel, which was established by Admiral Watkins, he made the following points in his presentation:

1. The responses of the Panel for the WIPP project were mixed, with some members experiencing frustration and others a sense of accomplishment. While DOE's cooperation and openness was outstanding, for various reasons the facility, which was well designed and executed, thus far is not being permitted to operate.

2. He believes that many of the lessons learned from the WIPP experience are directly translatable as lessons that must be

applied on the Yucca Mountain project.

3. One sense of frustration comes from the fact that starting in 1970, there have been thousands of drums (with a design life of 10 years) of transuranic wastes accumulating in surface (or just below the subsurface) storage, at 10 different sites. One particular troublesome storage was at the Idaho site which is at the head waters of the Snake River aquifer. Mr. Bishop noted that he had trouble with the acceptance of that storage vis-a-vis the proposed storage capability of the WIPP facility, where some geologists indicated that the bedded salt has not been disturbed for at least 250 million years.

4. Both EPA and DOE are to be criticized: the former for the various faults in their proposed HLW standards (such as their unmined ore comparison) and the latter for its inability to solve problems, such as the radwaste drum disposal situation described above, and its unwillingness to petition EPA for a redress of portions of Part 191.

5. The requirement to satisfy RCRA requirements in advance of waste emplacement, the remand decision for Part 191 which defined a HLW repository as an injection well, coupled with other unnecessary restrictions placed upon the WIPP (and potentially other geologic repositories), were also sources of frustration and concern. For example, although RCRA states that one of its fundamental purposes is to minimize the present and future threat to the environment, Mr. Bishop perceives that the emphasis has been placed upon the future, with little attention being placed on the present.

6. Consideration of human intrusion is the critical regulatory constraint. DOE should have challenged EPA on its position since, in Mr. Bishop's opinion, Appendix B, which indicates that human intrusion should be considered, is guidance (and not regulation).

Considerable discussion ensued on administrative law matters,

conflicting and duplicative regulations, Congressional reaction and the reasons why DOE did not challenge EPA (insofar as the latter, it was apparently DOE's perception that such an effort would be "suicidal").

In response to a question from Dr. Steindler, Mr. Bishop noted that, on most issues with which the WIPP Panel became involved, there was unanimity of opinion, even though each member's report was written individually.

In an interchange with Dr. Hinze on the suitability of WIPP insofar as the potential impact of some of the technical developments that arose as the project proceeded, Mr. Bishop expressed his belief that with the addition of a suitable containment barrier, there was "absolutely no question" as to the suitability of the WIPP facility. He further recommended that it is not necessary to proceed in haste with the redrafting and reissuance of the EPA standard, particularly when questioning whether 10,000 or 100,000 years is the proper timeframe of concern. (He questioned the ability to project the first number, let alone the second, with any meaningful certainty.)

The espoused view by some that the most important goal is to get underground was challenged, in that the real goal is broader: to find some way to dispose of transuranic (or high-level) waste. Mr. Bishop noted that he believed the US made a policy mistake when it rejected deep seabed disposal.

In reviewing his own personal review of Part 191, Mr. Bishop noted some of his concerns but stated that what he would do would be to ask EPA to re-evaluate their Part 191 fundamental conclusions in light of the reality of 1992.

Dr. Pomeroy asked whether the current testing program proposed for

WIPP could be conducted primarily above ground. After ruminating on some of the considerations, Mr. Bishop noted that perhaps the bin tests, while helpful, may not really be necessary.

After further discussion re: relationships between DOE, NRC and EPA, Mr. Roberts (DOE) noted his opinion that his organizations' relationship in dealing with EPA is probably similar to that experienced by the NRC. He reiterated DOE's position that they would rather not see a "rush towards judgement" on the reissuance of Part 191 if it is not realistic. Mr. E. Regnier, DOE, further amplified on the remarks of Mr. Roberts, recounting some of the recent activities leading up to the recent promulgation of the latest draft of Part 191 by EPA. He perceived the driving motive for the expedited EPA schedule for Part 191 was perhaps some recent statements made by EPA management before a Congressional committee.

Dr. J. Younker, SAIC, observed that many of the technical personnel working on the Yucca Mountain early site suitability evaluation had worked on the WIPP project. She noted a considerable amount of exchange between the two projects.

Dr. Steindler noted that while both DOE and NRC were composed primarily of technical personnel, many of the concerns related to the HLW issue were related to political or public information concerns, neither of which being areas in which DOE was considered as possessing large amounts of expertise or credibility.

In conclusion, Mr. Bishop noted his belief that Congress wants both the HLW and LLW concerns to be "taken care of", does not want to address these issues again and has, in effect, delegated resolution to the Administration. He also noted that the tendency to involve Congress in the resolution of technical issues was wrong.

Working Group Chairman Steindler then summarized his observations,

adjourned the meeting for the day, and announced that the Working Group would reconvene the next morning on the same topic.

FEBRUARY 20, 1992

The Advisory Committee on Nuclear Waste Working Group on System Analysis Applicability to Reviewing the Overall High-Level Waste Program was reconvened by Working Group Chairman Martin J. Steindler at 08:30 a.m. on Thursday February 20, 1992, at 7920 Norfolk Avenue, Bethesda, Maryland.

L. Desell, DOE Office of Regulatory Integration, introduced Drs. S. Brocoum and J. Younker, SAIC, who were to present the current status of the Early Site Suitability Evaluation (ESSE) conducted by SAIC for DOE.

Dr. Brocoum provided a brief history of the Yucca Mountain site selection, characterization and suitability process, noting that the Secretary, DOE, committed to an early evaluation of site suitability. The following points were made during his presentation:

1. Two types of evaluations were required:
   a. An initial focus on site conditions that would make the site unsuitable, and
   b. Comprehensive evaluation of suitability which was ultimately to lead to a decision whether the site should be recommended for development as a repository.
2. The applicability of 10 CFR Part 960 to the evaluation of a single site or whether it was possible to use it for comparison between sites was an early consideration. Examples of conflicting interpretations were given. It was also pointed out that although Part 960 was a DOE regulation, the reason it was utilized for compliance (vis-a-vis EPA standards or NRC regulations) was the requirement in the NWPA that DOE establish the general guidelines it would use to evaluate the

suitability of a site. It was also noted that compliance with these guidelines was to form the basis for the determination by the Secretary, DOE, whether to recommend that a particular site proceed through the licensing phase.

3. The Director, OCRWM, made a policy decision that Part 960 does apply to a single site and would be used. The ESSE task (suitability or non-suitability per the requirements of Part 960) was assigned to the Office of Geologic Disposal, who directed the technical and management support services contractor, SAIC, in the performance of the work

4. The ESSE commenced in January 1991 and has been completed. The issuance of the final report is imminent, with the comment period scheduled to end on June 15, 1992. On or about May 7, OCRWM will hold in the Chicago area a Director's forum on the ESSE, at which interested parties and the public can participate. All public comments will be responded to in writing.

5. Typical comments requested from the public will include questions on the value of the peer review process and a query as to the adequacy of the amount and type of public involvement. (Dr. Hinze asked about the testing prioritization effort and its value, if any, insofar as the conclusions in the ESSE. Mr. Brocoum noted that he did not believe the prioritization report was of any particular value in that report, but did note that the next step is to set priorities test by test. Study plan integration is also to be started).

6. DOE considers the ESSE to be, in a sense, a program guidance document that is to discuss not only what is known about the site at this "snapshot" in time, but also what further information is needed. The relationship to the site characterization plan, as originally envisioned, and as it is actually proceeding, was discussed.

7. While the NRC has not been directly involved in the ESSE, it

has been briefed on it several times. It may also provide comments during the public comment period.

8. In response to a question from Dr. Pomeroy, it was stated that the "site is suitable for continuing characterization", as none of the findings to date have resulted in identifying either a disqualifier present or a qualifying condition that could not be met. Mr. Brocoum pointed out that this evaluation, however, is the contractor's and does not represent formal DOE findings at this time.

Dr. Younker then commenced her presentation by describing the makeup of the core ESSE team she directed, specifically noting the breadth of reviewers necessary to completely conduct such a review. While the experts assigned to the review (which met approximately biweekly) were participants in the program, the peer review panel was comprised so as to be independent of the DOE "family".

Particular points made during her presentation were:

1. Total system performance and performance assessment were considered in ~90% of the guidelines. Preliminary CCDF's were calculated and compared to the EPA standard by not only those working on the evaluation but also by both Golder Associates and EPRI.
2. In the performance of the ESSE, it must be shown that every disqualifying condition is not present and every qualifying condition met at either one of two levels of confidence. At the time of the environmental assessment, in order for the DOE to move forward at least the lower confidence level on every condition had to be found. The ESSE group had not only to assure that these lower confidence findings were still valid, but also to assure that sufficient confidence had been developed to recommend a higher confidence finding.
3. The report indicates what kinds of tests or activities are available to obtain additional information and also indicates

1 the suitability of the information insofar as the completion
2 of the license application.
3 4. The four groups of guidelines (postclosure performance;
4 preclosure radiological safety concerns; environmental,
5 socioeconomic and transportation concerns; and ease and cost
6 of siting, construction, operation and closure) were briefly
7 discussed. It was noted that, although the guideline indicates
8 that cost comparisons between sites should be conducted,
9 explicitly such could not be done. Dr. Younker noted that the
10 way in which the guidelines were structured forced an
11 examination of looking at individual factors and how these
12 impacted total system performance and vice versa.
13 5. The ESSE was performed using the conceptual design modified by
14 changes that were being considered. The actual "target" design
15 used was well documented so that the conclusions could be
16 reassembled based on the design data assumed.
17 6. The definitions of the lower and higher confidence findings,
18 and an unsuitability finding, were discussed. For the lower
19 level finding, the condition, while not present, could perhaps
20 be changed with additional information. For the higher
21 confidence level finding, not only is the condition not
22 present, but it is unlikely that additional information will
23 result in changing that conclusion. Unsuitability is found if
24 the condition is present or likely to be present.
25 7. It was noted that Part 960 does not have a statement similar
26 to Part 60 which indicates that a combination of favorable
27 conditions could offset a potentially adverse condition.
28 8. The use of expert judgment, the possibility of dominance by
29 one expert, the method of voting (2 step with a threshold and
30 a probability) and the interpretation of the vote results,
31 were discussed at some length. An example was given wherein
32 13/14 panel members voted for the higher confidence conclusion
33 with only 1 voting for the lower level. What this meant to
34 the group's conclusion was that it remained at the lower

confidence level. Furthermore, Dr. Younker noted that a finding reporting higher level suitability was supported by every voting member of the team. Drs. Pomeroy and Steindler stressed the need to "sanitize" the evaluation process in order for the questions to be neutral and therefore permit independent reviewers to reach the same conclusion.

9. Mr. Brocoum noted that in addition to the public comments, which should increase the credibility of the evaluations, it should be noted that the NRC did concur with the guidelines utilized by the DOE. (Mr. Frishman, NV, set forth his views that not only are some of the definitions and interpretations applied in the ESSE not self evident, but a large number of the participants could be considered to have a vested interest in the result.) Dr. Younker pointed out that, while everything could not be written down for posterity, an attempt was made to record as much as possible so that followup reviewers could develop the same perspectives prior to reaching their own conclusions.

10. The peer review panel analysis document includes all of their comments and all of the DOE responses. Furthermore, that document is considered to be an integral part of the final ESSE and will accompany that report. The peer review panel was invited to request any resources that it needed and they were provided promptly.

11. A summary of the ESSE results: (a) 14/18 disqualifying conditions are not present (the other 4 are not likely to be present but more information is needed), and (b) 9/24 qualifying conditions are supported at the higher confidence level with 15 likely to be present but requiring further information. Three conclusions (postclosure rock characteristics, preclosure radiological safety and offsite installations) were changed (shifted to a lower confidence level) as a result of the peer review.

12. Areas where additional information was desired were discussed.

These included gaseous releases, geohydrology flow paths, expected climate changes over the next 10,000 years, tectonic disturbances over the next 10,000 years, potential for natural resources to attract human intrusion, sufficiency of host rock and environmental quality, to name a few. There were strong positions on the carbon-14 problem. The ESSE group believed the problem had less to do with the release, itself, than with the appropriateness of the EPA standards. This finding was probably the strongest questioned by the peer review group.

13. The peer review group injected many new thoughts into the review, with the most learned probably in the areas of economic geology, petroleum and natural resources.

14. Part 960 was a surprisingly worthwhile and valuable document. Each guideline was examined separately and in light of the overall performance assessment. The team recommends that future evaluations be performed with the same philosophical bent.

15. No explicit evaluation was performed on the objections or major comments made by the NRC on the site characterization plan. However, it was pointed out that several of the people on the ESSE team had previously prepared responses to the NRC comments. It was believed, therefore, that implicitly those comments and responses were considered in the evaluation.

Mr. S. Frishman, State of Nevada, was the next presenter. After providing his comments and perspective on the charge given to the ACNW by Chairman Selin on this subject last year, he then proceeded to make the following points:

1. While agreeing that the DOE mission plan is the basic document, Nevada believes that it relies on a number of things that are outside of the Department of Energy's control. Two major examples from his perspective, were provided: a) the MRS, and b) whether it is possible to find a site suitable for locating a repository.

2. Perhaps a semi-systems approach should be followed by the NRC. By this Mr. Frishman meant that the different technical disciplines on the staff should be encouraged to integrate their evaluations. He indicated that the current method of dealing with the review of the repository is what could be called "horizontal" and that a "vertical" review might be quite revealing.
3. Based on the "acknowledged limited bank of information and a very fluid design", it is Mr. Frishman's belief that it is premature at this time to rely on performance assessments.
4. Although the transportation and storage considerations related to repository operations would seem fairly standard it should be noted that this is the most likely area for the largest number of citizens to develop concerns. One can also observe that there will be many interfaces and linkages between regulators responsible for the various elements of the transportation and storage program. It was suggested that perhaps these interfaces, insofar as regulatory constraints, might be a fertile ground for the Commission to study.
5. In light of public concerns, there may also be a benefit in reviewing the lack of a requirement for full-scale testing of HLW casks. Perhaps the cask test conditions should also be reviewed.
6. Thermal loading was given as an example of an area of large unknowns that "bounces" through the review with various effects on the decision-making process. DOE considers thermal loading as a design element whereas the NRC views it as a potentially adverse or disruptive condition. Neither view, by itself, is correct. (It was noted that for the first time DOE appears to be recognizing the need for all-encompassing thermal management strategies -- from the spent fuel at the reactors to the spacing of the underground emplacement.) A recent report was referenced, which compared the impact on repository size of various kw/acre loadings and fuel ages.

Dr. Hinze, following up on an interchange between Dr. Steindler and Mr. Frishman, questioned whether the thrust of the latter's comments were that it may be too early to do a performance assessment since there are still very significant components of the site being characterized.

Discussion amongst the Members, consultants and Mr. Frishman ensued on several related topics, with the exchange being concluded with the observation that although a firm resolution of site suitability at this time may be unlikely, the NRC will, of necessity, address all of the relevant issues when the license application is submitted to it by DOE.

Mr. Robert Mussler, Counsel, Office of the Nuclear Waste Negotiator, was the last presenter. After recounting the formation of the Office following its establishment by the Nuclear Waste Policy Amendments Act of 1985, he noted the efforts of the Negotiator, David Leroy, in attempting to find a state or Indian nation that would be willing to voluntarily host a monitored retrieval storage facility or a repository. He made the following additional points in his presentation:

1. The headquarters office is located in Boise, Idaho and has a staff of ~10. Mr. Mussler operates the federal liaison office in Washington, D. C. For the first nine months of its existence, the Negotiator's Office gathered information, visited facilities and talked to any entity desirous of learning more about the process. That phase culminated in a workshop held last March.
2. On May 3, 1991, the Negotiator commenced direct interaction with the 560 tribes and 50 states and territories. Those communications introduced the proposed efforts and described the principles that would be used in the identification of prospective hosts. That effort was followed by a mailing of an Information Source Book to 23 organizations.

3. The grant process was described. It was noted as an aside that the Phase I grant, while available to anyone, due to a quirk in the law is only relevant for MRS investigations. Up to $100,000 may be awarded. The established deadline for applying for these grants was March 31, 1992. The grants are to be used for feasibility analyses and the grantee is to come to a conclusion within six months whether to apply for a Phase II grant. The only deliverable product after Phase I is the application for a Phase II grant, should the grantee desire to continue.
4. Phase II-a, which has a deadline of June 30, is really a continuation of Phase I. The grant for the follow-on phase could be for an additional $200,000. Upon satisfying certain specified conditions (e.g.-suitable area for an MRS, some likely means of gaining control over the proposed area, adequate intergovernmental coordination), the serious applicant may qualify for the Phase II-b grant of $3,000,000.
5. By statute the Negotiator is to work only with the Governor of a state or the governing body of an Indian nation. He is not authorized to deal with anyone else. (Several examples were given wherein counties were interested but the Governor objected and the prospective inquiry perished.)
6. Seven applications have been received to date. All except one are from Indian nations. (A brief status report on each one was provided.)

In response to Dr. Pomeroy's question regarding the need specified by DOE representatives that the MRS host must be identified by December 1992, Mr. Mussler indicated that "the voluntary process can't be driven by milestones."

Dr. Steindler asked if it were possible for a state to veto the decision of an Indian tribe or nation. While the direct response was negative, it was observed that no group is an island unto

1 itself. The need for meaningful interactions between the an Indian
2 tribe or nation and the state must be recognized. Furthermore, the
3 legal test which is to form the basis for the final phase binding
4 legal agreement will be one of reasonableness.

5 After thanking Mr. Mussler for an interesting set of comments, Dr.
6 Steindler brought the Working Group meeting to a close and
7 adjourned.

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9 NOTE: [Copies of the transcript taken at this meeting will be
10 available in the NRC Public Document Room in the Gelman
11 Building, 2120 L Street, N.W., Washington, D. C. Copies
12 will also be available from the Ann Riley & Associates,
13 Ltd., 1612 K Street, N. W., Washington, D. C. 20006]