

GCNW-0050

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

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

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

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

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

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

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

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

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

17 R. Robertson, General Manager, Civilian Radioactive Waste  
18 Management System (CRWMS), TRW

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

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

- 1           engineering, strategic and contingency planning, overall  
2           systems PA, licensing, etc.           The M&OC works for all  
3           radioactive waste (RW) organizations, and even bridges several  
4           of them.
- 5    4.    Research does not appear to directly feed back into the  
6           systems integration.
- 7    5.    The M&O management team involves other private organizations  
8           besides TRW, such as Morrison Knudsen, Babcock & Wilcox,  
9           INTERA, etc. - ten in all.
- 10   6.   Regulatory requirements do not necessarily reflect the mission  
11          needs; there is expectation that those setting requirements  
12          will allow sufficient flexibility to meet the mission needs.  
13          The international approach is just the opposite: after mission  
14          evaluation -- including research and development (R&D) --  
15          compliance requirements are set.
- 16   7.   In order to address necessary changes and modifications in the  
17          construction and operation phases, the regulations need to be  
18          sufficiently flexible to permit resolution of any "surprises",  
19          which are not necessarily associated with safety issues.
- 20   8.   The dilemma of a desirable solution which may be prohibited by  
21          law or regulation was briefly discussed; the question is  
22          whether it is fruitful to pursue a technically feasible option  
23          with the likelihood of rejection of the license application.
- 24   9.   The DOE/TRW HLW program control structure involves four levels  
25          of board review; these boards span the program structure from  
26          the DOE Secretary's office level down to the contractor design  
27          level. Whether an item or change is presented to any one or  
28          more boards is determined by cost, schedule, and degree of  
29          impact on the functional requirements.
- 30   10.   In response to questions with respect to the priority in  
31          selecting which system studies to perform, the TRW  
32          representatives described a "concept of operations" approach  
33          involving crude estimations of the logistics in moving an  
34          inventory from the utility to the Monitored Retrievable

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

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

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

19 13. The program utilizes an annotated license application (LA)  
20 outline, which serves three purposes:

21 i) it identifies the necessary references

22 ii) it identifies the required program deliverables and  
23 schedule milestones, as well as the responsible entities,  
24 and

25 iii) it becomes the framework for dialog between the DOE  
26 license development team and the NRC licensing entity.

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

33 15. Program convergence is attained by moving through data cycles

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

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

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

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

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

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

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

- 1 site-Yucca Mountain-and placed a second repository as a  
2 longer-term issue. An integral MRS was authorized as was the  
3 Office of the Nuclear Waste Negotiator and the Nuclear Waste  
4 Technical Review Board (NWTRB).
- 5 3. The Act, as passed by Congress, indicates that as a matter of  
6 public policy, long-term storage is not acceptable.
- 7 4. Public acceptability, external involvement, the involvement of  
8 the NRC, a comprehensive quality assurance program, and  
9 technical peer review are all program conditions.
- 10 5. DOE must develop a timely, credible disposal capability.  
11 Currently, the program has the repository scheduled to open in  
12 2010 with a capability to handle 70,000 metric tonnes of spent  
13 fuel in combination with certain amounts of vitrified Defense  
14 HLW. An important element of the program is contingency  
15 planning, which for this program is an attempt to envision  
16 future strategic changes and the necessary related  
17 accommodations. (In response to a question from Dr.  
18 Steindler, Mr. Issacs noted that the intent of the program is  
19 neither research nor technology, but rather, a service; i.e.,  
20 providing a demonstrated HLW disposal capability.)
- 21 6. DOE's Mission Plan document is based on the National Energy  
22 Strategy (NES). An important principle in the NES is the  
23 direct tie between solving the waste problem and the future  
24 viability of nuclear power. The nature of the Mission Plan  
25 will change in the future in that it is to be more generic and  
26 less subject to budget, schedule, and other constraints that in  
27 the past have necessitated that it be amended often. The  
28 Mission Plan, which lays out how the program will integrate  
29 the MRS, transportation and disposal capabilities, was put  
30 together based on both internal as well as external input from  
31 a variety of sources. These same groups were then asked to  
32 critique the final product, which should be ready in April.
- 33 7. The details of implementation of the Mission Plan will be

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

3 8. Key near-term objectives of the program are:

- 4 a. Obtain full access to the Yucca Mountain site
- 5 b. Prioritize activities to determine site suitability  
6 as early as possible
- 7 c. Work with the Negotiator to secure an MRS site
- 8 d. Coordinate licensing efforts to ensure timely  
9 issuance of a license
- 10 e. Maintain focus on agreed-upon management, technical  
11 and institutional principles
- 12 f. Develop strategic contingency plans (a recent  
13 workshop on the topic was discussed; the example  
14 given was a finding that Yucca Mountain was an  
15 unsuitable site).

16 9. The international program (which was deemed as "crucial" to  
17 the program's success) was next described. It was noted that  
18 in the early days of the program when the U.S. was looking at  
19 several sites, there was excellent synergism between the  
20 technical specialties at the various sites. Such interaction  
21 no longer exists as the US has only 1 site under  
22 consideration. A certain amount of synergism, however, is now  
23 coming from the international interfacing. One example given  
24 was the Swedish Stripa mine effort which brought home to the  
25 8 participating countries the extensive effort necessary to  
26 properly characterize a site. Also, while many things are  
27 site specific, there are data acquisition techniques, models,  
28 instrumentation, and collective issues resolutions and  
29 consensus building efforts that are generically accepted.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

- 24 1. Originally, in the US, waste classes were defined strictly on  
25 the basis of operational requirements. In the original  
26 definitions, there was no explicit consideration of protecting  
27 public health and the environment from the permanent disposal  
28 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

- 1 indicated his belief that the classification should be based  
2 on risks from disposal, rather than on how well the  
3 technology functions.
- 4 5. In summarizing the current definition and classification  
5 status of HLW, Dr. Kocher noted that there are no  
6 specifications anywhere of the minimum concentrations of  
7 either fission products or transuranics that constitute HLW.  
8 He interpreted this as meaning that the kind of reprocessing  
9 technologies and capabilities for removing radioactive  
10 material that have existed in the past will continue,  
11 unimproved, into the future. Such an attitude would seem to  
12 preclude new and innovative approaches. Since the properties  
13 of spent fuel and reprocessed waste are so similar, they will  
14 need to be handled in the same manner (even though the  
15 definitions may differ, depending upon the document). HLW  
16 does not include waste from any other source that might have  
17 equivalent levels of decay heat or external radiation and  
18 would require an equivalent degree of waste isolation for  
19 protection of public health.
- 20 6. The NWPA authorizes, but does not require, disposal of HLW in  
21 a repository. While DOE is explicitly directed by the Act to  
22 investigate alternatives, it is doing little in that regard  
23 (particularly since the only authorization it currently has is  
24 for the repository). Another feature of the NWPA is the co-  
25 disposal of defense HLW. This is both reasonable and  
26 economically sound.
- 27 7. The current EPA standards would probably have to be modified,  
28 if the disposal technology were other than a repository. Also  
29 noted was that EPA does not regulate disposal technologies;  
30 rather, it regulates disposal of waste classes.
- 31 8. The proposal by EPA to possibly apply drinking water standards  
32 to the protection of groundwater near disposal sites is  
33 extremely contentious.
- 34 9. NRC's Part 60 is a licensing criteria document for geologic

- 1            repositories. It is not, strictly speaking, an HLW standard.  
2            Since co-disposal of wastes will occur, it should be noted  
3            that NRC will also be regulating defense wastes as well.  
4            Elaborating further, Dr. Kocher pointed out that the NRC does  
5            not require that waste go to a repository nor does it require  
6            that the only waste that is placed in a repository be HLW.
- 7    10.    Significant discussion and background interchange occurred on  
8            greater-than-Class-C (GTCC) wastes, with Dr. Kocher stressing  
9            his point that, while such wastes are low-level wastes, the  
10           NRC has indicated that near-surface disposal is not generally  
11           acceptable and that civilian GTCC should be disposed of in the  
12           repository.
- 13   11.    EPA's role is to establish general environmental standards  
14           for disposal of particular waste classes without regard to the  
15           disposal system, while the NRC's function is exactly the  
16           opposite-to establish licensing criteria for particular  
17           disposal systems without regard for the waste that will be  
18           placed in them. The system functions satisfactorily because  
19           waste definitions have been decoupled from the requirements  
20           for disposal. This allows selection of whatever technology is  
21           appropriate for the particular waste. Dr. Moeller commented  
22           that a change in the technology could result in EPA being  
23           required to rewrite their regulations.
- 24   12.    Among the advantages of a system of waste classification based  
25           on risk from disposal was the belief of Dr. Kocher that many  
26           petitions and case-by-case actions could be eliminated as  
27           would the artificial distinction between fuel cycle and NARM  
28           wastes. Upon further questioning by Dr. Steindler, it was  
29           agreed that, at the time the regulations were initially  
30           issued, the approach was reasonable. Furthermore, although a  
31           proposed "solution" may solve many of the problems, one must  
32           also recognize that the new "fix" may have some difficulties  
33           of its own. Dr. Steindler expressed his belief that what  
34           should be used is a disposal system based on risk instead of

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

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

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

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

- 1 on the facility. Also, because of the low concentration  
2 limits, the intruder is considered protected.
- 3 16. Dr. Kocher discussed credit for passive controls at a LLW  
4 facility, noting the French have assumed control for 300 years  
5 while the US assumes active control for only 100 years. He  
6 believes the answer is "wide open."
- 7 17. The last proposition for consideration was whether RCRA poses  
8 a problem for a repository. For HLW and spent fuel the hazard  
9 is such that RCRA restrictions on leachability should not  
10 cause a problem. However, such a case cannot be made as  
11 clearly for Class C wastes.

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

18 Robert W. Bishop, former member, DOE WIPP Blue Ribbon Panel

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

- 25 1. The responses of the Panel for the WIPP project were mixed,  
26 with some members experiencing frustration and others a sense  
27 of accomplishment. While DOE's cooperation and openness was  
28 outstanding, for various reasons the facility, which was well  
29 designed and executed, thus far is not being permitted to  
30 operate.
- 31 2. He believes that many of the lessons learned from the WIPP  
32 experience are directly translatable as lessons that must be

1 applied on the Yucca Mountain project.

- 2 3. One sense of frustration comes from the fact that starting in  
3 1970, there have been thousands of drums (with a design life  
4 of 10 years) of transuranic wastes accumulating in surface (or  
5 just below the subsurface) storage, at 10 different sites.  
6 One particular troublesome storage was at the Idaho site which  
7 is at the head waters of the Snake River aquifer. Mr. Bishop  
8 noted that he had trouble with the acceptance of that storage  
9 vis-a-vis the proposed storage capability of the WIPP  
10 facility, where some geologists indicated that the bedded salt  
11 has not been disturbed for at least 250 million years.
- 12 4. Both EPA and DOE are to be criticized: the former for the  
13 various faults in their proposed HLW standards (such as their  
14 unmined ore comparison) and the latter for its inability to  
15 solve problems, such as the radwaste drum disposal situation  
16 described above, and its unwillingness to petition EPA for a  
17 redress of portions of Part 191.
- 18 5. The requirement to satisfy RCRA requirements in advance of  
19 waste emplacement, the remand decision for Part 191 which  
20 defined a HLW repository as an injection well, coupled with  
21 other unnecessary restrictions placed upon the WIPP (and  
22 potentially other geologic repositories), were also sources of  
23 frustration and concern. For example, although RCRA states  
24 that one of its fundamental purposes is to minimize the  
25 present and future threat to the environment, Mr. Bishop  
26 perceives that the emphasis has been placed upon the future,  
27 with little attention being placed on the present.
- 28 6. Consideration of human intrusion is the critical regulatory  
29 constraint. DOE should have challenged EPA on its position  
30 since, in Mr. Bishop's opinion, Appendix B, which indicates  
31 that human intrusion should be considered, is guidance (and  
32 not regulation).

33 Considerable discussion ensued on administrative law matters,

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

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

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

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

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

29 Dr. Pomeroy asked whether the current testing program proposed for

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

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

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

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

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

29 Working Group Chairman Steindler then summarized his observations,

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

3 FEBRUARY 20, 1992

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

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

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

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

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

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

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

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

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

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

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

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

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

16 Particular points made during her presentation were:

17 1. Total system performance and performance assessment were  
18 considered in ~90% of the guidelines. Preliminary CCDF's were  
19 calculated and compared to the EPA standard by not only those  
20 working on the evaluation but also by both Golder Associates  
21 and EPRI.

22 2. In the performance of the ESSE, it must be shown that every  
23 disqualifying condition is not present and every qualifying  
24 condition met at either one of two levels of confidence. At  
25 the time of the environmental assessment, in order for the DOE  
26 to move forward at least the lower confidence level on every  
27 condition had to be found. The ESSE group had not only to  
28 assure that these lower confidence findings were still valid,  
29 but also to assure that sufficient confidence had been  
30 developed to recommend a higher confidence finding.

31 3. The report indicates what kinds of tests or activities are  
32 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

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

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

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

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

34 12. Areas where additional information was desired were discussed.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

