Mr. Ralph Stein, Associate Director
Office of Systems Integration and Regulations
Office of Civilian Radioactive Waste Management
U. S. Department of Energy, RW-24
Washington, D. C. 20545

DEC 15 1988

Dear Mr. Stein:

SUBJECT: MINUTES FROM DECEMBER 8, 1988 MEETING ON THE EXPLORATORY SHAFT DESIGN ACCEPTABILITY ANALYSIS

The purpose of this letter is to provide you with a copy of the meeting minutes from the December 8, 1988 exploratory shaft facility (ESF), design acceptability analysis (DAA) meeting. Members of the U. S. Nuclear Regulatory Commission (NRC) staff and representatives from the U. S. Department of Energy (DOE) jointly prepared the minutes.

There are several points the staff raised during the meeting that DOE should know and consider in the DAA. These points are provided in the summary of the minutes. In addition, the staff believes that a clarification of its position on the application of requirements from the Code of Federal Regulations, Title 10, Part 60 (10 CFR Part 60) is needed. During the meeting, DOE informed the staff that it had identified 46 requirements from 10 CFR Part 60 that apply to the ESF. Of these 46, 23 would be considered in the DAA. The 23 being considered were the ones that addressed the three objectives identified in Step 2. of the DAA agreed upon at the November 3, 1988 meeting (John J. Linehan, NRC letter to Ralph Stein, DOE, dated November 14, 1988). This process is not consistent with the NRC understanding of the DAA. The staff understanding is that all 10 CFR Part 60 requirements need to be considered in the DAA analysis discussed in Step 2. In addition, that analysis should demonstrate that the ESF will not violate any of the three objectives identified in Step 2. The staff wants to clarify the point that all 10 CFR Part 60 requirements need to be considered in the DAA. Further discussion of this is given in the enclosure.

If you have any questions on the enclosed minutes, please feel free to contact the NRC project manager for this area, Mr. Joe Holonich who can be reached at (301) 492-3403 or FTS 492-3403.

Sincerely,

ORIGINAL SIGNED BY

John J. Linehan, Director
Repository Licensing and Quality
Assurance Project Directorate
Division of High-Level Waste Management

cc: C. Gertz, YMPO
R. Loux, St. of NV.
S. Bradhurst, Nye County, NV.
D. Bechtel, Clark County, NV.
M. Baugham, Lincoln County, NV.
K. Turner, GAO

DISTRIBUTION AND CONCURRENCE: SEE NEXT PAGE

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102.2
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LPDR	ACNW	PDR	

OFC	:NLPO	:HLEN	:HLPD	:	:	:
NAME	:JHolonich	:JBunting	:JLinehan	:	:	:
DATE	:12/15/88	:12/15/88	:12/15/88	:	:	:

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ENCLOSURE

On December 8, 1988, members of the U. S. Nuclear Regulatory Commission (NRC) staff met with representatives of the U. S. Department of Energy (DOE), its contractors, and the State of Nevada. The purpose of the meeting was to have DOE present preliminary results from several areas of activity associated with the design acceptability analysis (DAA), and to present the status of the overall DAA. Attachment 1 is a list of attendees.

The first presentation by DOE covered the status of the flowdown of requirements, given in the Code of Federal Regulations, Title 10, Part 60 (10 CFR Part 60), into the design requirements documents for the exploratory shaft facility (ESF). This briefing was given as a follow-up to the information presented by DOE at the November 23, 1988 meeting on the DAA. The purpose of the presentation was to provide an update on the status of the DOE efforts currently under way to verify the flowdown of 10 CFR Part 60 requirements into the specific ESF design documents. Relevant ESF design documents included: (1) the Generic Requirements for a Mined Geologic Disposal System (GRD), Appendix E; (2) the Yucca Mountain Project Office (YMPO) Subsystem Design Requirements Document (SDRD); and (3) the Basis for Design used by the architect/engineering firms. Included in the presentation was a summary of the review process that differentiated between those activities being done by the YMPO technical assessment review group and those that were being done by DOE/HQ. DOE also discussed the documentation that would result from the reviews, and presented a table of preliminary review results. The table contained a listing of the applicable 10 CFR Part 60 requirements and identified whether they were addressed in either the GRD, Appendix E and SDRD, or not addressed. Attachment 2 is a copy of the DOE presentation.

Based on the information presented, the NRC staff stated that the results presented in the table appear to cover the major objectives that should be considered. These objectives were: (1) the long-term waste isolation capability of the site is not compromised; (2) the ability to the characterize the site is not compromised; and (3) the ESF site characterization activities will provide representative data. In addition, the staff noted that the requirements identified as applicable should also cover preclosure design considerations, and based on the information presented in the table it appeared that DOE recognized this. Although the staff could not determine the acceptability of the specifics contained in the table, it did identify to DOE four additional 10 CFR Part 60 requirements that should be included on the table. The four additional requirements were: (1) 10 CFR 60.21 (c)(1)(ii)(A); (2) 10 CFR 60.21(c)(1)(ii)(B); (3) 10 CFR 60.131(b)(8); and (4) 60.134.

Next, DOE presented information on the status of its plans for the ESF, Title I DAA and the comparative evaluations related to alternative shaft locations. As part of this discussion, DOE provided a copy of the "Technical Assessment Review Notice," that defines the purpose, scope, and process for the technical assessment review (TAR) of the ESF, Title I design and the comparative evaluation of shaft locations. Attachment 3 is a copy of the presentation, and Attachment 4 is a copy of the TAR notice.

Part of this DOE presentation was a discussion on the preliminary results of what 10 CFR Part 60 requirements, identified by the flowdown analysis discussed above, need to be considered in the DAA. In this discussion, DOE stated that it intended to consider only those 10 CFR Part 60 requirements that are necessary

to meet the three major objectives discussed in the previous paragraph. In response to this information, the staff noted that its position was that DOE had to consider all of the applicable 10 CFR Part 60 requirements in the DAA. DOE further stated that this consideration could be an evaluation of the impact on the Title I design of omitting an applicable requirement, and a rationale describing why, if the impact was not significant, any design considerations could be delayed until Title II design. The staff agreed with DOE that this was acceptable. A copy of the DOE presentation on the review of flowdown requirements is given in Attachment 5.

The final presentation made by DOE covered the appropriateness of the data used in the design analysis and the consideration of uncertainties. DOE described its approach for determining the appropriateness, considering uncertainties, and determining the adequacy of the evaluations. The staff did not see any major difficulties with the proposed approach; however, the staff did not perform a detailed review.

At the end of the meeting, the NRC staff presented its summary of the points that DOE needed to consider. The points are presented below and are categorized based on the particular presentation.

Status and Results of Flowdown Requirements

(1) DOE should consider the application of four additional requirements to the results table (Attachment 2, Pages 15 through 17).

(2) The staff does not consider the information on page 10 of the presentation in Attachment 2 anything more than a preliminary assessment.

(3) Some of the applicable 10 CFR Part 60 requirements are not being addressed by DOE in the DAA. The staff position is that all applicable 10 CFR Part 60 requirements need to be considered per Step 1 (a) of the process outlined at the November 3, 1988 meeting. The fact that a requirement does not address any of the three major objectives, does not preclude DOE from including it in the DAA. The staff agrees that if DOE finds that in considering these requirements, a deficiency is identified, DOE can assess the impact on the ESF, Title I design, and delay any action until Title II design by providing appropriate rationale.

(4) DOE needs to provide the rationale for identifying which of the three major design objectives are addressed by 10 CFR Part 60 requirements. (How are the "X's" placed in the columns in the table in Attachment 3, Backup Material, Pages 1 through 3).

(5) The staff would like to see a matrix similar to the one given on page E-34 of the GRD. This matrix should not only include all of the applicable requirements from 10 CFR Part 60, but should also identify all of the work breakdown structures to which the requirements apply.

(6) The staff reiterated the point that 10 CFR Part 60.21 deals with the need to consider alternatives analysis for major design features of the ESF not just the shaft location. This point was raised at the November 23, 1988 meeting (John J. Linehan, NRC letter to Ralph Stein, DOE dated December 2, 1988.

TAR Notice

(1) In the TAR notice, DOE includes the minutes from the November 3, 1988 meeting. The staff was concerned that DOE did not include the November 23, 1988 meeting minutes and minutes for this meeting (December 8, 1988) in the TAR Notice. Both of these subsequent meetings help to better define the issues. Placing just the one set of minutes in the TAR could result in confusion.

With respect to the matrix requested by the staff in item (5) in the "Status and Results of Flowdown Requirements," DOE noted that it was generated after all the other previous work had been completed. The table itself was not input to the design process, it just summarizes the design criteria. In addition, DOE stated that this matrix would be generated in a separate design control process not the DAA. The staff noted that this was acceptable.

For its closing remarks, DOE requested that the staff review the TAR notice and provide any feedback it could. The NRC committed to review the document and identify any concerns it may have by the middle of the week of December 12, 1988. DOE also stated that it believed that NRC could see that the process being used and products being generated were being accomplished under the appropriate controls of the "Nevada Nuclear Waste Storage Investigation Quality Assurance Plan." Finally, DOE noted that it had hoped to receive feedback from the NRC on the completeness of the DOE list of 10 CFR Part 60 requirements, and the approach of relating these requirements to the three major objectives. DOE stated that the meeting achieved this.

The State of Nevada had no closing comments, noting that the NRC staff had captured all of its concerns.

Joseph J. Holonich 12/15/88
Joseph J. Holonich
Repository Licensing Project Directorate
Division of High-Level Waste
Office of Nuclear Material Safety and Safeguards
U. S. Nuclear Regulatory Commission

Gordon Appel 12/15/88
Gordon Appel, Chief
Licensing Branch
Office of Systems Integration and Regulations
Office of Civilian Radioactive Waste Management
U. S. Department of Energy

ATTACHMENT 1

List of Attendees

NRC

J. Holonich
D. Gupta
J. Kennedy
J. Linehan
K. Stablein
J. Conway
R. Weller
T. Verma
R. Natarja
F. Ross
K. McConnell
R. Ballard*

DOE

R. Stein*
R. Lahoti
M. Blanchard
G. Appel
T. Petrie
M. Frei
S. Kale
R. Lark
C. Bradley

State of Nevada

C. Johnson

DOE/Weston

S. Dam

General Accounting Office

K. Turner
E. Nakamura

USGS/DOE

R. Wallace

Advisory Committee on Nuclear Waste

O. Merril

Newman & Holtzinger

K. Unnerstall

* Did not stay the entire meeting.

ATTACHMENT 2

Presentation on the Status of Flowdown Analysis

STATUS OF 10 CFR 60 FLOWDOWN INTO ESF DESIGN REQUIREMENTS DOCUMENTS

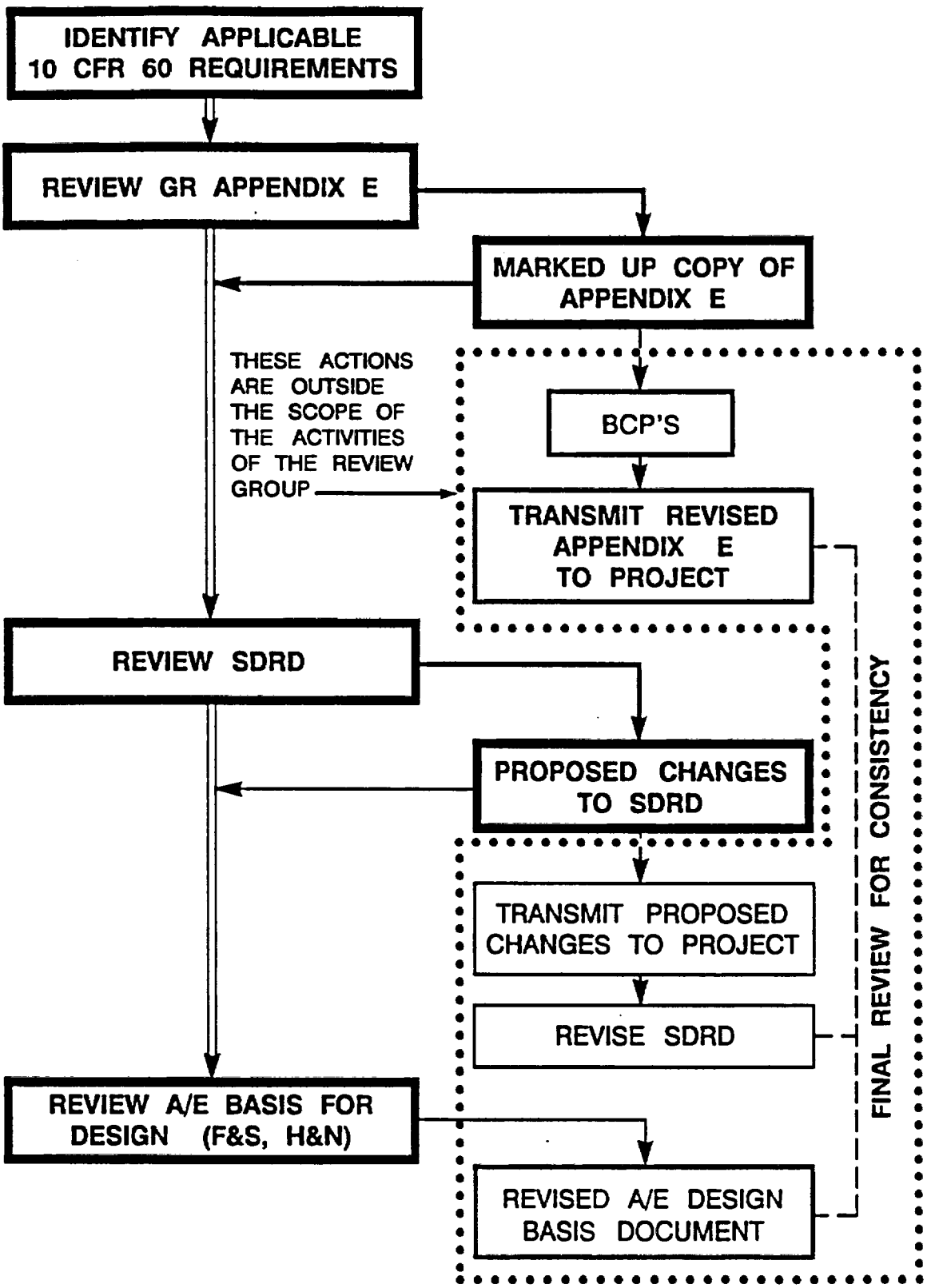
DOE/NRC MEETING

DECEMBER 8, 1988

PURPOSE OF BRIEFING

- TO PROVIDE AN UPDATED STATUS OF DOE EFFORTS CURRENTLY UNDER WAY TO VERIFY THE FLOWDOWN OF 10 CFR 60 REQUIREMENTS INTO THE ESF DESIGN REQUIREMENTS DOCUMENTS, INCLUDING:
  - GR APPENDIX E
  - YUCCA MOUNTAIN PROJECT OFFICE SDRD
  - A/E BASIS FOR DESIGN
- THIS IS A FOLLOW-UP TO THE NOVEMBER 23, 1988 DOE/NRC MEETING

SUMMARY OF REVIEW PROCESS



REVIEW PROCEDURE

- REVIEW MEETS THE 10 CFR 60 SUBPART G QA REQUIREMENTS
- QUALITY IMPLEMENTING PROCEDURE (QIP) 3.2 "TECHNICAL REVIEWS" WAS FOLLOWED
- REVIEW GROUP SELECTION WAS BASED ON INDIVIDUALS' QUALIFICATIONS, BACKGROUND, AND EXPERTISE IN THEIR SPECIFIC DISCIPLINES
- INDOCTRINATION AND TRAINING ACCORDING TO QIP 2.1 WAS PROVIDED TO REVIEW GROUP MEMBERS

APPENDIX E
TECHNICAL REVIEW GROUP MEMBERS

M. COMAR/DOE (CHAIRMAN)	ENGINEERING
D. WAGG/WESTON (CO-CHAIRMAN)	ENGINEERING
M. LUGO/WESTON (CO-CHAIRMAN)	LICENSING
M. MOZUMDER/DOE	GEOSCIENCES
S. SINGAL/DOE	REGULATORY
P. KUMAR/WESTON	ENGINEERING
S. VAN CAMP/WESTON	GEOSCIENCES
H. BERMANIS/WESTON	LICENSING
L. IBE/WESTON (OBSERVER)	QA
B. SCOTT/WESTON	SYSTEMS
G. HUANG/CER	LICENSING
D. FENSTER/WESTON	GEOSCIENCES
A. PAPADOPOULOS/WESTON	ENGINEERING
D. MICHLEWICZ/WESTON	SAFETY ASSESSMENT
H. MINWALLA/WESTON	LICENSING

SDRD TECHNICAL REVIEW GROUP MEMBERS

M. COMAR/DOE (CHAIRMAN)	ENGINEERING
D. WAGG/WESTON (CO-CHAIRMAN)	ENGINEERING
P. KUMAR/WESTON	ENGINEERING
S. VAN CAMP/WESTON	GEOSCIENCES
H. BERMANIS/WESTON	LICENSING
L. IBE/WESTON (OBSERVER)	QA
B. SCOTT/WESTON	SYSTEMS
J. MONTGOMERY/WESTON	ENGINEERING

BASIS FOR DESIGN TECHNICAL REVIEW GROUP MEMBERS

M. COMAR/DOE (CHAIRMAN)	ENGINEERING
D. WAGG/WESTON (CO-CHAIRMAN)	ENGINEERING
P. KUMAR/WESTON	ENGINEERING
S. VAN CAMP/WESTON	GEOSCIENCES
H. BERMANIS/WESTON	LICENSING
B. SCOTT/WESTON	SYSTEMS
J. MONTGOMERY/WESTON	ENGINEERING

DOCUMENTATION RESULTING FROM GROUP REVIEWS

- REPORT ON APPLICABILITY OF 10 CFR 60 REQUIREMENTS
- TECHNICAL REVIEW REPORT ON APPENDIX E
- TECHNICAL REVIEW REPORT ON SDRD
- TECHNICAL REVIEW REPORT ON A/E BASIS FOR DESIGN DOCUMENTS

RELATED DOCUMENTATION OUTSIDE THE SCOPE OF THE GROUP REIVEWS

- BASELINE CHANGE PROPOSALS FOR APPENDIX E
- REVISED APPENDIX E
- HQ DIRECTION TO PROJECT FOR REVISING SDRD & BASIS FOR DESIGN
- REVISED SDRD
- REVISED BASIS FOR DESIGN (F&S, H&N)

SUMMARY OF REVIEW RESULTS

- TOTAL 10 CFR 60 REQUIREMENTS: 157
- TOTAL REQUIREMENTS APPLICABLE: 46
- THERE ARE AREAS OF 10 CFR 60 THAT WERE NOT EXPLICITLY ADDRESSED IN THE DESIGN REQUIREMENTS DOCUMENTS

SUMMARY OF PRELIMINARY ASSESSMENT OF SIGNIFICANCE OF 10 CFR 60 REQUIREMENTS NOT EXPLICITLY ADDRESSED IN APPENDIX E/SDRD

- SIX ITEMS OF MINOR OR POTENTIALLY MINOR SIGNIFICANCE TO ESF TITLE I DESIGN
  - 60.21(c)(1)(ii)(D)
  - 60.21(c)(1)(ii)(E)
  - 60.131(b)(2)
  - 60.131(b)(6)
  - 60.133(g)
  - 60.140(d)(1)

- ONE ITEM MAY HAVE SIGNIFICANCE TO THE TITLE II DESIGN PROCESS
  - 60.21(c)(1)(ii)(D)

- PRELIMINARY ASSESSMENT OF SIGNIFICANCE TO TITLE I DESIGN WAS BASED PARTLY ON THE TECHNICAL ASSESSMENT REVIEW CONDUCTED DURING THE ESF 100% TITLE I DESIGN REVIEW

PRELIMINARY ASSESSMENT OF SIGNIFICANCE OF 10 CFR 60 REQUIREMENTS NOT EXPLICITLY ADDRESSED IN APPENDIX E/SDRD

	10 CFR 60 REQUIREMENT	PRELIMINARY ASSESSMENT OF SIGNIFICANCE	REMARKS
1	60.15(b)	NONE	TITLE I DESIGN COMPLIES WITH REQUIREMENT*
2	60.15(d)	NONE	TITLE I DESIGN COMPLIES WITH REQUIREMENT*
3	60.16	NONE	COMPLIANCE REQUIRED PRIOR TO SHAFT SINKING
4	60.21(c)(1)(ii)(D)	POTENTIALLY MINOR	(1) EVALUATION OF ALTERNATIVE SHAFT LOCATIONS TO BE PREPARED PRIOR TO START OF TITLE II (2) IDENTIFICATION OF ESF COMPONENTS IMPORTANT TO WASTE ISOLATION TO BE MADE PRIOR TO START OF TITLE II (3) EVALUATION OF ALTERNATIVES TO THE MAJOR DESIGN FEATURES IMPORTANT TO WASTE ISOLATION TO BE CONDUCTED DURING TITLE II
5	60.21(c)(1)(ii)(E)	POTENTIALLY MINOR	(1) IDENTIFICATION OF ESF COMPONENT IMPORTANT TO SAFETY TO BE MADE PRIOR TO START OF TITLE II (2) NO ESF COMPONENTS ARE EXPECTED TO BE IMPORTANT TO SAFETY
6	60.72(a)	NONE	COMPLIANCE WITH THIS REQUIREMENT IS NOT NEEDED UNTIL START OF ESF CONSTRUCTION
7	60.72(b)	NONE	COMPLIANCE WITH THIS REQUIREMENT IS NOT NEEDED UNTIL START OF ESF CONSTRUCTION

PRELIMINARY ASSESSMENT OF SIGNIFICANCE OF 10 CFR 60 REQUIREMENTS NOT EXPLICITLY ADDRESSED IN APPENDIX E/SDRD (CONTINUED)

	10 CFR 60 REQUIREMENT	PRELIMINARY ASSESSMENT OF SIGNIFICANCE	REMARKS
8	60.111(a)	NONE	TITLE I DESIGN COMPLIES WITH REQUIREMENT*
9	60.111(b)(1)	NONE	TITLE I DESIGN COMPLIES WITH REQUIREMENT*
10	60.111(b)(3)	NONE	TITLE I DESIGN COMPLIES WITH REQUIREMENT*
11	60.131(b)(2)	POTENTIALLY MINOR	(1) IDENTIFICATION OF ESF COMPONENT IMPORTANT TO SAFETY TO BE MADE PRIOR TO START OF TITLE II (2) NO ESF COMPONENTS ARE EXPECTED TO BE IMPORTANT TO SAFETY
12	60.131(b)(6)	POTENTIALLY MINOR	(1) IDENTIFICATION OF ESF COMPONENTS IMPORTANT TO SAFETY TO BE MADE PRIOR TO START OF TITLE II (2) NO ESF COMPONENTS ARE EXPECTED TO BE IMPORTANT TO SAFETY
13	60.131(b)(9)	NONE	TITLE I DESIGN COMPLIES WITH REQUIREMENT*
14	60.133(a)	NONE	TITLE I DESIGN COMPLIES WITH REQUIREMENT*
15	60.133(c)	NONE	TITLE I DESIGN COMPLIES WITH REQUIREMENT*
16	60.133(e)	NONE	TITLE I DESIGN COMPLIES WITH REQUIREMENT*

PRELIMINARY ASSESSMENT OF SIGNIFICANCE OF 10 CFR 60 REQUIREMENTS NOT EXPLICITLY ADDRESSED IN APPENDIX E/SDRD (CONTINUED)

	10 CFR 60 REQUIREMENT	PRELIMINARY ASSESSMENT OF SIGNIFICANCE	REMARKS
17	60.133(g)	MINOR	(1) TITLE I DESIGN COMPLIES WITH 60.111(a), WHICH IS REFERENCED HERE* (2) TITLE I DESIGN COMPLIES WITH 60.133(e), WHICH WOULD SHOW COMPLIANCE WITH 60.133(g)(2) REGARDING STABILITY OF OPENINGS TO ASSURE CONTINUED FUNCTIONING DURING NORMAL AND ACCIDENT CONDITIONS* (3) FURTHER EVALUATION TO BE DONE DURING TITLE II, TO ASSURE FUTURE ABILITY TO PROVIDE VENTILATION SEPARATION BETWEEN EMPLACEMENT AND EXCAVATION AREAS
18	60.133(i)	NONE	TITLE I DESIGN COMPLIES WITH REQUIREMENT*
19	60.137	NONE	TITLE I DESIGN COMPLIES WITH REQUIREMENT*
20	60.140(b)	NONE	TITLE I DESIGN COMPLIES WITH REQUIREMENT*
21	60.140(c)	NONE	TITLE I DESIGN COMPLIES WITH REQUIREMENT*
22	60.140(d)(1)	MINOR	POTENTIAL IMPACTS CAUSED BY PERFORMANCE CONFIRMATION TESTING TO BE EVALUATED DURING TITLE II DESIGN
23	60.141(a)	NONE	TITLE I DESIGN COMPLIES WITH REQUIREMENT*
24	60.141(b)	NONE	TITLE I DESIGN COMPLIES WITH REQUIREMENT*

PRELIMINARY ASSESSMENT OF SIGNIFICANCE OF 10 CFR 60 REQUIREMENTS NOT EXPLICITLY ADDRESSED IN APPENDIX E/SDRD (CONTINUED)

	10 CFR 60 REQUIREMENT	PRELIMINARY ASSESSMENT OF SIGNIFICANCE	REMARKS
25	60.141(c)	NONE	TITLE I DESIGN COMPLIES WITH REQUIREMENT*
26	60.141(d)	NONE	TITLE I DESIGN COMPLIES WITH REQUIREMENT*
27	60.141(e)	NONE	TITLE I DESIGN COMPLIES WITH REQUIREMENT*
28	60.142(a)	NONE	TITLE I DESIGN COMPLIES WITH REQUIREMENT*
29	60.142(b)	NONE	TITLE I DESIGN COMPLIES WITH REQUIREMENT*
30	60.142(c)	NONE	TITLE I DESIGN COMPLIES WITH REQUIREMENT*
31	60.142(d)	NONE	TITLE I DESIGN COMPLIES WITH REQUIREMENT*

NOTE: * AS DETERMINED BY THE TECHNICAL ASSESSMENT REVIEW CONDUCTED DURING THE ESF 100% TITLE I DESIGN REVIEW

REVIEW RESULTS

	APPLICABLE 10 CFR 60 REQUIREMENTS	APPENDIX E ADDRESSED	APPENDIX E NOT EXPLICTLY ADDRESSED	SDRD ADDRESSED	SDRD NOT EXPLICITLY ADDRESSED
1	60.15(b)		X	1.2.6.0 FR(1) 1.2.6.4 C(10) 1.2.6.6 C(2)	
2	60.15(d)		X		X*
3	60.16		X		X*
4	60.21(c)(1)(ii)(D)		X		X
5	60.21(c)(1)(ii)(E)		X		X
6	60.21(c)(11)	6.0 C(T)		1.2.6.0 C(10) 1.2.6.9 PC(1)	
7	60.72(a)	6.1 PC(4)(a)			X
8	60.72(b)	6.1 PC(4)(a)			X
9	60.74	6.0 PC(1) 6.1 PC(3)		1.2.6.0 PC(2) 1.2.6.6 PC(17) 1.2.6.8 PC(10)	
10	60.111(a)		X		X*
11	60.111(b)(1)		X		X
12	60.111(b)(3)		X		X
13	60.112	6.0 C(W)		1.2.6.0 C(3) 1.2.6.0 PC(10) 1.2.6.6 PC(3) 1.2.6.8 C(2)	
14	60.113(a)(1)(i)	6.0 PC(6)(c)		1.2.6.0 C(3) 1.2.6.6 PC(3) 1.2.6.6 PC(4)	
15	60.113(a)(1)(ii)	6.0 PC(6)(c)		1.2.6.0 PC(4) 1.2.6.0 PC(10) 1.2.6.0 C(3)	
16	60.130	THROUGHOUT		THROUGHOUT	
17	60.131(b)(1)	6.0 C(G)		1.2.6.0 C(4)	
18	60.131(b)(2)	6.0 C(H)			X
19	60.131(b)(3)	6.0 C(D) 6.0 C(I) 6.0 C(L) 6.0 PC(5)		1.2.6.0 PC(8) 1.2.6.0 PC(9) 1.2.6.0 C(2) 1.2.6.0 C(5) 1.2.6.0 C(7) 1.2.6.7.8	
20	60.131(b)(4)(i)	6.0 C(J)		1.2.6.0 C(6)	
21	60.131(b)(6)		X		X

REVIEW RESULTS (CONTINUED)

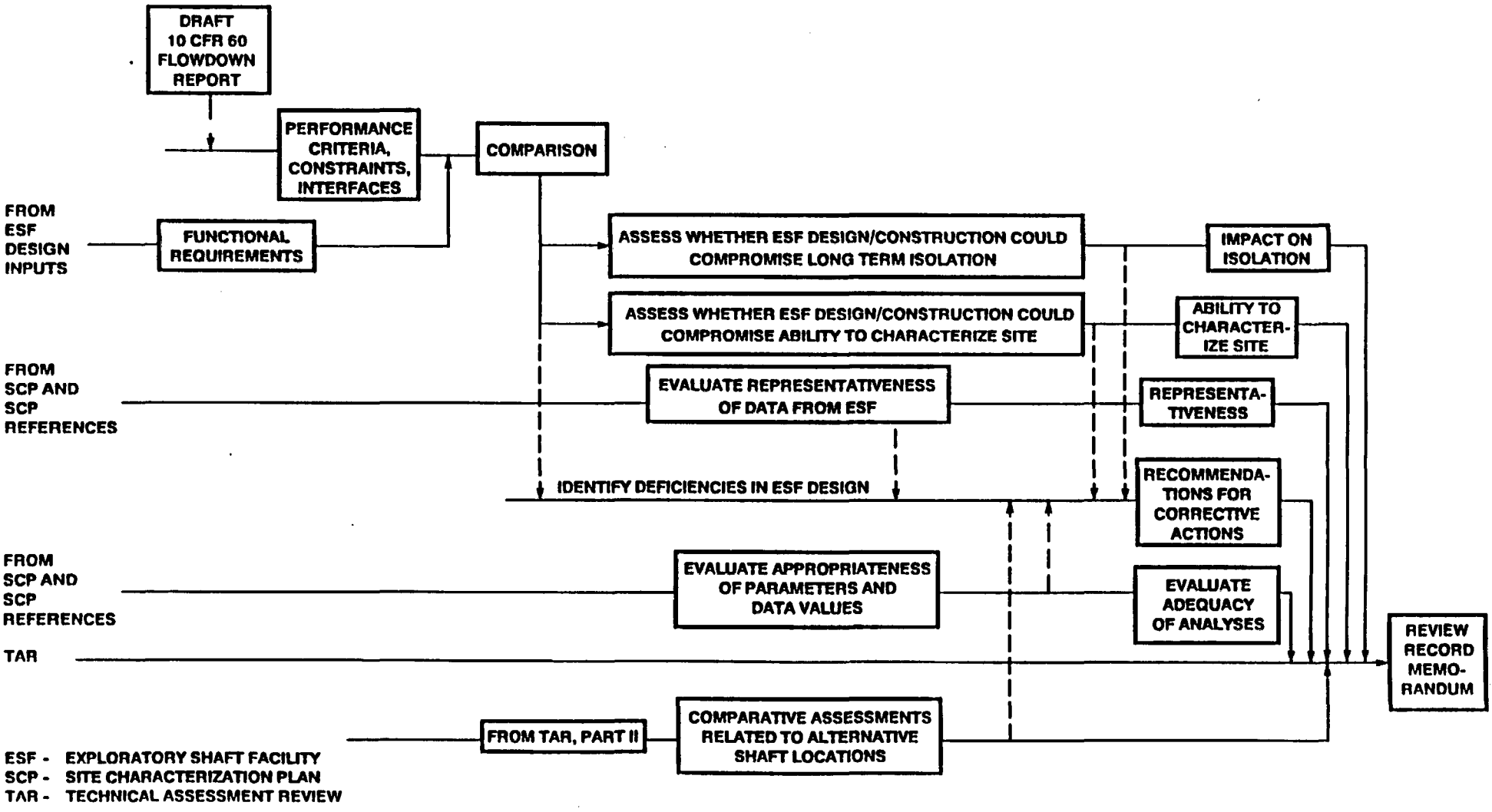
	APPLICABLE 10 CFR 60 REQUIREMENTS	APPENDIX E ADDRESSED	APPENDIX E NOT EXPLICTLY ADDRESSED	SDRD ADDRESSED	SDRD NOT EXPLICITLY ADDRESSED
22	60.131(b)(9)	6.0 PC(3)(e) 6.0 PC(4)(a) 6.1 PC(5)(a)			X
23	60.133(a)	6.0 C(C)			X
24	60.133(b)	6.0 PC(1)(a) 6.0 PC(1)(b) 6.0 PC(1)(c) 6.0 PC(1)(k)		1.2.6.0 PC(2) 1.2.6.6 PC(17)	
25	60.133(c)		X		X
26	60.133(d)	6.6 PC(1)(f)		1.2.6.0 PC(7) 1.2.6.0 PC(9) 1.2.6.6 PC(18) 1.2.6.7.6 PC(6) 1.2.6.7.6 PC(7)	
27	60.133(e)		X*		X*
28	60.133(f)	6.0 C(E) 6.6 PC(1)(c) 6.6 PC(1)(d)		1.2.6.6 PC(3) 1.2.6.6 PC(23) 1.2.6.4 C(2) 1.2.6.4 C(3) 1.2.6.5 C(2) 1.2.6.5 C(3)	
29	60.133(g)		X*		X*
30	60.133(h)	6.0 PC(6)(c)		1.2.6.0 C(3) 1.2.6.6 PC(3)	
31	60.133(i)		X	1.2.6.0 C(8)	
32	60.137		X*		X*
33	60.140(b)	6.1 PC(3) 6.9 PC(2)			X
34	60.140(c)	6.1 PC(3) 6.9 PC(2)			X
35	60.140(d)(1)	6.1 PC(3) 6.9 PC(2)			X
36	60.141(a)	6.1 PC(3) 6.9 PC(2)			X
37	60.141(b)	6.1 PC(3) 6.9 PC(2)			X
38	60.141(c)	6.1 PC(3) 6.9 PC(2)			X
39	60.141(d)	6.1 PC(3) 6.9 PC(2)			X

REVIEW RESULTS (CONTINUED)

	APPLICABLE 10 CFR 60 REQUIREMENTS	APPENDIX E ADDRESSED	APPENDIX E NOT EXPLICTLY ADDRESSED	SDRD ADDRESSED	SDRD NOT EXPLICITLY ADDRESSED
40	60.141(e)	6.1 PC(3) 6.9 PC(2)			X
41	60.142(a)	6.1 PC(3) 6.9 PC(2)			X
42	60.142(b)	6.1 PC(3) 6.9 PC(2)			X
43	60.142(c)	6.1 PC(3) 6.9 PC(2)			X
44	60.142(d)	6.1 PC(3) 6.9 PC(2)			X
45	60.151	6.1 PC(6)		1.2.6.0 PC(5) 1.2.6 INTRO	
46	60.152	6.1 PC(6)		1.2.6.0 PC(5) 1.2.6 INTRO	

*PARTIALLY ADDRESSED IN DOCUMENT

COMPONENTS OF TECHNICAL ASSESSMENT REVIEW



ESF - EXPLORATORY SHAFT FACILITY
SCP - SITE CHARACTERIZATION PLAN
TAR - TECHNICAL ASSESSMENT REVIEW

NRCFL29P.A25/12-6-88

ATTACHMENT 3

Presentation on the Status of ESF, Title I DAA

and the Comparative Evaluations

STATUS OF PLANS FOR TITLE I EXPLORATORY SHAFT FACILITY DESIGN ACCEPTABILITY ANALYSIS

AND

COMPARATIVE EVALUATIONS RELATED TO ALTERNATIVE SHAFT LOCATIONS

DOE-NRC MEETING

DECEMBER 8, 1988

MAXWELL B. BLANCHARD

REVIEW OF ELEMENTS OF DOE PLAN FOR CONDUCTING DESIGN ACCEPTABILITY ANALYSIS OF TITLE I EXPLORATORY SHAFT DESIGN

- ELEMENTS OF DESIGN ACCEPTABILITY ANALYSIS CORRELATE WITH STEPS OR PARTS OF STEPS IN THE NRC LETTER (LINEHAN TO STEIN, 11-14-88), ATTACHMENTS 2 AND 3

- THE DESIGN ACCEPTABILITY ANALYSIS WILL BE COMPLETED THROUGH A TECHNICAL ASSESSMENT REVIEW ACCORDING TO QUALITY MANAGEMENT PROCEDURE (QMP) 02-08

- FINAL DOCUMENTATION OF THE TECHNICAL ASSESSMENT REVIEW (THE TECHNICAL ASSESSMENT REVIEW RECORD MEMORANDUM) WILL INCLUDE:

  — RECOMMENDATIONS FOR APPROPRIATE CORRECTIVE ACTIONS IN TITLE II DESIGN FOR ANY DEFICIENCIES IDENTIFIED IN TITLE I DESIGN

  — RECOMMENDATIONS FOR MODIFICATIONS IN THE SITE CHARACTERIZATION PROGRAM IF RESULTS OF DATA REASONABLENESS AND REPRESENTATIVENESS REVIEWS WARRANT SUCH CHANGES

COMPONENTS OF DOE DESIGN ACCEPTABILITY ANALYSIS

ATTACHMENT 2: NRC LETTER	COMPONENTS OF DESIGN ACCEPTABILITY ANALYSIS	AVAILABLE INFORMATION FOR TECHNICAL ASSESSMENT REVIEW	ACTION REQUIRED
Step 1a	2.3.1 Identify all 10 CFR Part 60 requirements that are applicable to the design and construction of the ESF	10 CFR 60 Flowdown Report	Review draft Flowdown Report
	Identify subset of 10 CFR Part 60 functional requirements that are relevant to 1,2,3*	SCP 8.4 has a compilation focused directly on 1,2,3*	Evaluate set of functional requirements for ESF in 10 CFR 60 and correlate to NRC concerns 1, 2, & 3*
	2.3.2 Assess the completeness of the SDRD against the list of functional requirements identified in 2.3.1		Use correlations from 2.3.1; identify the functional requirements included/ not included in SDRD

* 1, 2, & 3 refer to the NRC concerns expressed Step 2 of Attachment 2 to their letter: 1. isolation capability of the site will not be compromised; 2. capability to characterize the site will not be compromised; and 3. characterization will provide representative data.

COMPONENTS OF DESIGN ACCEPTABILITY ANALYSIS (CONTINUED)

ATTACHMENT 2: NRC LETTER	ELEMENTS OF DOE ACTION PLAN	AVAILABLE INFORMATION FOR TECHNICAL ASSESSMENT REVIEW	ACTION REQUIRED
Step 1, part (b)	2.3.2 Develop a list of Design and physical features/interfaces and siting, design, testing and PA	Draft YMMGDS, ESF Design, Const. & Ops Plans, SCP, SCP/CDR and list from 2.3.1	Identify design and physical features of ESF and interfaces related to 1, 2, & 3* [This is subset of ESF design information that is either defined or impacted by siting of the ESF, repository design, ESF testing, surface-based testing, or ESF/repository performance assessments.]
	Develop performance criteria and constraints for list from 2.3.1 considering list from 2.3.2 in context of 1, 2, & 3*	As above	Identify or develop (in context of 1, 2, & 3*) performance criteria and constraints for each correlation in 2.3.1, considering the list of interfaces and design/physical features from 2.3.2.
	Categorize criteria into subsets with similar impacts		

COMPONENTS OF DESIGN ACCEPTABILITY ANALYSIS (CONTINUED)

ATTACHMENT 2: NRC LETTER	COMPONENTS OF DESIGN ACCEPTABILITY ANALYSIS	AVAILABLE INFORMATION FOR TECHNICAL ASSESSMENT REVIEW	ACTION REQUIRED
Step 1, second option in part (c)	2.3.2 Assess the completeness of the SDRD against the list of performance criteria/constraints		On basis of correlations in 2.3.1, identify relevant performance criteria and constraints included/not included in SDRD.

COMPONENTS OF DESIGN ACCEPTABILITY ANALYSIS (CONTINUED)

ATTACHMENT 2: NRC LETTER	COMPONENTS OF DESIGN ACCEPTABILITY ANALYSIS	AVAILABLE INFORMATION FOR TECHNICAL ASSESSMENT REVIEW	ACTION REQUIRED
Step 2	2.3.3 Assess the current design against the design criteria to:		
(1)	a. Demonstrate the long term waste isolation capability of the site will not be compromised	Point Paper Response Obj # 4 & Sect. 8.4.3	For each criterion on the lists generated for 2.3.1 & 2.3.2 - assess whether the criteria or interfaces are relevant to 1, 2, & 3* ; (ii) the relevant criteria and interfaces were considered in the ESF design or existing assessments of ESF adequacy; and iii) the adequacy of the treatment.
(2)	b. Demonstrate that the capability to characterize the site will not be compromised.	Point Paper Response Obj # 3 & # 4 & Sect. 8.4	Same as a.

COMPONENTS OF DESIGN ACCEPTABILITY ANALYSIS (CONTINUED)

ATTACHMENT 2: NRC LETTER	COMPONENTS OF DESIGN ACCEPTABILITY ANALYSIS	AVAILABLE INFORMATION FOR TECHNICAL ASSESSMENT	ACTION REQUIRED REVIEW
(3)	c. Demonstrate that characterization will provide representative data	Sec 8.4.2., SAND Repts & letters on subject ESF	Summarize representativeness arguments with emphasis on location; Assess role of ESF in developing representative program. Assess whether criteria or interfaces in 2.3.1 & 2.3.2 are relevant to representativeness concern. Assess whether the (i) criteria were considered; and (ii) the adequacy of the treatment.
Step 2: last half of paragraph	2.3.4 Demonstrate the adequacy of the analyses, including the appropriateness of data and considerations of data uncertainty	ESF RIB, RIB, and Summaries of relevant evaluations and analyses in Section 8.4	See Below*

*Required Action:
A. Identify critical design features related to NRC concerns 1, 2, & 3
B. Identify analyses related to critical design features
C. Identify parameters used in analyses
D. Identify data values used for parameters
E. Identify and group key data used in design of critical design features
F. Determine how sensitive the critical design features are to uncertainty
G. Identify what are reasonable values for the parameters
H. Identify the differences between C. and G.
I. Evaluate overall adequacy of analyses in (b).

COMPONENTS OF DESIGN ACCEPTABILITY ANALYSIS (CONTINUED)

ATTACHMENT 2: NRC LETTER	COMPONENTS OF DESIGN ACCEPTABILITY ANALYSIS REVIEW	AVAILABLE INFORMATION FOR TECHNICAL ASSESSMENT	ACTION REQUIRED
Step 3	NRC-DOE meetings held 11-23-88, & scheduled for 12-8-88 to review draft action plans	Briefing package used in discussion with NRC on 11-23-88	Prepare update for use on 12-8-88
Step 4	4.3 Prepare input and recommendations for Review Record Memorandum		Prepare Technical Assessment Review Record Memorandum
Step 5	2.3.5 Identify deficiencies, if any, in criteria list or interface list, concomitant deficiencies and impact on ESF design and plans correct.	Results of 2.3.1 & 2.3.2	Summarize deficiencies, if any, in criteria lists from 2.3.1 & 2.3.2 in context of concerns (1, 2, 3*). Summarize deficiencies, if any, from 2.3.3. Prepare recommendations for corrective actions.

COMPARATIVE EVALUATIONS RELATED TO ALTERNATIVE SHAFT LOCATIONS

ELEMENTS OF EVALUATION	INFORMATION AVAILABLE FOR TECHNICAL ASSESSMENT REVIEW	ACTION REQUIRED
2.4 Prepare Comparative Evaluation of alternative shaft locations, considering (1) current site conditions; (2) expected changes to these conditions over next 10,000 years; (3) low-probability disruptive events and processes over next 10,000 yrs; and (4) alternative conceptual models of conditions at the site. Evaluation of Bertram report (SAND 84-1003, ESF Site and Construction Method Recommendation Report) has 3 parts: 2.4.1. Compare alternative locations with one another, without ESF present, for: a. significant differences among alternative locations in their potential for providing waste isolation; b. The influence these differences might have had on selection of ESF location. 2.4.2 Compare alternative locations with one another (considering any significant differences that were observed in 1a), assuming ESF has been constructed, to: a. Examine any adverse effects on isolation; b. Examine the influence these effects might have had on selection of ESF location.	SCP Chapters 1-4; Section 8.4.3 (Impacts on Isolation); Sinnock & Lin (SNL, 1986).	A qualitative 3-part evaluation will be conducted

COMPARATIVE EVALUATIONS RELATED TO ALTERNATIVE SHAFT LOCATIONS

ELEMENTS OF EVALUATION	INFORMATION AVAILABLE FOR TECHNICAL ASSESSMENT REVIEW	ACTION REQUIRED
2.4.3 Compare the five alternative locations to the Yucca Mt. site with regard to factors contributing to waste isolation. Consider parameters such as GWTT, thickness of UZ below repository, thickness of zeolite units beneath repository, and presence of volcanic glass.		

ATTACHMENT 4

TAR Notice

06-Dec-1988
rev. 6

PRELIMINARY DRAFT

TECHNICAL ASSESSMENT REVIEW NOTICE

TECHNICAL ASSESSMENT REVIEW

OF THE EXPLORATORY SHAFT FACILITY (ESF)

TITLE I DESIGN CONTROL PROCESS

DECEMBER/JANUARY 1988/1989

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION
LAS VEGAS, NEVADA

PRELIMINARY DRAFT

Responsibility for Conducting Technical Assessment Review

By transmitting this document to the Yucca Mountain Project managers, the Yucca Mountain Project Office authorizes the Science Applications International Corporation (SAIC), Las Vegas, NV, as the YMP designee, to conduct the Technical Assessment Review described in this document, and requests that staff support be provided for that review.

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1.0 PREFACE

1.1 Introduction

In recent interactions with the U. S. Nuclear Regulatory Commission (NRC), the U. S. Department of Energy (DOE) has been asked to furnish information related to the 10 CFR Part 60 requirements that were considered in the Title I design of the Exploratory Shaft Facility (ESF) for the Yucca Mountain site, located in Nye County, Nevada. Appendix I is a November 14, 1988 letter from the NRC (John J. Linehan, Acting Director of Repository Licensing Project Directorate) to the DOE (Ralph Stein, Acting Associate Director, Office of Systems Integration and Regulations) explaining some of their concerns related to the acceptability of the Title I ESF design. In order to provide an integrated package of information to the NRC in response to their concerns, the DOE has decided to conduct a review of the package of information relevant to the concerns expressed by the NRC according to Quality Management Procedure (QMP) 02-08 entitled Technical Assessment Review (TAR). Science Applications International Corporation (SAIC) will plan, organize, conduct, document, and coordinate the TAR. This document, together with the transmittal letter from the YMP, satisfies the purpose and scope of QMP-02-08 Section 3.2, Technical Assessment Review Notice.

1.2 Technical Assessment Review Definitions

This TAR is being conducted by the DOE and other participating organizations according to the Quality Assurance Plan NV/88-9, Section III (Scientific Investigation and Design Control), Paragraph 5.0, (Technical Reviews), and the definitions in Appendix A for verification and technical review. QMP-02-08 adequately fulfills the intent and definitions for technical review specified in NV/88-9.

2.0 SCOPE OF THE TECHNICAL ASSESSMENT REVIEW

This section provides a description of the purpose and scope of the technical assessment review of the design control process used to develop the Title I design for the ESF. This review is divided into two parts: Part I addresses all elements of the Title I ESF design acceptability analysis, and Part II focuses on the comparison of alternative locations for the ESF. Both Parts I and II of the TAR will develop a set of review conclusions, together with recommendations for corrective actions, if it is determined that such actions are necessary as a result of the review.

2.1 Purpose of Technical Assessment Review

The purpose of the review is to: (a) determine if applicable 10 CFR Part 60 requirements were considered during Title I design of the ESF (Appendix I, Letter, NRC to DOE, Step 1, a); (b) evaluate design interfaces (Appendix I, Letter, NRC to DOE, Step 1, b); and (c) assess how the design criteria and interfaces considered during Title I ESF design address the applicable 10 CFR Part 60 requirements and interfaces (i.e. provide an analysis that

"demonstrates how the current design criteria used for the Title I addresses (a) and (b)" (Appendix I, Letter, NRC to DOE, Step 1, c). In the letter from the NRC (Appendix I), the DOE was asked to analyze the ESF Title I design criteria in terms of "three general objectives in 10 CFR Part 60: (1) the long-term waste isolation capability of the site is not compromised; (2) the ability to characterize the site is not compromised; and (3) the ESF site characterization activities would provide representative data." The NRC also requested that this analysis "address the appropriateness of the data used in the design and how the uncertainties were considered." Those parts of the design that are found deficient in this analysis are to be identified by the DOE, as well as the impacts on the overall design, and actions are to be taken to correct the deficiency. A related concern to be addressed by the TAR is described on Attachment 3 of the NRC letter (Appendix I). This concern focuses on a determination of any potential differences in the isolation capability of alternative locations for the ESF.

2.2 Components of Technical Assessment Review Package

Documents that are likely to be included in the TAR package include the Generic Requirements Document/Appendix E; the ESF-SDRD, Volumes I and II; the Reference Information Base (RIB); the ESF Design Scope and Planning Document for Title I Design, prepared by Fenix & Scisson; the ESF Title I Scope and Planning Basis Document, prepared by Holmes & Narver; the ESF Title I Design Basis Document, prepared by Holmes & Narver; all codes and standards specified in these documents; the Nuclear Waste Repository in Tuff Subsurface Facility Conceptual Design ESF/Repository Interface Control Drawing Number R07048A, Sheets, 1-15, prepared by Sandia National Laboratories (SNL); the Draft 10 CFR Part 60 Flowdown Report, prepared by DOE/Headquarters (HQ); applicable parts of the Site Characterization Plan for the Yucca Mountain Site; and other documents determined to be necessary by the TAR Chairman or team members.

2.3 Scope of Part I of Technical Assessment Review - Exploratory Shaft Facility Title I Design Acceptability Analysis

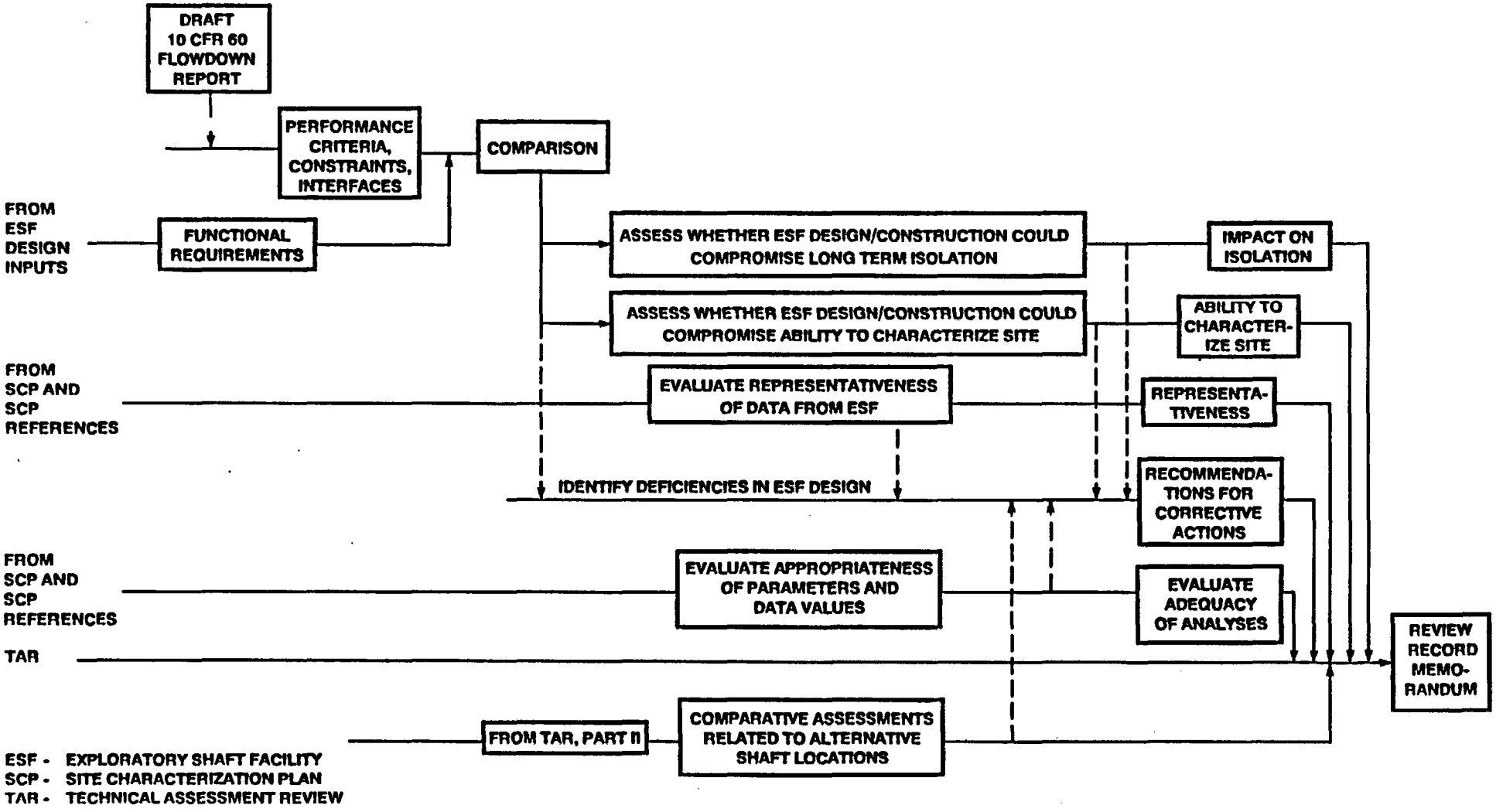
Part I of the TAR includes five discrete elements. Each element is reviewed in the following sections. A logic diagram displaying the elements of Part I is shown in Figure 1.

2.3.1 Technical Assessment Review Part I - Element 1: Assessment of 10 CFR Part 60 Requirements in the Yucca Mountain Project Subsystem Design Requirements Document

Preparation of this element of the Technical Assessment Review (TAR) package has been assisted by actions taken by DOE/HQ. An analysis of the flowdown of 10 CFR Part 60 requirements into the Generic Requirements Document, Appendix E has recently been completed. This analysis was conducted in accordance with the DOE/HQ Quality Implementing Procedure (QIP) 3.2 for Technical Reviews. Some of the products from the DOE/HQ review will be used in Part I, Element 1 of the TAR. A draft package containing the following items will serve as input to the TAR team: Report on Applicability of 10 CFR 60 Requirements; Technical Review Report on Appendix E (GR); Technical Review

FIGURE 1: Logic diagram for Part I of Technical Assessment Review: Design acceptability analysis

COMPONENTS OF TECHNICAL ASSESSMENT REVIEW



ESF - EXPLORATORY SHAFT FACILITY
SCP - SITE CHARACTERIZATION PLAN
TAR - TECHNICAL ASSESSMENT REVIEW

NRCFL29P.A25/12-6-88

Report on A/E Design Basis Documents; Baseline Change Proposals for Appendix E; and, DOE/HQ direction to YMP for revising the SDRD and Basis for Design.

In Element I, the TAR members will review the information provided by the DOE/HQ flowdown analysis about 10 CFR Part 60 requirements that are applicable to the ESF Title I design. The subset of 10 CFR Part 60 requirements that are relevant to the NRC's concerns expressed in Step 2 of Attachment 2 of their letter (See Appendix I) will be identified. The NRC concerns are summarized as follows: (1) isolation capability of the site will not be compromised; (2) capability to characterize the site will not be compromised; and (3) site characterization will provide representative data. The TAR team will assess the completeness of the coverage of these requirements in the SDRD and will identify any requirements not adequately covered. The results of this review will be summarized as recommendations in the TAR Record Memorandum (See Section 4.2.2).

2.3.2 Technical Assessment Review Part I - Element 2: Evaluation of Design Interfaces and Assessment of Completeness of Title I ESF Design Requirements

Element 2 of the TAR consists of reviewing the list of design and physical features and interfaces for siting of the ESF, repository design, ESF testing, surface-based testing, or ESF and repository performance assessments. A partial list of sources for this information are provided in Section 2.2. The TAR team will identify those design and physical features and interfaces that are related to the three NRC concerns: (1) isolation capability of the site will not be compromised; (2) capability to characterize the site will not be compromised; and (3) site characterization will provide representative data. Performance criteria and constraints for the 10 CFR Part 60 requirements that were found to be relevant to the NRC concerns in TAR Part I, Element 1, will be correlated with the subset of design/physical features and interfaces that are related to the NRC concerns. The TAR team will then review the SDRD and other design documentation to determine those performance criteria and constraints that are adequately represented and those for which additional performance criteria and constraints should be developed. Recommendations resulting from Part I, Element 2, for performance criteria and constraints that should be added to the SDRD will be prepared as a part of the TAR Record Memorandum.

2.3.3 Technical Assessment Review Part I - Element 3: Assessment of Adequacy of the Current ESF Title I Design Criteria

For Element 3 of Part I of the TAR, the TAR team will review the current 100 % Title I ESF design to determine if the requirements, criteria, constraints, and interfaces identified in Elements 1 and 2 are adequately reflected in the design or in existing assessments. The focus of this element of the TAR is on those requirements, criteria, constraints, and interfaces relevant to the NRC's three concerns: (1) long term waste isolation capability of the site will not be compromised; (2) capability to characterize the site will not be compromised; and (3) characterization will provide representative data. For purposes of assessing the representativeness of data to be obtained during site characterization, the role of the ESF in developing a representative program will be reviewed.

The criteria and interfaces identified in Elements 2 will be reviewed to determine if they are relevant to the representativeness concern.

Element 3 will also include an assessment of the adequacy of those calculations summarized in SCP Section 8.4 that address the three major concerns expressed by the NRC, and summarized in the previous paragraph.

The Review Record Memorandum for the 100% Title I ESF Design Review will serve as a component of the TAR package. Recommendations resulting from any deficiencies identified in the current design under this element will be included in the Review Record Memorandum for this TAR.

2.3.4 Technical Assessment Review Part I - Element 4: Assessment of the Appropriateness of Data Used in Design Analyses, Consideration of Data Uncertainties, and Adequacy of Evaluations

Element 4 of Part I of the TAR will focus on the parameters and data used for performance analyses and calculations related to the three NRC concerns presented in Section 2.3.3. Many of the relevant analyses are summarized in Section 8.4 of the Site Characterization Plan (SCP) and described in more detail in supporting references. The TAR will evaluate the adequacy of the analyses and calculations, including the appropriateness of the data or values used in those calculations that address the concerns expressed by the NRC. The appropriateness and reasonableness of the data and parameters will be reviewed relative to the data and parameters included in the Reference Information Base for the Yucca Mountain Project and other sources as deemed necessary by the TAR team. The team will also review the analyses and calculations to establish how uncertainties in data and models were used to determine that items described in 2.3.2 (1), (2), and (3) have been adequately satisfied.

The steps that will be taken in Element 4 are as follows:

a. Identify critical design features relevant to NRC concerns (See Section 2.3.3);
b. Identify analyses related to critical design features in (a);
c. Identify parameters used in analyses in (b);
d. Identify data values used for parameters in (c);
e. Identify and group key data used in design of critical design features according to NRC concerns;
f. Determine how sensitive the critical design features (a) are to uncertainty;
g. Identify what are reasonable values for the parameters;
h. Identify the differences between c and g;
i. Evaluate overall adequacy of analyses in (b)

All recommendations related to the appropriateness of the analyses and data will become part of the Review Record Memorandum for this TAR.

2.3.5 Technical Assessment Review Part I - Element 5: Assessment of Impacts on Design and Recommendations for Corrective Measures

Element 5 of Part I of the TAR will result in a summary of the deficiencies, if present, in the requirements, criteria, constraints, and

interfaces identified in the current ESF 100% Title I Design Package (Sections 2.3.1 - 2.3.3), as well a summary of any deficiencies identified in assessments, including data and parameter values used, of impacts of site characterization (Section 2.3.4). The TAR team will develop recommendations for correcting the deficiencies and will include the recommendations in the Review Record Memorandum for this TAR. These recommendations will include consideration of any deficiencies so significant as to bring into question the adequacy of the ESF Title I design presented in the SCP.

2.4 Scope of Part II of Technical Assessment Review: Assessment of the Alternative Locations for the Exploratory Shaft Facility

Part II of the TAR is being conducted in response to the NRC's concerns expressed on Attachment 2 of their letter, included with this package as Appendix I. These concerns are related to whether the alternative locations considered for the ESF in Bertram (1985; SAND84-1003) may have differed in their waste isolation capabilities, and further, what effects these differences might have had if they had been an explicit part of the selection process. Part II is composed of three distinct elements, which are described in following sections. All three elements will assess the alternative locations relative to current site conditions; expected changes in current conditions over the next 10,000 years; low-probability disruptive events and processes over the next 10,000 years; and alternative conceptual models of conditions at the site. Figure 2 provides the overall logic for Part II of the TAR.

2.4.1 Technical Assessment Review Part II - Element 1: Assessment of Alternative Locations for the ESF to Determine if there are Significant Differences in the Potential for Providing Waste Isolation Without the ESF Present

The five alternative ESF locations considered in the Bertram (1985) document will be reviewed without an ESF present, to determine if there are significant differences among the alternative locations in their potential for providing waste isolation. The influence any differences might have had on selection of the ESF location will then be examined.

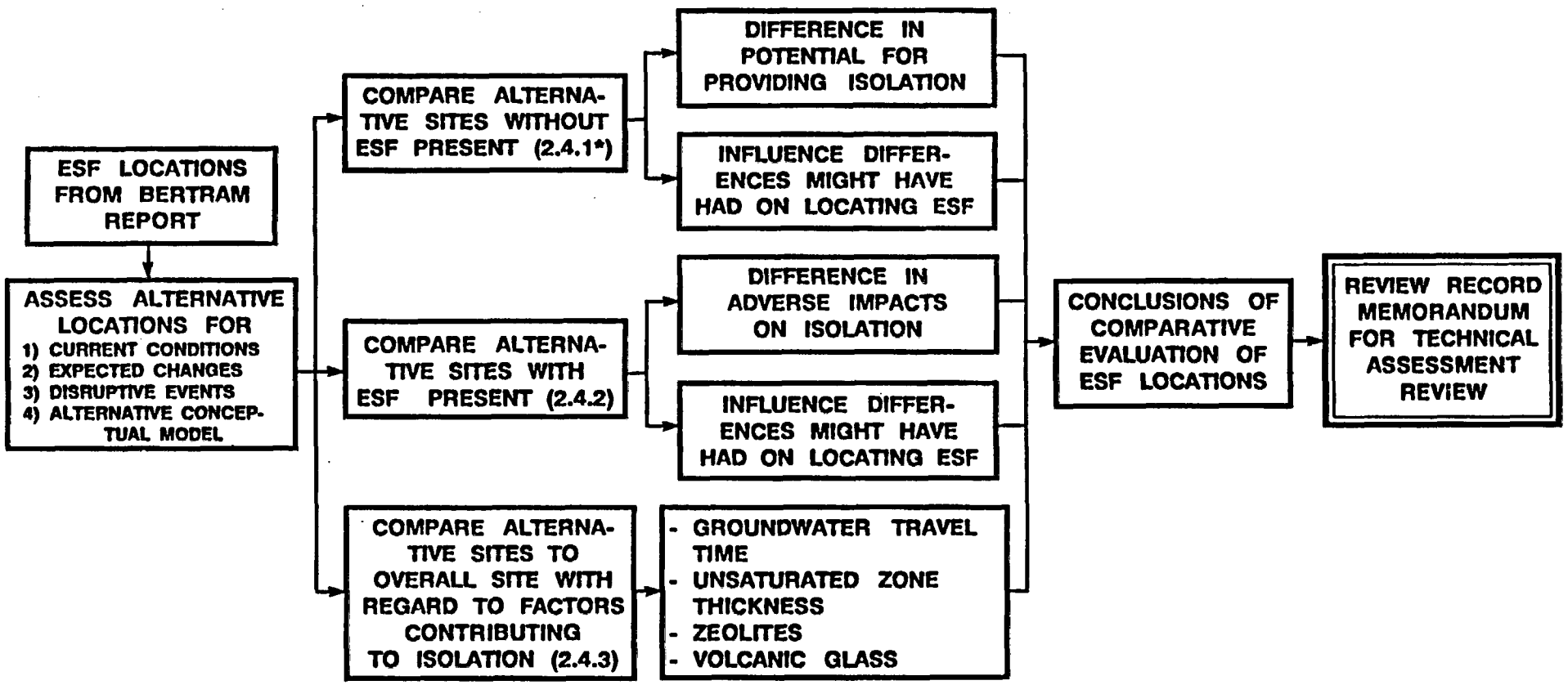
All input related to differences in isolation potential among the alternative locations and recommendations resulting from this review will become a part of the TAR Record Memorandum.

2.4.2 Technical Assessment Review Part II - Element 2: Assessment of Alternative Locations for the ESF to Determine if there are Significant Differences in the Potential for Providing Waste Isolation with the ESF Present

The five alternative ESF locations considered in the Bertram (1985) document will be compared, assuming that an ESF has been constructed at each

Figure 2: Logic for Part II of Technical Assessment Review: Evaluation of alternative locations for the Exploratory Shaft Facility

COMPARATIVE ANALYSIS OF ALTERNATIVE ESF LOCATION



ESF - EXPLORATORY SHAFT FACILITY
SDRD - SUBSYSTEM DESIGN REQUIREMENTS DOCUMENT
* - SECTION REFERENCES IN TECHNICAL ASSESSMENT REVIEW NOTICE

alternative location, to determine if there are any differences in potential adverse impacts on isolation capabilities at the sites. The influence any differences might have had on selection of the ESF location will be examined.

All input and recommendations related to potential differences in the isolation potential of alternative shaft locations will become a part of the TAR Record Memorandum.

2.4.3 Technical Assessment Review Part II- Element 3: Assessment of Alternative ESF Locations Compared to Isolation Potential for the Overall Site

The five alternative ESF locations considered in the Bertram (1985) document will be compared with other possible ESF locations within the conceptual perimeter drift boundary of the repository with regard to factors contributing to waste isolation. Parameters such as ground-water travel time; thickness of the unsaturated zone below the repository horizon; thickness of the zeolite units beneath the repository horizon; and the presence of volcanic glass wil be considered.

All conclusions and recommendations related to the variation of factors contributing to isolation at the alternative ESf locations will become a part of the TAR Record Memorandum.

3.0 PLAN BASIS

3.1 Organizations

The following organizations will participate in the Technical Assessment Review:

- o U. S. Department of Energy/Headquarters (DOE/HQ)
- o U. S. Department of Energy/Nevada - Yucca Mountain Project Office (PO)
- o Roy F. Weston, Inc.
- o U. S. Geological Survey (USGS)
- o Science Applications International Corporation (SAIC)
- o Sandia National Laboratories (SNL)
- o Los Alamos National Laboratory (Los Alamos)

SAIC will provide a small multidisciplinary team, the Technical Assessment Review Committee (TARC), to act as a part of the Technical Assessment Review Team. The TARC will include a YMP Branch Chief, who is responsible for ensuring that all actions taken by the TARC are in accord with YMP policy. The TARC will also include a Review Chairman, a Review Secretary, a Quality Assurance specialist, and one or two technical specialists with responsibility for assisting the Review Chairman in assembling the TAR products into an integrated package. The following individuals are designated as members of the TARC:

YMP - Technical Assessment Review Committee Representative: Robert Levich
TARC Chairman: Jerry King

TARC Secretary: David Goings
SAIC Quality Assurance: John Jardine (alternate: Peter Karnoski)
Technical Specialist: Carolyn Rutland

The TARC chairman is responsible for coordinating all efforts among the members of the TAR team, with the assistance of the YMP-TARC representative. Organizations participating in the TAR will provide reviewers for the review team, and will designate a lead reviewer for their respective organization. A suggested list of lead reviewers is provided in Table 1. The TARC chairman may add other reviewers to the team as he deems necessary for successful completion of the TAR.

3.2 Technical Assessment Review Team Selection

Selection of team members is based on the individual's independence, qualifications, and technical or scientific speciality. Specific parts the TAR review package will be identified as requiring familiarity with various documents or regulations.

Table 1: List of suggested reviewers and specialities for each participating organization.

Organization	Representative	Speciality
DOE/HQ	Jeff Kimball	ESF Regulatory Requirements
YMPO	Arch Girdley	ESF Regulatory Requirements
Weston	Mike Lugo	NRC Regulatory Requirements
SAIC	Mike Voegele	Correlation of NRC Design Requirements to ESF Design
	August Mathussen	ESF Performance Analyses Database
	Keith Kersch	Impacts of Site Characterization on Site Hydrology
	John Shaler	Mining Engineering & ESF Design
SNL	Joe Tillerson	Correlation of NRC Design Requirements to ESF Design
	Scott Sinnock	Comparison of Alternative ESF Locations
	Felton Bingham	Performance Analyses to Assess ESF Impacts
USGS	Bill Wilson	Adequacy of Hydrologic Calculations in 8.4
	Bill Langer	
PNL	Charlie Voss	General Geotechnical Review and Geomechanics

This is a tentative list and will be confirmed by the participating organizations on the first official day of the review proceedings.

In order to meet the qualifications specified, each team member will, as a minimum, possess a Bachelors Degree and five years of experience or the demonstrated equivalency of training and experience in their area of expertise. Team member's qualifications will be certified and documented by the team member's supervisor. Documentation will be prepared on the YMPO Proficiency Review Report, Form no. N-QA-007 and provided to the TARC Secretary on or before the first day of the start of the review. Background data/material substantiating the qualification certification should be retained at the team member's place of employment. Background data/material may be subject to audit by personnel from the Nuclear regulatory Commission or the U.S. Department of Energy. The completed form N-QA-007 will be included in the TAR Record Memorandum. This section satisfies QMP-02-08, Section 5.2.

3.3 Location and Time of Technical Assessment Review

A schedule for the TAR is provided in Section 5.0. The TAR will officially begin at a workshop, attended by all members of the review team on December 12-13, 1988, in Room 637 at the SAIC offices in Las Vegas, NV, located at 101 Convention Center Drive. The workshop will convene at 8:30 a.m. It is likely that a number of working sessions will be scheduled in order to complete the TAR on the planned schedule. The TARC Chairman is responsible for determining the need for additional TAR team working sessions and scheduling rooms and logistical support.

4.0 TECHNICAL ASSESSMENT REVIEW PROCESS

4.1 Pre-Review

The PO has requested that SAIC conduct a Technical Assessment Review with multiple participating organizations. The Technical Assessment Review Committee Secretary will coordinate all review activities, including transmitting the meeting announcements, review notice, and TAR package to all team members. The participating organizations are requested to provide the reviewer qualifications, and to make the reviewers available for the duration of the TAR.

The TARC Secretary should ensure that a Technical Assessment Review Notice announcing the planned review is sent to each participating organization. As noted earlier, this document, together with the formal transmittal letter from the YMP, constitutes the TAR Notice. Upon receipt of this Review Notice, the cognizant managers at the participating organizations should respond to the TAR Chairman by letter, with copy to the YMP representative, providing an acknowledgement of receipt of the Review Notice, statements of qualifications for the reviewers from their respective organizations, and should arrange for the necessary commitment of reviewers for the TAR period. SAIC will provide meeting rooms and logistical support for the reviewers throughout the duration of the TAR.

Reviewers must complete the YMP QA training on QMP-02-08 prior to acceptance of their input into the review process. An integral part of the reviewer's qualification training consists of attendance at the initial Review Presentation and Indoctrination, active participation during the TAR, and providing input to the TAR Review Record Memorandum.

4.2 Review Process Outline

An overview of the purpose and scope of this TAR and QA training for the TAR will be provided at the initial TAR team meeting on December 12-13, 1988 (Room 637, SAIC offices, Las Vegas, NV). Prior to the meeting, reviewers are required to become familiar with QMP-02-08, and with this document, describing the scope of the TAR. The TARC will identify the documents that are to be included in the TAR package and will make this package available to the reviewers at the initial meeting. This action will satisfy Sections 3.4 and 4.2 of QMP-02-08, compiling a data package for the TAR.

The principal guidance to be provided to the reviewers, in addition to the purpose and scope of the TAR includes: responsibility of participants; guidelines for preparation of input to the Review Record Memorandum; and review input preparation instructions.

Reviewers for each participating organization are to provide input for the Review Record Memorandum to the TARC Secretary. It is the reviewer's responsibility to ensure that his/her input is appropriate, relevant, and not redundant to other input submitted by other reviewers from his organization. Reviewers will use the TAR input form attached to this package (modified from N-QA-006). The TARC Chairman or Secretary will review the input to ensure it is within scope and appropriate. The TARC Chairman and the cognizant YMP representative on the TARC will resolve problems related to preparation of input and development of recommendations on the basis of the input. The TARC Secretary will compile all input into an integrated package for inclusion in the Review Record Memorandum.

Some input resulting from this TAR will lead to the development of a list of recommendations to be provided to DOE management for deficiencies that should be corrected in the ESF Title II Design. Other input may lead to recommendations for changes that should be made in the site characterization plans for the Yucca Mountain site. These recommendations would be incorporated into semiannual progress reports as appropriate. It is the intent of the DOE that some form of recommendations should result from all problems identified as a result of the TAR. If unreconciled differences of opinion occur or if reviewers are uncertain as to the appropriate recommendation to be offered, the TAR Secretary will include these items as open items in the Review Record Memorandum (RRM). If it is judged to be appropriate by the TARC Chairman, the cognizant manager from the participating organization may be requested to provide a recommendation for closing the open item prior to completion of the TAR. This satisfies Sections 5.5.3 and 5.5.5 of QMP-02-08.

Remaining open items and recommended actions resulting from the TAR will be addressed during the DOE Management Assessment Review, planned to immediately follow completion of the TAR. The purpose of the Management Assessment Review is to ensure that plans are in place to address all recommended actions resulting from the TAR. This action satisfies Section 5.7 of QMP-02-08, Closure of Resolution.

4.2.1 Instructions to Reviewers

A. General Guidance

The reviewer should provide concise statements of concerns and recommended actions as a result of the TAR. Input from the reviewers should be understandable without dialog, and should provide specific information about actions that can be taken to resolve all problems identified during the TAR. The TAR Review Record Memorandum should be assembled with enough detail to communicate the intent of the input.

B. Specific Guidance

1. The input should not, in general, be provided in the form of questions.

2. Use of terms such as "more detail required", "change" or "clarify" without specific suggestions should be avoided.

3. Provide supporting evidence if a technical error is identified. Provide a page number and paragraph if a supporting document is cited.

4. The reviewer should restrict his input to his specific area of qualified expertise.

5. All input must be written on the TAR input forms provided.

6. To meet the short schedule imposed on this TAR, reviewers are required to sign a "Reviewer Designation Authority", which designates signature authority to their organization's lead reviewer so that the review process can continue in the absence of any individual reviewer.

7. The TARC Chairman will review, sign, and date each reviewer's input included in the Review Record Memorandum to ensure that all TAR results are presented as supporting information, recommendations for actions, or as open items to be considered by the DOE Management Assessment Review.

4.2.2 Development of Input to the Review Record Memorandum

Input Development

The TARC Chairman will provide written instructions to the reviewers at the initial TAR meeting on December 12-13, 1988. These instructions

will describe the sequence of steps to be followed in reviewing the TAR package; developing input to the Review Record Memorandum; reviewing the word-processed packages of each reviewer's input; and participating in working sessions to develop recommendations for correction of deficiencies, as well as those open items to be included in the Review Record Memorandum for the TAR.

4.2.3 Input Identification

A scheme will be developed by the TARC Chairman and provided to reviewers at the initial TAR meeting on December 12-13, 1988. The input from each reviewer will be given an identification number that will include, at least, a designation as to the organization providing the input, and the initials of the reviewer.

4.3 Review Record Memorandum

The TARC Secretary collects all reviewer input, recommendations and other relevant information from the TAR and prepares a final report in the form of a Review Record Memorandum (RRM). The TARC Chairman, as well as the cognizant YMP representative on the TARC, sign the RRM, and issue it to the YMP Office. The dates for issuance of the RRM are shown on the schedule in Section 5.0.

The RRM shall contain, at a minimum, the following items:

Scope of the Review
Technical Assessment Review Notice
Technical Assessment Review Meeting minutes
Technical Assessment Review Team Selection Record
Technical Assessment Review Input Records
List of meeting attendees and their Technical Assessment Review Responsibilities
Documentation of Design Acceptability Analyses and Performance Analyses
Recommendations for Actions to Address Design Deficiencies
Documentation of Open Items

The RRM will be issued approximately 15 calendar days after the final TAR meeting to reach a consensus on actions needed to address deficiencies.

5.0 SCHEDULE/ACTIVITIES

6.0 ACRONYMNS

APPENDIX I

November 14, 1988, Letter from Linehan to Stein

ENCLOSURE

On November 3, 1988 members of the Nuclear Regulatory Commission (NRC) staff met with representatives from the Department of Energy (DOE), the State of Nevada, and Nye County, Nevada to discuss the design control on the exploratory shaft facility (ESF). A list of attendees is contained in Attachment 1. During the meeting, the NRC staff identified one acceptable approach DOE could use to demonstrate the adequacy of the current design. The approach was reviewed and revised based on input received from other participants. The final, tentatively agreed upon version is contained in Attachment 2. In addition, DOE presented its approach to evaluating alternative exploratory shaft locations. A copy of this is contained in Attachment 3. The NRC staff noted that it believes that the DOE approach by itself would not be acceptable; however, further staff discussions would be necessary before a final position would be taken.

Joseph J. Holonich 11/14/88

Joseph J. Holonich, Sr. Project Manager
Repository Licensing Project Directorate
Division of High-Level Waste Management
Office of Nuclear Material Safety and
Safeguards
U. S. Nuclear Regulatory Commission

Attachment 1

Attendees

NRC
J. Holonich
J. Kennedy
J. Linehan
K. Stablein
M. Nataraja
D. Gupta
J. Conway

STATE OF NEVADA
C. Johnson

NYE COUNTY
E. Holstein

DOE
E. Wilmont
G. Appel
R. Stein
J. Saltzman
L. Barrett
S. Echols

WESTON
D. Siefken

GENERAL ACCOUNTING OFFICE
K. Turner
E. Nakamura

Attachment 2

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Design Acceptability Analysis

In the site characterization plan (SCP), the Department of Energy (DOE) will be providing design information on the exploratory shaft facility (ESF) that was developed without a design control process that met 10 CFR Part 60, Subpart G. Before the staff can comment on the ESF design information presented in the SCP, DOE must first demonstrate that the design meets the applicable 10 CFR Part 60 technical requirements. One acceptable approach to demonstrate the acceptability of the ESF design is outlined below.

Develop and implement a plan that meets the appropriate requirements of 88-9 and addresses Steps 1 and 2.

Step 1

Provide an analysis for 10 CFR Part 60 requirements which:

(a) identifies all 10 CFR Part 60 requirements that are applicable to the design and construction of the ESF;

(b) evaluates design interfaces; and

(c) generates design criteria based on (a) and (b) or demonstrates how the current design criteria used for the Title I addresses (a) and (b).

Step 2

DOE should analyze the current design against the design criteria generated under 1(c). This analysis should demonstrate that the ESF design and construction satisfy the three general objectives in 10 CFR Part 60. These are: (1) the long-term waste isolation capability of the site is not compromised; (2) the ability to characterize the site is not compromised; and (3) the ESF site characterization activities would provide representative data. This analysis should also address the appropriateness of the data used in the design and how the uncertainties were considered. The analysis is not intended to meet NUREG-1298, "Qualification of Existing Data for HLW Repositories," but will demonstrate the reasonableness of the data for the type of analyses being performed.

Step 3

DOE needs to brief NRC on the design control process and quality assurance applied to the ESF Title I design to the degree it was relied upon in the design acceptability analysis as well as the methodology for and status of the design acceptability analysis prior to the SCP.

Step 4

DOE should submit the design acceptability analysis to the staff for review along with the SCP.

Step 5

For any area of the design found unacceptable by DOE during the design acceptability analysis, DOE should identify the impact on the overall design and the DOE actions to correct the deficiency.

Step 6

After the SCP is issued, DOE should independently confirm the design acceptability analysis through an on-site review that is observed by NRC.

Step 7

Based on the results of Step 6, the NRC staff will assess the need for it to conduct a visit to evaluate the QA and technical aspects of the ESF Title I design and the design acceptability analysis.

Step 8

The ability of the staff to comment on the ESF will be dependent on the timeliness and ability of DOE to demonstrate the adequacy of the design and to independently confirm the design acceptability.

Prior to the start of sinking of the ESF, DOE must have a fully qualified QA program, including design control, in place for ESF activities.

III. PERFORM COMPARATIVE EVALUATIONS RELATED TO ALTERNATIVE SHAFT LOCATIONS TO EXAMINE:

- ANY SIGNIFICANT DIFFERENCES IN THE CAPABILITY OF THOSE LOCATIONS TO ISOLATE OR CONTAIN WASTES AND WHAT INFLUENCE, IF ANY, THESE DIFFERENCES MAY HAVE HAD ON THE SELECTION OF THE PREFERRED SHAFT LOCATION IF THEY HAD BEEN AN EXPLICIT PART OF THE SELECTION PROCESS

- ANY SIGNIFICANT ADVERSE EFFECTS THAT A SHAFT MIGHT HAVE ON THE ABILITY OF THE LOCATION TO CONTAIN AND ISOLATE WASTE AND WHAT INFLUENCE, IF ANY, THESE DIFFERENCES MAY HAVE HAD ON THE SELECTION OF THE PREFERRED SHAFT LOCATION IF THEY HAD BEEN AN EXPLICIT PART OF THE SELECTION PROCESS

ATTACHMENT 5

Presentation on the Preliminary Results of the

Applicable 10 CFR Part 60 Requirements

REVIEW OF FLOWDOWN: PRELIMINARY RESULTS

	APPLICABLE 10 CFR 60 REQUIREMENTS	NRC CONCERNS 1	2	3
1	60.15(b) ..site characterization to include in situ exploration & testing at depths of waste emplacment			X
2	60.15(d)(1)	X		
	(2)	X		X
	(3)	X		X
	(4)			
3	60.16			
4	60.21(c)(1)(ii)(d)	X		
5	60.21(c)(1)(ii)(e)			
6	60.21(c)(11)	X		
7	60.72(a)			
8	60.72(b)			
9	60.74	X	X	X
10	60.111(a)			
11	60.111(b)(1) ..preserve the option of waste retrieval throughout ...			
12	60.111(b)(3)			
13	60.112	X		
14	60.113(a)(1)(i)	X		
15	60.113(a)(1)(ii)	X		
16	601.130	X		

REVIEW OF FLOWDOWN: PRELIMINARY RESULTS (CONTINUED)

	APPLICABLE 10 CFR 60 REQUIREMENTS		NRC CONCERNS 1	2	3
17	60.131(b)(1)	...structures, systems components important to safety .. designed natural phenomena and environmental conditions anticipated ...will not intefere with necessary safety functions....			
18	60.131(b)(2)				
19	60.131(b)(3)				
20	60.131(b)(4)(i)				
21	60.131(b)(6)				
22	60.131(b)(9)				
23	60.133(a)(1)		X		
	(2)		X	X	
24	60.133(b)	...underground facility to be designed with sufficient flexibility to allow adjustments...to accomodate specific site conditions	X	X	X
25	60.133(c)				
26	60.133(d)		X	X	
27	60.133(e)(1)				
	(2)		X	X	
28	60.133(f)		X	X	
29	60.133(g)				
30	60.133(h)		X		
31	60.133(i)		X		
32	60.137		X		X
33	60.140(b)				
34	60.140(c)				

REVIEW OF FLOWDOWN: PRELIMINARY RESULTS (CONTINUED)

	APPLICABLE 10 CFR 60 REQUIREMENTS	NRC CONCERNS 1	2	3
35	60.140(d)(1)..program does not adversely affect the ability of the natural and engineered elements of the geologic repository to meet the performance objectives.....	X		
36	60.141(a)			
37	60.141(b)			
38	60.141(c)			
39	60.141(d)			
40	60.141(e)			
41	60.142(a)			
42	60.142(b)			
43	60.142(c)			
44	60.142(d)			
45	60.151	X	X	X
46	60.152	X	X	X

NRC CONCERN ABOUT RELYING ON EXISTING DATA AT FACE VALUE

DOE RESPONSE

(A) SECTION 2.3.4 - ELEMENT 4, ASSESSMENT OF DATA USED IN DESIGN ANALYSIS AND CONSIDERATION OF DATA UNCERTAINTIES:

DESCRIBES THE TASK AND SPECIFIES THAT ASSESSMENTS WILL BE CONDUCTED OF THE DATA AND THE ANALYSES THAT FORM THE BASIS FOR THE CONCLUSIONS THAT (1) THE LONG-TERM WASTE ISOLATION CAPABILITY OF THE SITE IS NOT COMPROMISED; AND (2) THE ABILITY TO CHARACTERIZE THE SITE IS NOT COMPROMISED. THE ASSESSMENT DESCRIBES A COMPREHENSIVE 10-STEP APPROACH.

(B) QMP-02-08, PARA. 3.1 REQUIRES QUALIFIED INDIVIDUALS OTHER THAN THOSE WHO PRODUCED THE TECHNICAL WORK BEING REVIEWED.

EXAMPLE OF DATA "REASONABLENESS" ANALYSIS (TAR 2.3.4)

A. CRITICAL DESIGN FEATURES
Elevation of current ESF location

B. ANALYSES RELATED TO CRITICAL DESIGN FEATURE
Analysis of surface water flooding of exploratory shaft due to occurrence of Probable Maximum Flood (PMF)

C. PARAMETERS USED IN ANALYSIS
1. Thunderstorm probable maximum precipitation
2. Clear water peak flood discharge volume of PMF
3. Flood discharge volume for PMF with debris
4. Topography of Coyote Wash
5. Elevation of exploratory shaft collar

D. DATA VALUES
14 inches in 6 hours; volume of 129 acre-feet for Coyote Wash drainage area; 3354 cfs (C1)
3,350 cubic feet per second (C2)
5,025 cubic feet per second (C3)
Topography taken from topographic maps (C4)
4,140 feet above mean sea level (C5)

E. SENSITIVITY OF CRITICAL DESIGN FEATURES TO UNCERTAINTY
SCP estimates that peak flood discharge value needed to flood the shaft is 45 times larger than the clear water PMF discharge

F. REASONABLE VALUES FOR PARAMETERS
Current values are reasonable and indicate that even an increase in the PMF discharge by an order of magnitude would not flood the shaft

Rcvd 11/17/88

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

NOV 14 1988

Pg 1

Mr. Ralph Stein, Acting Associate Director
Office of Systems Integration and Regulations
Office of Civilian Radioactive Waste Management
U. S. Department of Energy RW-24
Washington, D. C. 20545

Dear Mr. Stein:

The purpose of this letter is to transmit a copy of the meeting minutes prepared by the Nuclear Regulatory Commission (NRC) staff covering the November 3, 1988 meeting on the design control issues associated with the exploratory shaft facility. The minutes, along with supporting attachments, are contained in the enclosure. If you have any additional questions, please contact the NRC project manager for this subject, Mr. Joe Holonich at (301) 492-3403 or FTS 492-3403.

Sincerely,

John J. Linehan, Acting Director
Repository Licensing Project Directorate
Division of High-Level Waste Management

Enclosures: As stated

cc: C. Gertz, DOE
R. Loux, State of Nevada
K. Turner, GAO

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