

**OFFICE OF CIVILIAN  
RADIOACTIVE WASTE MANAGEMENT  
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AUDIT/SURVEILLANCE

NO YMP-93-01-02

**QUALITY ASSURANCE CHECKLIST**

ORGANIZATION EVALUATED USGS	<input checked="" type="checkbox"/> EXTERNAL <input type="checkbox"/> INTERNAL	<input checked="" type="checkbox"/> AUDIT <input type="checkbox"/> SURVEILLANCE	PREPARED BY <u>I. Bjerstedt / K. KEESCH</u>	DATE <u>9/30/92</u>
DATES OF EVALUATION				

CONTROLLING DOCUMENT (Title, Number, Revision)	ACTIVITY EVALUATED
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ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
20-1	<p>8.3.1.4.2.1.1 (SURFACE AND SUBSURFACE STRATIGRAPHIC STUDIES OF THE HOST ROCK AND SURROUNDING UNITS)</p> <p>8.3.1.4.2.2.1 (GEOLOGIC MAPPING OF ZONAL FEATURES IN THE PAINTBRUSH CANYON TUFF AT 1:12,000)</p> <p>What acquired or developed data gathered from this activity has been entered into the Project's technical database?</p>		<p align="center">130030</p> <p align="right">NH03 102.7 WM-11</p>

\* INDICATE RESULTS: SATISFACTORY (SAT), UNSATISFACTORY (UNSAT), NOT APPLICABLE (N/A)

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ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
20-2	How is the content of data packages for the technical database determined?		
20-3	How does the PI interpret the 45-day requirement from YMPO AP-5.1Q, Step 2, for entry of acquired or developed data into the Project's technical database?		

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ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
20-4	What approved schedules from AP-5.1Q, Step 2, have been established with YMPO's technical data manager for submittal of data into the technical database?		
20-5	Who is responsible for ensuring that acquired or developed data from this activity are entered into the Project's technical database?		

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20-6	What maps or other deliverables to YMPO are produced under activity 8.3.1.4.2.1.1?		
20-7	Where is activity 8.3.1.4.2.1.1 in relation to the network in Figure 5-1 of the study plan?		

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20-8	How are the volcanistratigraphic field work in activity 8.3.1.4.2.1.1 and zonal features mapping in 8.3.1.4.2.2.1 integrated?		
20-9	What is the state of completion for the stratigraphic sections to be produced under activity 8.3.1.4.2.1.1 (Ref. Study Plan, Section 2.1.2.1)?		

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20-10	Describe the "close communication and information exchange with scientists at Los Alamos in areas of potential overlap" in mineralogic, petrologic and diagenetic work under LANL studies 8.3.1.3.2.1 and 8.3.1.3.2.2, with activity 8.3.1.4.2.1.1 (Ref. Study Plan, Section 1.1, Page 1.3)? Is documentation available?		
20-11	How are the USGS and LANL data sets in mineralogy, petrology, and diagenesis "unique and complimentary" (Ref. Study Plan, Section 1.1, Page 1-3)?		

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ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
20-12	What is the scale of the topographic base maps used to plot geologic data from this activity?		
20-13	Why is this scale appropriate for this activity?		

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20-14	What is the thinnest volcanistratigraphic unit that can be mapped at this scale under 8.3.1.4.2.1.1?		
20-15	What is the minimum-displacement on a fault that would be plotted at a map scale of 1:12,000 under 8.3.1.4.2.2.1?		

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20-16	How many field stations are to be part of activity 8.3.1.4.2.1.1? (Ref. USGS Technical Procedure GP-01, Section 4.2)?		
20-17	Are geologic maps to be the same scale as the topographic base? Would field station data compiled from both activities be adequate to make larger scale geologic maps from the database without substantial additional field work?		

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20-18	How are field station data plotted in the field on aerial photographs transferred to the base topographic map if each is a different scale?		
20-19	What is the intended scope of USGS Technical Procedure GP-18, "Volcanic Stratigraphic Studies," and how is it related to the scope of work in GP-01, "Geologic Mapping?"		

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20-20	How is descriptive information formatted from field stations that cannot be depicted on a geologic map (Ref. Study Plan, Section 2.1.1.1, Page 2-2)?		
20-21	What type of coordinate or grid system is used for plotting of two (mapped) and three dimensional (borehole) data for activity 8.3.1.4.2.1.1? Is there any software involved?		

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20-22	Define activity 8.3.1.4.2.1.1 use of the term "model." (Ref. Study Plan, Section 2.1.2.2, Page 2-9)		
20-23	How has USGS Technical Procedure GP-20, "Volumetric Estimation of Lithophysae" been used in this activity?		

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20-24	What are the qualifications of the staff conducting the field mapping?		
20-25	How congruent is the format for core logs prepared from this activity and those prepared by staff from the Sample Management Facility?		

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20-26	How does activity 8.3.1.4.2.1.1 interface with the natural resource assessment (Study Plan 8.3.1.9.2.1)?		
20-27	Where are the field and borehole samples used for activity 8.3.1.4.2.1.1 now warehoused?		

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20-28	How are drill cuttings used with downhole video camera logs and geophysical logs to determine subsurface lateral and vertical stratigraphic and lithologic variations (Ref. Study Plan, Section 2.1.1.3)?		
20-29	Have previous XRF analyses on the Yucca Mountain tuffs indicated that the elemental variation in them is such to make XRF useful as a correlation tool for cuttings? (Ref. Study Plan, Section 2.1.1.5, Page 2-5). What is the documentation for this?		
20-30	When will the study plan for each activity be revised to remove references to exploratory shaft facility?		

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ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
20-31	<p>CHECKLIST FOR 8.3.1.14.2, STUDIES TO PROVIDE SOIL/ROCK PROPERTIES FOR POTENTIAL LOCATIONS OF SURFACE AND SUBSURFACE FACILITIES</p> <p>What data acquired, or developed, as part of this study, has been entered into the Project Technical Data Management (TDM) system?</p>		
20-32	<p>What acquired or developed data is intended for entry? When will Technical Data Information Forms (TDIFs) be provided to the Project technical data administrator?</p>		

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ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
20-33	Who is the Project's technical data administrator?		
20-34	How does the PI now meet the 45-day requirement in AP-5.1Q for entry of acquired or developed data into the TDM system?		

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20-35	Has any approved schedule been established with the Project technical data administrator, in accordance with AP-5.1Q, for entry of acquired or developed data into the Project TDM system that is not amenable to the 45-day requirement?		
20-36	What data evolved to date from this study is destined for entry into the Project's Reference Information Database?		

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ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
20-37	Does the scope of work for this study require that the PI personally ensure acquired and developed data are entered into the Project TDM system?		
20-38	Is the final site reconnaissance report for 8.3.1.14.2.1 identified in Table 5-1 and Figure 5-1, now available?		

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ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
20-39	Who is the Project WBS manager for this study?		
20-40	State how geotechnical parameters gathered by this study relevant to design of surface facilities, are provided to the architect/engineering participant?		

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20-41	Section 4.2 of the Study Plan states that "Some of the siting and reconnaissance activities for the ESF ramps and ramp portals will be performed under Study Plan activity 8.3.1.4.2.2.4, "Geologic Mapping of the Exploratory Shaft and Drifts." Since the qualifier "some work" is used, what is the exact partitioning of responsibility between the work carried out under 8.3.1.4.2.1 and 8.3.1.4.2.2.4? What documentation exists to show this has taken place?		
20-42	Does Study Plan 8.3.1.4.2.2.4 include surface mapping within its scope of work to permit this interface?		

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20-43	Section 4.2, "Interfaces with Other Site Characterization Study Plans," states, "Coordination will also be required between Study Plan 8.3.1.17.4.2 and Study Plan activity 8.3.1.14.2.1, "Preliminary and Detailed Exploration Activity," to optimize trench locations so that the objectives of both studies are met and data from each study can be used to supplement the other." What coordination has taken place?		
20-44	Of the possible geophysical and remote sensing techniques for use in Midway Valley listed in Table 2-1 of Study Plan 8.3.1.17.4.2 (Page 22), which has been used in support of Study Plan 8.3.1.14.2.1? If any of these techniques have been used, how has the evolved data been provided to the PI of 8.3.1.14.2.1?		

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ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
20-45	What geotechnical threshold(s) would have to be exceeded to warrant consideration of one of the other alternative locations for the north portal shown in Appendix C, Figure C-1?		
20-46	In what way does the identification of a presumed northwest trending bedrock fault at the north portal location in Midway Valley, impact the viability of the portal's current location?		

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20-47	Section 2.1.1.2 states that the 8.3.1.14.2.1 reconnaissance activity is to "...identify the type and number of tests, and type number, location, spacing, and depth of subsurface borings, test pits, and trenches used to develop data in the Preliminary Exploration phase." Where are the criteria used to make these decisions documented?		
20-48	Section 2.1.1.2 states that the 8.3.1.14.2.1 reconnaissance activity is to, "...help identify the method and location of recommended geophysical surveys in the Geophysical Field Measurements Activity." What geophysical techniques are recommended to be applied?		

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ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
20-49	What stratigraphic framework was used to assess the quaternary stratigraphy near the north portal location?		
20-50	What acquired or developed data from this study is manipulated on computer database(s)?		

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20-51	Section 2.1.2.1 of the Study Plan states, "The objective of the reconnaissance exploration phase will be to obtain a rough interpretive cross-section of the soil and rock stratigraphy and structure of the area." Where is this cross-section?		
20-52	What impact have comments from the NRC had on this Study Plan?		

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20-53	What impact have comments from the State of Nevada had on this Study Plan?		
20-54	What evaluation criteria are generally used in responding to comments on Study Plans?		

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20-55	<p>STUDY PLAN 8.3.1.2.2.7, HYDROCHEMICAL CHARACTERIZATION OF THE UNSATURATED ZONE</p> <p>Monthly progress reports indicate that there is a lot of work that is related to this study that is being conducted as prototype testing. Discuss the status of prototype testing.</p>		
20-56	<p>Study Plan 8.3.1.2.2.7 states that information developed in this study will be used to support the resolution of performance and design issues. How will data from this study be supplied to the people who will be examining those issues?</p>		

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20-57	Has any data from this study been submitted to the RIB or SEPDB?		
20-58	What criteria are used to determine if data will be submitted to the RIB or SEPDB?		

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20-59	The Study Plan mentions "geochemical evolution of ground waters." How is this being done? What computer codes will be used?		
20-60	<p>Page 2.1-3 of the Study Plan states: "If significant amounts of unsaturated-zone water were recharging the saturated-zone groundwater beneath Yucca Mountain, the isotopic and chemical compositions of both zones would be similar."</p> <p>Some water will be likely to move toward the surface by evaporation and recondensation on a microscopic scale because of the thermal gradient. This process competes with the tendency to flow downward because of gravity. If there is evaporation and recondensation, won't this tend to fractionate the waters resulting in lighter isotopes near the surface than are found at depth?</p>		

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20-61	Provide a list of recent publications or open file reports.		
20-62	What is the status of the WRI report?		

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20-63	What use is being made of outside contractors for technical support (e.g. Colorado School of Mines, LANL)? How are their activities controlled? Do they come under the USGS QA Program or do they have their own?		
20-64	Examine some of the training records of the outside contractors, if appropriate.		

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20-65	Have any samples been sent to LANL for 36Cl analysis? Discuss traceability and the use of such data.		
20-66	Discuss gas sampling in UZ-1.		

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20-67	Water extraction methods include squeezing, immiscible displacement (mercury, hydrocarbon, etc.), distillation, and centrifuging. To what extent are these methods used. Discuss the evidence that shows the effect of the extraction method on the chemistry of the resulting extracted water.		
20-68	The second paragraph of Section 3.2.2 of the Study Plan says that if there were a dilute composition of water in the fractures at great depth, it would imply a relatively fast travel time in the unsaturated zone. With the current conceptual model of flow in the unsaturated zone, doesn't the mere presence of water in the fractures at depth imply a very rapid travel time? Discuss.		

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20-69	<p><b>ACTIVITIES:</b></p> <p>8.3.1.2.3.1.2: WATER LEVEL MONITORING</p> <p>8.3.1.2.3.1.3: ANALYSIS OF SINGLE- AND MULTIPLE-WELL STRESS TESTS</p> <p>What is the status of the report on water level monitoring during 1989? What about the report covering the period of 1985-1988?</p>		
20-70	<p>What other publications have been released in the past year?</p>		

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20-71	Examine the report, review file, and comment resolution process on the report on "Precision and Accuracy of Water-Level Measurements Taken in the Yucca Mountain Area, Nevada, 1988-90" by S. Boucher.		
20-72	Discuss regression analyses of water level transducer calibrations.		

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QUALITY ASSURANCE CHECKLIST (continuation sheet)

ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
20-73	What use has been made of the regression analysis statistics on the estimation of accuracies of water-level measurements?		
20-74	What prototype activities are being conducted in support of this project? What are the procedural controls placed on the prototype testing? What are the training requirements?		

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ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
20-75	Discuss the monitoring of water level data during recent earthquakes in California and Nevada. Have these water level excursions been used to calculate strain changes?		
20-76	Discuss the NWIS software. How was this software treated under the USGS Software QA Program?		

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ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
20-77	What use is being made of outside contractors for technical support (e.g. Colorado School of Mines, LBL)? How are their activities controlled? Do they come under the USGS QA Program or do they have their own?		
20-78	Examine training records of some outside contractors.		

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ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
20-79	What is the status of the analysis of strain-related water level responses?		
20-80	What is the status of the report on the analysis of C-Hole testing?		

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ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
20-81	What prototype activities are being conducted in support of this project?		
20-82	What is the status of the intraborehole flow and stress test report?		

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ITEM NO.	CHARACTERISTICS TO BE EVALUATED	REMARKS Record objective evidence reviewed, method of verification, personnel contacted	RESULTS
20-83	What is the status of the well test analysis computer program. Has it been fully qualified under the USGS Software QA Program?		
20-84	What use is being made of the data from the tests conducted by USGS Carson City on the observation well drilled for the National Park Service?		