

CONVERSATION RECORD

TIME 5:30 PM

DATE Feb. 16, 1983

TYPE  VISIT  CONFERENCE  TELEPHONE

INCOMING  OUTGOING

Location of Visit/Conference:

NAME OF PERSON CONTACTED OR IN CONTACT

ORGANIZATION (Office, dept., bureau, etc.)

TELEPHONE NO.

O. L. Olson

DOE/RL

SUBJECT

ROUTING	
NAME/SYMBOL	INT
Brown	
Miller	
Cholewicki	
Wright	
File	

DOE Response to 1/13/83 dealing letter

WMHT: 3012.7  
WM-10  
PDR

- NRC met with DOE to determine status of DOE response to subject letter. Those present included (O.L. Olson, R. Stein, J. Anttonen of DOE; H. Miller, V. Rajaram (E/I) and J. Greaves of NRC)

- DOE reviewed the attached chart and list of references to identify the type of documents available

- DOE agreed to submit within one week design, construction and quality assurance documents for at least the initial phase of shaft construction. DOE agreed to provide a schedule for complete response to the Jan 13 letter.

ACTION REQUIRED

NAME OF PERSON DOCUMENTING CONVERSATION: J. Greaves

SIGNATURE: John J. Greaves

DATE: 4/7/83

ACTION TAKEN

8307270375 830216

PDR WASTE

WM-10 PDR

SIGNATURE: \_\_\_\_\_ TITLE: \_\_\_\_\_ DATE: \_\_\_\_\_

00411

## REFERENCED DOCUMENTS

- No.
- 1 SD-BWI-CR-015  
Preliminary Performance Requirements to Establish Seal Design Criteria for a Nuclear Waste Repository in Basalt
  - 2 (No number available)  
BWIP Repository Seal Design Criteria
  - 3 SD-BWI-TP-007 Rev. ~~0-2~~ 0-3  
Test Plan for Exploratory Shaft in Basalt, Phase I and Phase II
  - 4 B-314-C-X28018 (BWIP 7490)  
Construction Specification for Shaft Boring [and Casing Installation]
  - 5 B-314-C-X28048 (BWIP 7493)  
Construction Specification for Casing Cementing
  - 6 (No number available)  
M-K Procedure for Casing Handling, Aligning and Running  
NOTE: This procedure will be prepared for the 112" casing initially. A separate procedure will be developed for the 72" casing.
  - 7 (No number available)  
Dowell letter report on their chemical seal describing available laboratory test data, performance experience in past applications, and recommendations for further testing/development.
  - 8 B-314-P-S28005 (BWIP 7473)  
Procurement Specification for 72" ID Steel Casing
  - 9 RHO-BW-ST-28 P  
Horizon Identification Report
  - 10 (No number available)  
ES Acceptance Test Procedure
  - 11 (No number available)  
DuPont Blasters Manual
  - 12 B-314-P-S28004  
Procurement Specification for the 112" ID Steel Casing
  - 13 B-314-P-X28028  
Procurement Specification for Drilling Mud

REFERENCED DOCUMENTS (Continued)

No.

29

SD-BWI-TC-001  
Test Specification for RRL-2, Rev. 1-0

30

SD-BWI-PMP-002  
Project Management Plan for Exploratory Shaft

31

(No number available)  
M-K procedure for cementing

32

SD-BWI-TP-007, Rev. 0-1  
(Revised) Test Plan for Exploratory Shaft in Basalt, Phase I and Phase II

INFORMATION CONSIDERED NECESSARY RELATED TO EXPLORATORY SHAFT CONSTRUCTION AND SEALING

*submit to DOE-RL for review/info.*

INFORMATION REQUEST	REFERENCES <sup>a</sup>	DATES		STATUS/REMARKS
		BWIP NEED <sup>b</sup>	<del>DOE-RL</del> AVAILABLE <sup>c</sup>	
<p>I. Shaft and Seal Design Considerations</p> <p>- Provide an analysis of the potential effects of construction of the exploratory shaft on long-term sealing capabilities of the rock mass and identify factors that determine the nature and extent of such effects.</p> <p>- Describe how the selected excavation technique and shaft design accounts for limitations and uncertainties in long-term sealing considerations.</p>	1	09/83	02/11/83	<p>The reference 20 document provides an analysis of the effects on rock mass permeability associated with the excavation of shafts and tunnels in fractured rock. This document relates to the exploratory shaft primarily from the standpoint of redistribution of stresses around the shaft opening resulting in a disturbed rock zone. Reference 1 defines the performance requirements for a seal in a repository. While it does not specifically refer to the exploratory shaft, the sealing criteria and sealing requirements are the same for the exploratory shaft. Reference 2 will be the BWIP repository seal design criteria for long-term isolation which will also apply to the exploratory shaft.</p>
	2 20	09/83 07/82	09/83 07/82	
	3	11/04/82	11/04/82	<p>The Exploratory Shaft Test Plan (reference 3) provides for physical examination of the shaft affected zone through the port-holes in the liner. The shaft liner is designed for full hydrostatic head from the surface and is inspected to insure that the fabricated liner meets the design requirements. The design of the liner, grout and seal ring is designed to last the useful life of the shaft but if problems develop, remedial grouting can be accomplished from inside the shaft. Present plans are that upon decommissioning of the exploratory shaft the liner would be partially removed and a pre-engineered seal</p>

*the current shaft sinking approach will result in the least disturbance to the existing rock of any of the available excavation techniques.*

<sup>a</sup>See Attachment 1.

<sup>b</sup>Date the BWIP needs the information.

INFORMATION CONSIDERED NECESSARY RELATED TO EXPLORATORY SHAFT CONSTRUCTION AND SEALING

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INFORMATION REQUEST	REFERENCES <sup>a</sup>	DATES		STATUS/REMARKS
		BWIP NEED <sup>b</sup>	DOE-RL AVAILABLE <sup>c</sup>	
				isolation. The design of this isolation seal has not been completed.
- Provide design specifications for the shaft construction and show how they deal with the factors affecting sealing.	3	11/04/82	11/04/82	The design specifications for the exploratory shaft are described in references 4, 5, 8, and 14. References 6 and 31 deal with emplacement of the shaft liner and grout. The Test Plan (reference 3) and seal test procedures (reference 28) deal with evaluation of the effectiveness of the shaft seal and reference 24 documents this evaluation. <i>This TP must identify the factors affecting sealing &amp; following this the logic of how each design specs notifies the particular factors.</i>
	4	02/09/83	02/09/83	
	5	02/18/83	02/18/83	
	6 112"	02/25/83	02/25/83	
	72"	03/31/83	03/31/83	
	8	12/27/82	12/27/82	
	14	02/18/83	02/18/83	
	<del>21</del>	<del>02/11/82</del>	<del>02/14/82</del>	
	24	01/85	01/85	
	28	01/84	01/84	
31	03/01/83	03/01/83		
- Describe the grout and chemical seal design.	<del>3</del>	<del>11/04/82</del>	<del>11/04/82</del>	The grout and chemical seal design is described in the construction specification for casing cementing (reference 5). The procedure for casing handling, running, etc. and the procedure for cementing (references 6 and 31) describe the approach used in placing the grout seal. The Exploratory Shaft Test Plan describes the features to be examined following placement (see reference 3) and the shaft sealing report (reference 24) will document the effectiveness of the seal in isolating the shaft station from the flow tops both above and below the breakout zone.
	5	02/18/83	02/18/83	
	<del>6 112"</del>	<del>02/25/83</del>	<del>02/25/83</del>	
	<del>72"</del>	<del>03/31/83</del>	<del>03/31/83</del>	
	24	01/85	01/85	
	31	03/01/83	03/01/83	
	28			

INFORMATION CONSIDERED NECESSARY RELATED TO EXPLORATORY SHAFT CONSTRUCTION AND SEALING

*submit to DOE-RL for review*

*This must include a development of the logic used to determine how/why locations of portholes were used*

INFORMATION REQUEST	REFERENCES <sup>a</sup>	DATES		STATUS/REMARKS
		BWIP NEED <sup>b</sup>	DOE-RL AVAILABLE <sup>c</sup>	
<p>- Discuss the selected locations of the portholes. Include discussion of data on sealing characteristics to be gathered through the portholes.</p> <p>- Limitations and uncertainties associated with the [porthole] data.</p>	3	<del>11/04/82</del>	11/04/82	<p>The Exploratory Shaft Test Plan (reference 3) describes in general terms the tests to be conducted through portholes. The supporting document (reference 17) describes the selected locations for the portholes. The seal test procedures (reference 28) describe the actual acquisition of data to be gathered through the portholes and the seal test report (reference 24) will describe the test program conducted and present the data to be collected. This report will assess the suitability of the sealing technique utilized at the exploratory shaft.</p>
	17 24 28	<del>02/14/83 01/85 01/84</del>	02/28/83 01/85 01/84	
	<del>3</del> 32	<del>11/04/82</del> 05/20/83	11/04/82 06/20/83	<p>The next revision of the Exploratory Shaft Test Plan (see reference 32) will include additional discussion on the limitations of the hydrologic data <del>required</del> <i>obtainable</i> through porthole testing. The present test plan (reference 3) does not contain these discussions.</p>

<sup>a</sup>See Attachment 1.  
<sup>b</sup>Date the BWIP needs the information.

INFORMATION CONSIDERED NECESSARY RELATED TO EXPLORATORY SHAFT CONSTRUCTION AND SEALING

*submit to DOE-RL for review*

INFORMATION REQUEST	REFERENCES <sup>a</sup>	DATES		STATUS/REMARKS
		BWIP NEED <sup>b</sup>	DOE <sup>4</sup> RL AVAILABLE <sup>c</sup>	
<p>II. Construction Plans and Procedures</p> <p>- Identify the acceptance criteria for construction of the exploratory shaft.</p> <p><i>*18 *27 *28 *31 MK inspection plans. QA surveillance plans.</i></p> <p>- Identify procedures used to minimize damage to the rock penetrated.</p>	<del>3</del>	<del>11/04/82</del>	<del>11/04/82</del>	<p>References 4 through 9, 12 through 14, and 17 identify the requirements for constructing the exploratory shaft to support the test program. References 3 and 17 identify the required exploratory shaft configurations to support the tests at either of two mining horizons. Reference 10 is required to approve all shaft equipment and utilities required to support the exploratory shaft testing and mining programs.</p> <p>The blind boring technique has been selected for shaft drilling (ref. 4) as the least damaging of the available methods. The cutters, mounted on the bit body, crush and grind the solid rock as the hole is deepened while exerting minimal pressure on the wall of the hole as drilling advances. Alternate methods of shaft sinking all employ explosives to dislodge and break up the solid rock. Blasting damage, even under controlled conditions, extends below and beyond the shaft perimeter. Stress redistribution around the opening results in a disturbed rock zone (see reference 20). For construction of the shaft station (breakout) the engineering judgement of personnel experienced in underground mining operations will be employed, using established (reference 11) controlled explosive procedures.</p>
	4	02/09/83	02/09/83	
	5	02/18/83	02/18/83	
	6 112"	02/25/83	02/25/83	
	72"	03/31/83	03/31/83	
	<del>7</del>	<del>02/18/83</del>	<del>02/18/83</del>	
	8	12/27/82	12/27/82	
	<del>9</del>	<del>05/01/83</del>	<del>05/01/83</del>	
	10	10/01/83	10/01/83	
	12 Rev 2	11/19/82	11/19/82	
	13	02/08/83	02/08/83	
	14	02/18/83	02/18/83	
	<del>17</del>	<del>02/14/83</del>	<del>02/26/83</del>	
	4	02/09/83	02/09/83	
	11	1975	1975	
	<del>20</del>	<del>07/82</del>	<del>07/82</del>	

<sup>a</sup>See Attachment 1.

INFORMATION CONSIDERED NECESSARY RELATED TO EXPLORATORY SHAFT CONSTRUCTION AND SEALING

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INFORMATION REQUEST	REFERENCES <sup>a</sup>	DATES		STATUS/REMARKS
		BWIP NEED <sup>b</sup>	DOE/RL AVAILABLE <sup>c</sup>	
- Identify liner construction and placement technique. Include information on topics such as: liner type, liner material testing, welding of liner, placement of liner. This information needs to be fully considered in application of any permanent sealing program.	4	<del>02/09/83</del>	02/09/83	The liner design and materials specifications, shop welding specifications, and shop inspection and testing procedures are detailed in references 8 (72" casing) and 12 (112" casing). Casing handling, field welding and inspecting, aligning, and installation procedures are documented in references 4, 6, and 14.
	6 112"	<del>02/25/83</del>	02/25/83	
	72"	<del>03/31/83</del>	03/31/83	
	8	<del>12/27/82</del>	12/27/82	
	12 Rev 2	<del>11/19/82</del>	11/19/82	
14	<del>02/18/83</del>	02/18/83		
<div style="border: 1px solid black; border-radius: 50%; padding: 10px; display: inline-block;">                         MK inspection plans                          RHO surveillance "                          #18                     </div>				

<sup>a</sup>See Attachment 1.  
<sup>b</sup>Not the BWIP needs the information



INFORMATION CONSIDERED NECESSARY RELATED TO EXPLORATORY SHAFT CONSTRUCTION AND SEALING

*Submitted To DOE-RL for review*

INFORMATION REQUEST	REFERENCES <sup>a</sup>	DATES		STATUS/REMARKS
		BWIP NEED <sup>b</sup>	DOE-RL AVAILABLE <sup>a</sup>	
<p>III. Seal or Grouting Plans and Procedures</p> <ul style="list-style-type: none"> <li>- Describe how the grouts and chemical seal are expected to perform in sealing the exploratory shaft. Describe tests done, both laboratory and field, to determine their long-term durability and their compatibility, both chemical and physical, to the host rock environment.</li> <li>- Describe the placement methods to be used including the limitations and uncertainties of the methods.</li> </ul>	5	02/18/83	02/18/83	<p>Expanding cement (regulated fill cement) in conjunction with a chemical seal ring, a proprietary product of Dow Chemical, will be used to seal the exploratory shaft from overlying aquifers. The low permeability expanding cement will provide the major barrier to water movement. The chemical seal ring which is activated by water will be used above and below the shaft station to provide a gasket-like seal to minimize water in-leakage. The sealing subcontractor, Dowell, will be providing a letter report discussing past laboratory testing and actual field experience in sealing boreholes and large diameter shafts (see reference 7). The specification for casing cement is described in reference 5.</p> <p>The construction specification for casing cementing (reference 5), the procedure for grout emplacement (reference 31), the procedure for casing handling (reference 6), and the Dowell report (reference 7) describe the grout and seal placement. The purpose of the exploratory shaft and associated test programs is to determine limitations and uncertainties of the grout placement method which would be used for the repository shafts. The Test Plan (reference 3) has an objective devoted to determining the effectiveness of the shaft seal. The primary function of the exploratory shaft program is to resolve uncertainties or</p>
	7	02/18/83	02/18/83	
	3	11/04/82	11/04/82	
	5	02/18/83	02/18/83	
	<del>6</del>	<del>112" 02/25/83</del>	<del>02/25/83</del>	
		<del>72" 03/31/83</del>	<del>03/31/83</del>	
	7	02/18/83	02/18/83	
	31	03/01/83	03/01/83	

<sup>a</sup>See Attachment 1.

INFORMATION CONSIDERED NECESSARY RELATED TO EXPLORATORY SHAFT CONSTRUCTION AND SEALING

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		BWIP NEED <sup>b</sup>	DOE-RL AVAILABLE <sup>c</sup>	
- Describe remedial methods to be used if sealing methods are not adequate.	15 16 * 3	<del>1973 01/28/83</del>	1973 01/28/83	<p>identify areas needing improvement in grout placement and effective shaft sealing during the operating phase.</p> <p>The reference documents (15 &amp; 16) provide guidance for remedial actions which have been effective in other locations and materials. Penetration of the reference horizon will help resolve questions of adequacy of present plans, magnitude and type of deviations and corrective measures in site specific applications.</p>

INFORMATION CONSIDERED NECESSARY RELATED TO EXPLORATORY SHAFT CONSTRUCTION AND SEALING

*Submitted to DOE-PL for review*

INFORMATION REQUEST	REFERENCES <sup>a</sup>	DATES		STATUS/REMARKS	
		BWIP NEED <sup>b</sup>	DOE PL AVAILABLE <sup>c</sup>		
IV. Testing and Inspection Plans and Procedures  - Describe test and inspection procedures to be used during drilling (e.g., plumbness of hole, drill mud loss, drill bit inspection, etc.) to determine acceptability of the shaft as constructed and to obtain adequate information on this construction technique.	3	11/04/82	11/04/82	The Exploratory Shaft Test Plan (see reference 3) provides the test requirements for the shaft drilling. The construction specification for shaft boring and casing installation provides the technical requirements for the shaft construction (reference 4). The procedure for drilling implements the engineering specification requirements. This procedure will be utilized by the Construction Manager and Construction Manager subcontractors to execute the drilling program (see reference 27). The shaft sinking report which will be prepared at the conclusion of the shaft sinking will document the history and evaluate the construction technique (see reference 23).	
	4	02/09/83	02/09/83		
	21	02/11/83	02/14/83		
	23	11/84	11/84		
	27	02/10/83	02/10/83		
	*18				
	<i>MK inspection plans RHO surveillance</i> →				
- Describe test and inspection procedures to be used after completion of drilling and during the sealing of the shaft. Include information such as caliper surveys, grout injection rate, grout level sensor, cement bond log, thermal measurements during curing, etc.	4	02/09/83	02/09/83	Caliper surveys/loggings are performed in conjunction with the drilling operation (reference 4). Additional, precision alignments will be required by reference 6 (during liner installation). The testing requirements for grout installation are provided in reference 5. The details of grout injection, grout level sensors, cement bond log will be provided in a shaft seal report as defined in reference 24. There will be no thermal measurements	
	5	02/18/83	02/18/83		
	<del>6</del>	<del>712"</del>	<del>02/25/83</del>		<del>02/25/83</del>
		<del>72"</del>	<del>03/31/83</del>		<del>03/31/83</del>
	<del>21</del>	<del>02/11/83</del>	<del>02/14/83</del>		
	24	01/85	01/85		
	*28				
	*31				
	<i>MK inspection plans RHO surveillance</i> →				

<sup>a</sup>See Attachment 1

INFORMATION CONSIDERED NECESSARY RELATED TO EXPLORATORY SHAFT CONSTRUCTION AND SEALING

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		BWIP NEED <sup>b</sup>	DOE-RL AVAILABLE <sup>c</sup>	
<p>- Describe test and inspection procedures to be used after sealing of the shaft to assess the results of the sealing effort in controlling adverse effects. Include information such as grout strength tests, visual identification of seal conditions, records of water inflow, assessment of seal bond to host rock, physical logging of drill holes, photo or T.V. camera methods in all portholes.</p>	3	11/04/82.	11/04/82	<p>conducted during curing as these are inappropriate since the grout will be injected underwater and temperature measurements are not possible.</p> <p>The Exploratory Shaft Test Plan (ref. 3) lists requirements for accessing the shaft seal. The techniques to be utilized for shaft seal verification will be developed in the Near-Surface Test Facility and will result in a shaft seal test procedure (see reference 28). The results of the shaft seal testing will be documented in the shaft seal report (see reference 24). Photo or T.V. camera logging of the holes drilled through the portholes is not planned at this time.</p>
	24	01/85	01/85	
	28	01/84	01/84	

*AK - inspection plans  
RHO surveillance*

<sup>a</sup>See Attachment 1.

INFORMATION CONSIDERED NECESSARY RELATED TO  
EXPLORATORY SHAFT CONSTRUCTION AND SEALING

INFORMATION REQUEST	REFERENCES <sup>a</sup>	DATES		STATUS/REMARKS
		BWIP NEED <sup>b</sup>	DOE-RL AVAILABLE <sup>c</sup>	
<p>V. Plans and Procedures for Gathering Specific Information Related to Site Characterization</p> <p>- Describe test plans and procedures used to obtain adequate data on site characteristics that can be measured either directly or indirectly during construction of the exploratory shaft.</p> <p>- Will hydrologic conditions [heads] in nearby drill holes be measured during shaft construction to help understand bulk hydrologic properties?</p>	<p>3</p> <p>22</p> <p>25</p> <p>26</p>	<p>11/04/82</p> <p>01/31/83</p> <p>01/85</p> <p>01/85</p>	<p>11/04/82</p> <p>01/31/83</p> <p>01/85</p> <p>01/85</p>	<p>The Exploratory Shaft Test Plan (see reference 3) describes the requirements for a principal borehole which will be used to characterize the site prior to construction of an exploratory shaft. The borehole test report documenting the results of the principal borehole is presently available (see reference 22). A matrix in the Exploratory Shaft Test Plan identifies the relevant work elements in the Site Characterization Report which will be addressed during the exploratory shaft construction and testing.</p> <p>The hydrologic conditions in borehole RRL-2 will be monitored as the exploratory shaft is drilled from the Vantage to total depth. The borehole RRL-2 is cased down to the Vantage and is therefore not available for testing above that horizon. The test specification for RRL-2 will be revised (see reference 29) to include monitoring the heads from the Vantage interbed to total depth. This work is expected to start in late summer 1983.</p>
	29	06/83	06/83	

<sup>a</sup>See Attachment 1.

INFORMATION CONSIDERED NECESSARY RELATED TO EXPLORATORY SHAFT CONSTRUCTION AND SEALING

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		BWIP NEED <sup>b</sup>	DOE-RL AVAILABLE <sup>c</sup>	
<p>- Will the following be monitored: Sampling of drill cuttings, bit thrust, torque, rate of advance, slurry weight, speed of rotation, pumping pressure, water inflow? This information can be used to detect and/or explain anomalies encountered?</p>	<p>3 22 23 27</p>	<p>11/04/82 01/31/83 11/84</p>	<p>11/04/82 01/31/83 11/84</p>	<p>The Exploratory Shaft Test Plan (see reference 3) calls out certain parameters to be monitored during drilling operations. Additional parameters as identified in this information request, will be monitored with the exception of water inflow since the hole is already filled with water. Water inflows have been measured in the RRL-2 borehole (see reference 22). The data from the drilling activity will be presented in the drilling test report (see reference 23) at the conclusion of the drilling program and will provide a complete history of the exploratory shaft drilling activities.</p>
<p>- Identify all parameters to be measured and methods of measurement.</p>	<p>3 23 27</p>	<p>11/04/82 11/84</p>	<p>11/04/82 11/84</p>	<p>The Exploratory Shaft Test Plan (see reference 3) identifies the parameters to be measured to meet the objectives of the test plan. Additional parameters such as rotary table torque, bit load, rate of advance, speed of rotation will be measured as a normal part of drilling activities. The rig to be used for the exploratory shaft drilling contains all instrumentation necessary to measure these parameters. The drilling test report (see reference 23) will include the results from the drilling program.</p>

*MK inspection plans  
RHO surveillance "*

<sup>a</sup>See Attachment 1.

INFORMATION CONSIDERED NECESSARY RELATED TO EXPLORATORY SHAFT CONSTRUCTION AND SEALING

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INFORMATION REQUEST	REFERENCES <sup>a</sup>	DATES		STATUS/REMARKS
		BWIP NEED <sup>b</sup>	DOE-RL AVAILABLE <sup>c</sup>	
<p>VI. Quality Assurance (QA) - Administrative Procedures</p> <ul style="list-style-type: none"> <li>- Identify the line of responsibility for implementing QA procedures down to and including the Construction contractor.</li> <li>- Identify the procedures for monitoring and implementing the QA program by the Quality Assurance organization of exploratory shaft design, construction and testing.</li> </ul>	<p>18 30</p> <p><i>OK inspection plan RHO surveillance</i> →</p> <p>19 *18</p> <p>→</p>	<p><del>01/83</del> <del>01/83</del></p> <p>01/83</p>	<p>01/83 03/83</p> <p>01/83</p>	<p>Line of responsibility for QA is described in the Project Management Plan for the Exploratory Shaft, Phase I (see reference 30). The QA Program Plan (see reference 18) further identifies the specific QA requirements for the exploratory shaft.</p> <p>The QA Program Index (see reference 19) identifies the specific BWIP operating procedures which are used for auditing and surveillance of the QA program for the exploratory shaft.</p>

<sup>a</sup>See Attachment 1.  
<sup>b</sup>Date the BWIP needs the information.

REFERENCED DOCUMENTS (Continued)

- No.
- 14 B-314-C-X28038  
Construction Specification for Casing Field Welding Services
- 15 (No number available)  
Amchitka Mining History, Fenix and Scisson (1973)
- 16 Letter #R83-0283.1  
Contingency Plan for Anomaly Detection and Resolution During Exploratory Shaft Construction
- 17 SD-BWI-TI-119  
Exploratory Shaft Test Porthole Configuration.
- 18 RHO-QA-PL-3, Rev. 1 L  
"Basalt Waste Isolation Project - QA Program Plan"
- 19 RHO-QA-PL-3, Rev. 1 L  
Appendix A, "QA Program Index"
- 20 NM 79-137  
Topical Report, "Preliminary Evaluation of the Rock Mass Disturbance Resulting from Shaft, Tunnel, or Borehole Excavation," D'Appolonia, July 1982.
- 21 (No number available)  
Sperry Sun Procedure for Logging
- 22 (No number available)  
Borehole Test Report
- 23 (No number available)  
Drilling Test Report
- 24 (No number available)  
Shaft Seal Report
- 25 (No number available)  
Hydrologic Test Report
- 26 (No number available)  
Geomechanics Test Report
- 27 (No number available)  
M-K Drilling Program
- 28 (No number available)  
Seal Test Procedure