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Establishment of Selectio Activity E-20-15 Metal Barrier S	on Criteria Selection & Testing
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# ACTIVITY PLAN

# Establishment of Selection Criteria

Activity E-20-15 of the scientific investigation 'Metal Barrier Selection and Testing' WBS # 1.2.2.3.2

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Revision 0 May 23, 1989

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5/31/89 Date

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5/26/89

#### **1.0 INTRODUCTION**

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# 1.1 Identification of activity

This activity plan is written pursuant to quality procedure 033-YMP-QP 3.0, "Scientific Investigation Control" of the LLNL Yucca Mountain Project Quality Procedures Manual. It pertains to activity E-20-15 'Establishment of Selection Criteria', which is a part of the scientific investigation 'Metal Barrier Selection and Testing' (WBS  $\ddagger$  1.2.2.3.2).

#### 1.2 Quality Assurance Level Assignment

A quality assurance level of QA-I has been assigned to this activity.

#### 1.3 Responsibilities

William G. Halsey is the Principal Investigator for this activity and is responsible for the conduct of this work. R. Daniel McCright is the Task Leader for the Metal Barrier Selection and Testing investigation. Willis L. Clarke is the Technical Area Leader for Container Design.

## 2.0 PURPOSE AND OBJECTIVES

The objective of this activity is to complete establishment of the criteria for the selection of the metal barrier (container) material to be used for advanced waste package design studies. This includes the revision, review, and approval of the draft criteria. The result of this activity is the final selection criteria document.

#### 3.0 ACTIVITY DESCRIPTION

The starting point for the completion of this activity is the draft criteria document entitled "Selection Criteria for the Yucca Mountain Project Waste Package Container Material" prepared under 033-NNWSI-P 3A.3 and the report dated December 14, 1988, of the peer review conducted on this draft during September 1988. The selection criteria will be revised in response to the peer review comments and technical input from program staff. The revised draft will receive technical review by program staff and be returned to the peer review panel for their comment. Because the peer review panel is an independent group there is no mechanism for guaranteeing closure between the author and the panel. In the event of substantive disagreement, the issue will be referred to the YMP management for consideration. The result of this activity will be the final selection criteria report. The peer review report, and peer review comments on the revised criteria, will be part of the QA records. If a consensus is reached between the author, the peer review panel, and technical reviewers, an effort will be made to maintain it throughout the programmatic review process.

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The selection criteria will provide the framework within which the candidate container materials will be evaluated. A wide variety of topics must be considered such as: mechanical properties, corrosion, predictability, fabrication and closure, and cost. To select a material several steps are required. First, it must be determined whether the candidate meets the regulatory and engineering requirements for the application. Then, the material must be quantitatively compared to the other candidates on a variety of topics. It is intended to have a two-part selection process. The first part is a "Pass/Fail" (P/F) to determine whether each candidate meets the minimum performance goals for the waste package, and whether it is a practicable material to use in this application. The second part is a "Quantitative Score" (QS) to determine a numerical value for each candidate, allowing the relative merit of each to be compared in order to select the "best" candidate. To support these goals, many diverse parameters must be defined, weighted, described on a quantitative scale, and a passing score determined.

### 3.1 Technical Reviews

A revised draft of the criteria and the author's response to the peer review comments will be circulated to the peer review panel members for their comments. The author may choose to revise the document further, if appropriate. The draft will also be returned to the internal technical reviewers for their comment on changes made in response to the peer review.

The final draft of the criteria document will be circulated through the YMP approval cycle for comment, but suggested changes which alter any consensus of the author and the independent peer review may be rejected and require management resolution.

3.2 Hold Points

Not applicable.

3.3 Equipment

Not applicable.

3.4 Materials

Not applicable.

# 3.5 Special Environmental Conditions

Not applicable.

3.6 Special Training/Qualification Requirements

Qualifications of the principal investigator are specified by the Task Leader in accordance with 033-YMP-QP 2.10 "Qualification of Personnel". Qualifications of the peer review members are specified in accordance with 033-YMP-QP 2.2 "Peer Review".

#### 3.7 Activity Closeout

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The final product of this activity will be the selection criteria document. Supporting documentation will include drafts of the criteria which were subjected to technical and/or peer review, and the results of the reviews. The QA office will be on the distribution list for these drafts. Documents such as activity notebooks, technical review comments, and communications within the peer review group will be retained by the responsible individual until the document package is transferred to the local records center at the conclusion of the activity.

4.0 PRECISION AND ACCURACY

Not applicable.

#### • 4.1 Calibration Requirements

Not applicable.

4.2 Conditions Which May Adversely Affect Results

Not applicable.

# 4.3 Sources of Uncertainty and Error to be Controlled and Measured

Not applicable.

5.0 IN-PROCESS DOCUMENTATION

Records produced during the conduct of this activity will include the final selection criteria document, intermediate drafts of the criteria document which were subjected to technical or peer review and the results of those reviews. Other records include the scientific notebooks of the principal investigator and support staff, memos establishing the need for a peer review, memos describing the selection of the peer review chairman and members, correspondence of the peer review, and contracting documents for the peer review members.

5.1 Data Recording and Data Reduction

Not applicable.

5.2 Analysis

Not applicable.

### 6.0 INTERFACES

This activity can proceed independent of any other activity. One activity, E-20-19 'Metal barrier selection' cannot proceed without the selection criteria document produced by this activity. The Technical Area Leader, Task Leader, and Principal Investigator for activity E-20-19 are the same as for activity E-20-15.

### 7.0 SCHEDULE

The draft selection criteria report has been prepared, and technically reviewed under 033-NNWSI-P 3A.3, and peer reviewed under 033-NNWSI-P 2.2 and 2.5 prior to this activity plan. Contingent on approval of this activity plan and adequate budget, the revision, re-review, and approval of the document will begin 6/89 and end about 9/89. E-20-19 will begin about 10/89. The selection criteria report is milestone L025.

## 8.0 TECHNICAL IMPLEMENTING PROCEDURES

In the event that a procedure more detailed than 033-YMP-QP 2.2 "Peer Review" is needed for conducting the Peer Review, a Technical Implementing Procedure will be followed. The document 033-NNWSI-P 2.5 currently serves as this TIP.

### 9.0 SPECIAL CASES (PROCUREMENT)

Consultants/contract labor work in two areas of this activity. The members of the peer review group provide their services through either a consultant agreement or technical services contract under the requirements of 033-YMP-QP 2.2 "Peer Review". In addition, independent technical support for the peer review group is provided by consultant agreement or technical services contract under the requirements of 033-YMP-QP 4.0 "Procurement Control and Documentation". All services procured for this activity will be performed under the LLNL YMP Quality Assurance Plan.

#### 9.1 QA Requirements Specification

Not applicable.

#### 9.2 Statement of Work

The statement of work for members of the peer review panel is to provide expert opinion on the selection criteria in accordance with appropriate program requirements such as the QAPP. An example of prior consultant and service contract statements of work used for this activity are provided as Appendix A.

The statement of work for technical support of the peer review panel is to provide independent technical support for the peer review members, support the conduct of the peer review meeting, and preparation of the peer review comments and report under the direction of the peer review chairman. An example of a prior service contract statement of work used for this activity is provided as Appendix B.

#### 9.3 Subcontractor Interface Control

The technical contacts at LLNL for contracts under this activity are the P.I., the T.L., and the T.A.L. Details of the reporting requirements, information control, and schedule for the contracts can be found in Appendices A and B.

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#### 9.4 Materials/Equipment Provided

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Not applicable.

#### 9.5 Deliverables

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The deliverable for the peer review members is the peer review report. Deliverables for the technical support contractor include copies of correspondence with the peer review members, scientific notebooks if used, and the peer review report.

**10.0 REFERENCES** 

W. G. Halsey, R. D. McCright, <u>Scientific Investigation Plan for Metal</u> <u>Barrier Selection and Testing</u>, UCID-21262 (publication version) December 1987, Lawrence Livermore National Laboratory.

<u>Establishment of Criteria for Metal Barrier Selection</u>, a technical procedure, 033-NNWSI-P 3A.3, LLNL - NNWSI Quality Assurance Program Plan, Lawrence Livermore National Laboratory, June, 1988.

<u>Peer Review</u>, a technical procedure, 033-NWMP-P 2.2, LLNL - NNWSI Quality Assurance Program Plan, Lawrence Livermore National Laboratory, November, 1987.

<u>Peer Review of Barrier Material Selection Criteria and Barrier</u> <u>Material Selection</u>, a technical procedure, 033-NNWSI-P 2.5, LLNL -NNWSI Quality Assurance Program Plan, Lawrence Livermore National Laboratory, June, 1988.

W. G. Halsey, <u>Selection Criteria for the Yucca Mountain Project Waste</u> <u>Package Container Material</u>, Draft CRIT-Q, Lawrence Livermore National Laboratory, September 15, 1988.

<u>Peer Review Report on "Selection Criteria for the Yucca Mountain</u> <u>Project Waste Package Container Material"</u>, prepared by Metal Barrier Selection Criteria Peer Review Panel, December 14, 1988.

11.0 APPENDIXES

Appendix A: Example statement of work for peer review panel member.

Appendix B: Example statement of work for peer review panel technical support.

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# Appendix A:

#### Example Statement of Work for Peer Review Panel Member

# Metal Barrier Selection Peer Review Participation

# STATEMENT OF WORK

# Introduction

The Metal Barrier Selection and Testing (MBST) Task of the Nuclear Waste Management Program (NWMP) at Lawrence Livermore National Laboratory (LLNL) is responsible for the selection of the metal barrier material for application in the high-level nuclear waste repository being designed for the Yucca Mountain Site in Nevada. The Scientific Investigation Plan (SIP) for the MBST Task includes development of criteria for metal barrier selection (E-20-15), metal barrier selection (E-20-19) and peer review of the selection criteria and metal barrier selection (E-20-15, E-20-19).

It is proposed that Aptech Engineering provide scientific and engineering personnel to participate in the peer review of metal barrier selection.

The task, which is described in detail below, shall be completed in accordance with the Quality Assurance Program Plan for NWMP (033-NWMP) at the Quality Assurance level assigned in the Scientific Investigation Plan for information input into these activities (E-20-19, E-20-15 = QA I).

### **Technical Scope of Work**

Seller will provide a Ph.D. Senior Engineer/Scientist to participate in the Material Selection Peer Review of the Metal Barrier Selection and Testing Task of the Nuclear Waste Management Program at Lawrence Livermore National Laboratory. The task to be performed includes;

Task 1 Review the background material and information provided by LLNL staff members and subcontractors to permit evaluation of the selection of the metal barrier material, evaluate the final quantification of the selection criteria and ranking of the candidates, participate in the peer review meeting to evaluate the metal barrier selection, and provide input to the peer review report on the metal barrier selection. This task will assimilate input from the degradation mode surveys, performance models, parametric studies, the peer review of the metal barrier selection criteria completed for activity E-20-15, and selection criteria development, to review the quantification and ranking of the candidate materials. This quantification and ranking will be the basis for the selection of a metal barrier material. The peer review, similar to the peer review completed for the metal barrier selection criteria (E-20-15), will be completed in accordance with the peer review procedure as described in the Quality Assurance Program Plan for the NWMP (033-NWMP-P 2.5). This task, which is a part of activity E-20-19, will be performed at a quality assurance level QA I.

## **Proposed Level of Effort**

This task will encompass approximately 120 man-hours of effort (0.07 FTE).

# **Proposed Milestone Schedule**

The following schedule is proposed for the completion of each task;

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1 June 1989 to 31 July 1989 - Review background information

1 August 89 to 30 September 1989 - Complete Peer Review

This schedule is tentative and depends upon the progress of Activity E-20-19.

# Reports

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The final peer review report will include input from the engineer/scientist assigned to complete this task. This report, which will be completed by the peer review chairman, is the only report required for this task.

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# Appendix B:

#### Example Statement of Work for Peer Review Technical Support

# Establishment and Peer Review of the Metal Barrier Selection Criteria

# for the Nuclear Waste Management Program

## Statement of Work

# Introduction

The Metal Barriers Selection and Testing (MBST) Task of the Nuclear Waste Management Program (NWMP) at Lawrence Livermore National Laboratory (LLNL) is responsible for the selection of the metal barrier material for application in the high-level nuclear waste repository being designed for the Yucca Mountain Site in Nevada. The Scientific Investigation Plan (SIP) for the MBST includes Peer Reviews for the Metal Barrier Selection Criteria (E-20-15) and subsequently Metal Barrier Selection (E-20-19).

It is proposed that Science and Engineering Associates, Inc. provide significant scientific and engineering support for the Peer Review of the Metal Barrier Selection Criteria (E-20-15). This support will include providing technical input to MBST engineers and scientists for the development of the selection criteria establishment plan and completing a review of the selection criteria establishment plan, providing technical and engineering input to MBST staff members for the establishment of the selection criteria and completing a review of the selection criteria, development of the plan for the completion of the Peer Review, and execution of the Peer Review. All of these tasks, which are described in detail below, will be completed in accordance with the Quality Assurance Program Plan for NWMP (033-NWMP-P 2.2, P 5.0, P 6.0, P 17.0, P 21B.0, P 21B.0, P 22.0) at the Quality Assurance levels (QA-I) assigned in the Scientific Investigation Plan.

### **Technical Scope of Work**

Seller will provide a "Q" cleared Ph.D. Senior Engineer/Scientist to support the Nuclear Waste Management Program at Lawrence Livermore National Laboratory. The four (4) tasks to be performed include; selection criteria plan development and review, selection criteria establishment and review, Peer Review plan development, and Peer Review execution.

Task 1 Provide technical input to MBST engineers and scientists for the development of the selection criteria establishment plan and completing a review of the selection criteria establishment plan includes working with the MBST staff to develop a plan for the completion of the selection criteria establishment and providing a written technical review of the plan when completed.

Task 2 Provide technical and engineering input to MBST staff members for the development of the selection criteria and completing a review of the selection criteria includes working with the Metal Barriers Selection and Testing staff to develop the selection criteria to be reviewed in the Peer Review process, including identification of important parameters, assignment of relative weighing factors for each parameter,

determination of minimum acceptable performance standards and documentation of the criteria and the criteria development process to insure compliance with the Quality Assurance Program Plan. A written technical review of the selection criteria will also be completed.

Task 3 Develop the plan for the completion of the Peer Review includes review of the Scientific Investigation Plan and Quality Assurance Program Plan, then writing a plan for the execution of the Peer Review to meet the requirements set forth in these documents, submitting the plan to the MBST and QA staff for review and completing necessary revisions and additions.

Task 4 Execution of the Peer Review includes working in conjunction with Metal Barriers Selection and Testing Staff to distribute necessary background information to the Panel members prior to the Peer Review Meeting, organizing and moderating the Peer Review and documenting the Peer Review Meeting to insure compliance with the Quality Assurance Program Plan.

## **Proposed Milestone Schedule**

The following milestones are proposed for the completion of the Peer Review;

1 April 1988	- Completion of the Peer Review Plan
1 May 1988	- Selection of the Peer Review Panel
1 July 1988	- Proposed Selection Criteria Completed
1 August 1988	- Distribution of the Background Information Package to Peer Review Panel
1 September 1988	- Conduct Peer Review Meeting
30 September 1988	- Complete First Draft of Peer Review Report

# **Possible Additional Tasks**

The Metal Barriers Selection and Testing Scientific Investigation Plan (3.2.3) states that it is expected that the same panel used for the peer review of the selection criteria, activity E-20-15, will be used to review the metal barrier selection (E-20-19). Hence, it is possible that SEA will be involved in the planning, organization and execution of this subsequent peer review. Therefore, it is proposed that this contract should be scheduled to conclude on 30 September 1989 to provide for the possibility of additional tasks related to the Peer Review of the metal barrier selection.

## **Special Conditions**

The Senior Engineer/Scientist shall be Q-cleared to permit access to the LLNL site and the associated laboratory and library facilities.

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# Reports

The Seller will submit monthly progress reports, technical reviews of the Selection Criteria Establishment Plan and the Selection Criteria, and the Peer Review Plan, when completed. The final Peer Review Report will be submitted to the MBST staff following the completion of the Peer Review.

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