CRWMS/M&O

Determination of Importance Evaluation Cover Sheet

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1. DIE Title	
Determination of Importance Evaluation (DIE) for the East-West Cross Drift Starter Tunnel	
2. Document Identifier (DI) Number (include revision number)	3. DIE Category (Check one)
BABEAF000-01717-2200-00010 Rev 01	☐ I ☑ II ☐ III

Signatures on this document represents signers' acknowledgement that the applicable procedure has been read, understood and complied with.

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23. Remarks

This Category II DIE evaluates the design and construction activities associated with the East-West Cross Drift (also termed ECRB) Starter Tunnel. This DIE concludes that the activities evaluated herein are sufficiently similar to activities previously evaluated in the DIE for the Subsurface Exploratory Studies Facility (BAB000000-01717-2200-00005 Rev 06) that they are bounded by the conclusions of that evaluation. Therefore, the DIE for the Subsurface ESF ~~shall~~ should be used as input to the applicable implementing documents for the activities evaluated herein.

Rev 01 of this DIE incorporates changes to the original East-West Drift Starter Tunnel design and construction activities. This DIE will be distributed as a controlled document in accordance with procedure QAP-6-1, "Document Control."

DFO 30/ 10/ WM-11 JAK 9/30/97

DIE Title
Determination of Importance (DIE) Evaluation for the East-West Cross Drift Starter Tunnel

DI Number (include revision number)
BABEAF000-01717-2200-00010 Rev 01

Rev No.	Date	Description of Revision
00	06/23/97	Initial revision
01	10/01/97	Incorporated modifications to reflect the current East-West Drift Starter Tunnel design;
		Updated references and made editorial changes throughout.

Introduction/Purpose

The purpose of this Determination of Importance Evaluation (DIE) is to determine whether activities associated with the design and construction of the East-West Cross Drift Starter Tunnel could potentially affect either Q-List items (including the natural barriers) or site characterization testing. The East-West Cross Drift is synonymous with the Enhanced Characterization of the Repository Block (ECRB) Drift. This analysis evaluates only the Starter Tunnel portion of the East-West Cross Drift; subsequent design, construction and testing activities for the East-West Cross Drift will be evaluated in future DIEs.

This DIE was prepared in accordance with procedure NLP-2-0, "Determination of Importance Evaluations," Revision 3, dated (effective date) June 2, 1997.

This evaluation is prepared as a Category II DIE in accordance with NLP-2-0. This DIE is quality-affecting because it determines the applicability of the Quality Assurance (QA) program to the evaluated activities relative to impacts to Q-List items (including the natural barriers) and site characterization testing. It is a Category II DIE because it concludes that the evaluated activities are similar to and are bounded by the conclusions of the evaluation of activities in the DIE for the Subsurface ESF (Reference 1). Reference 1 is a Category III DIE.

Description of Activities

Construction activities at the Starter Tunnel will focus on excavation of the tunnel, assembly of the Tunnel Boring Machine (TBM), and preparation for TBM startup.

The Starter Tunnel will originate at approximately Station 19+92m of the North Ramp of the Subsurface Exploratory Studies Facility (ESF), based on current best available information. The Starter Tunnel will be excavated into the left rib at approximately a 45 degree angle from the North Ramp and have a length of approximately 26m (Reference 2).

Concrete may be poured over approximately the left half of the rail and invert segments in the North Ramp and throughout the full length of the Starter Tunnel. The concrete pad is planned to have a 0% slope in the North Ramp and a positive 0.5% slope from the departure point in the North Ramp to the end of the excavated Starter Tunnel (Reference 2). The flat section of concrete in the North Ramp is intended to facilitate assembly of the TBM in the subsurface. The positive slope of the concrete invert in the Starter Tunnel is expected to match the slope of the excavated invert and is intended to allow for the drainage of water.

The excavation of the Starter Tunnel will be accomplished either by controlled drill-and-blast or with a mechanical excavator. Diesel-fueled equipment will be used to remove the muck from the excavated areas. Ground support in the Starter Tunnel is expected to be consistent with that which was evaluated for and used in the ESF alcoves, or specifically in the ESF Main Drift transition zone (see Reference 3).

Equipment planned to be installed/used in the Starter Tunnel may include the TBM and trailing gear, locomotives, conveyor belt, conveyor booster drive, takeup units, electrical switchgear, and rail switching equipment.

Note that all of the dimensions and locations cited above are approximate and are subject to changes both as the design is finalized and during construction. Such changes, however, should not impact the conclusions of this evaluation.

Evaluation

Tunnel excavation by either controlled drill-and-blast or employment of a mechanical excavator was previously evaluated in Reference 1 (analysis performed in Reference 7). The Starter Tunnel had not been sited when Reference 1 was prepared; therefore, its design/construction was not specifically included in the scope of that evaluation. However, except for location-specific test interference considerations evaluated in this DIE, the design and construction activities associated with the Starter Tunnel are sufficiently similar to those which were previously evaluated in Reference 1 that they can be considered bounded by that evaluation.

Controls and constraints associated with ground support in the Starter Tunnel are expected to be similar to those specified in drawing BABEE0000-01717-2100-40164 for the Topopah Springs Main Drift (Reference 3). These controls, which have been used in various ESF alcoves, allow the use of Swellex rockbolts and do not preclude wet-drilling of rockbolt holes. The controls in Reference 1 related to ground support are judged sufficient to minimize potential impacts on site characterization testing or potential repository performance.

A temporary, concrete pad may be poured in the Starter Tunnel. As a result, an unquantifiable amount of water used in the concrete mixture may be volatilized and released. Since the concrete is planned to be temporary, all materials used in the concrete mixture are expected to be removed prior to potential repository operation, and thus should not impact performance. The controls in Reference 1 related to water ponding and spillage (Requirement 7.a), water loss limits (Requirement 7.e), and water reporting (Requirements 7.b and 7.c) are judged sufficient to minimize potential impacts such that additional QA requirements in this regard are not necessary.

A positive slope on the temporary concrete pad (provided by the Constructor) is expected to provide sufficient drainage to satisfy the ponding requirement (Requirement 7.a) of Reference 1. Other means (e.g., sumps and/or pumps) may be used by the Constructor, in conjunction with the sloped grade, to satisfy the ponding requirement.

The physical distance between the Starter Tunnel and nearby Surface Based Testing (SBT) boreholes presents a minimal potential for test interference concerns. The nearest borehole, UE-25 a#4, is approximately 500 feet deep (Reference 4) and is located approximately 200m from the estimated path of the Starter Tunnel (Reference 5). Other boreholes within 400m are listed below along with their approximate distance from the Starter Tunnel (Reference 5):

- UE-25 NRG#5 - 275m
- USW UZ-N37 - 350m
- USW UZ-N38 - 400m

UE-25 NRG#5 is the deepest borehole at approximately 1350 feet deep, whereas USW UZ-N37 and USW UZ-N38 are both shallow boreholes of approximately 271 feet and 94 feet deep, respectively (Reference 4). Testing activities have been completed at all of the above referenced boreholes except for UE-25 NRG#5, which is instrumented with a USGS "Seamist" monitoring system (Reference 4). Based upon the scope of the activities covered in this analysis and the distance between the Starter Tunnel and the nearest SBT boreholes, the potential impact on site characterization testing is judged to be negligible.

The distance of the Starter Tunnel from testing alcoves in the subsurface ESF is considered sufficient to conclude that the excavation activities at the Starter Tunnel will present negligible potential for impacting site characterization testing in those alcoves. The nearest planned alcove is the Drill Hole Wash Fault Alcove, located approximately 200 meters away at Station 22+00m (note that excavation of the Drill Hole Wash Fault Alcove has been deferred indefinitely). The Thermal Testing Facility (TTF) is the next closest alcove, located at approximately Station 28+27m (Reference 6). The potential for test interference with the TTF is judged to be minimal since the distance between the Starter Tunnel and the nearest point of the TTF is approximately 400m (Reference 5). Note: In accordance with Reference 1, it is the responsibility of the TCO to site subsurface test area locations so as to minimize the potential for impacting testing at other locations.

Subsequent DIEs will evaluate the potential impact on waste isolation and site characterization testing as a result of excavating the main East-West Drift.

Conclusion

Based on the similarity of the activities evaluated herein to activities that have been previously evaluated in Reference 1, it is concluded that the activities evaluated herein are bounded by the conclusions of the DIE for the Subsurface ESF (Reference 1). Hence, in order to minimize the impact on waste isolation and test interference, construction activities associated with the East-West Cross Drift Starter Tunnel shall be subject to the following QA controls from Section 13.2 of Reference 1:

Requirement	Summary Description
1	QA records
3	Traced water
4	Controlled drilling-and-blasting
5	QA records for drill and blast work
6	Cement grouting restriction
7	Water use minimization to the extent practical
8	Organic material minimization to the extent practical
9	Use of diesel equipment underground
10	TFM records
11	Large fluid storage systems prohibition underground
12	Coordination of shotcrete application with the TCO
13	TCO notification for perched water
14	Chloride use limitation
15	Minimization of potential equipment leaks
16	Evaluation of chemical grout injection
17	Construction locations and timing subject to TCO approval

References

1. *Determination of Importance Evaluation for the Subsurface Exploratory Studies Facility*, BAB000000-01717-2200-00005 Rev 06, dated February 7, 1997.

2. QAP-3-12 Design Input Transmittal, *ECRB Starter Tunnel and Cross Drift Plan and Sections, Figure 1*, McDonald to Kimura, September 26, 1997.

3. *Exploratory Studies Facility Alcoves Rockbolts & Shotcrete Plan, Section & Elevation*, Drawing No. BABEE0000-01717-2100-40164 Rev 00, dated (effective date) January 12, 1996.

4. Lotus Notes Documentation, M. Esp to J. Kappes, dated June 17, 1997, Subject: "Borehole Info for Launch Chamber DIE."
(This document is included in the records package for Revision 00 of this DIE.)

5. YMP-97-058.0, *Yucca Mountain Site Characterization Project Proposed Repository Site Investigation Area Map*, compiled March 21, 1997.

6. *Exploratory Studies Facility TS Main Drift Thermal Testing Facility Alcove Plan Sheet 1 of 3*, Drawing No. BABEAF000-01717-2100-40230 Rev 01 (including ECR E97-0015), dated (effective date) October 28, 1996.

7. *Waste Isolation Evaluation: Tracers, Fluids, and Materials and Excavation Methods for Use in the Package 2C Exploratory Studies Facility Construction*, BABE00000-01717-2200-00007 Rev 04, January 26, 1995.