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SITE SELECTION REPORT
BASALT WASTE ISOLATION PROGRAM
NEAR-SURFACE TEST FACILITY

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SITE SELECTION REPORT
BASALT WASTE ISOLATION PROGRAM
NEAR-SURFACE TEST FACILITY

Approved By: Site Selection Committee

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H. B. Dietz, Chairman

8/18/78
Date

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A. D. Krug

12/4/78
Date

C. W. Myers
C. W. Myers

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TABLE OF CONTENTS

	<u>Page</u>
1.0 INTRODUCTION	3
2.0 SUMMARY	3
3.0 SELECTION PROCESS	3
4.0 SITE SELECTION COMMITTEE	4
5.0 SELECTION CRITERIA	4
5.1 PRIMARY CRITERIA	4
5.2 SECONDARY CRITERIA	5
6.0 REGIONAL ALTERNATIVES	5
7.0 SELECTED AREA	7
8.0 SELECTED SITE	11

LIST OF FIGURES

Figure

1	POTENTIAL SITE LOCATIONS	6
2	SELECTED AREA	8
3	GABLE MOUNTAIN CROSS SECTIONS	9
4	GABLE MOUNTAIN CROSS SECTIONS	10

1.0 INTRODUCTION

This report documents the selection process, criteria, regional alternatives and the selected site for the Near-Surface Test Facility (Phase I and II).

2.0 SUMMARY

A site selection committee was established to review the information gathered on potential sites and to select a site for the Near-Surface Test Facility Phase I. A decision was made to use a site on the north face of Gable Mountain located on the Hanford Site. This site provided convenient access to the Pomona Basalt Flow. This flow was selected for use at this site because it exhibited the characteristics established in the primary criteria. These criteria were: the flows thickness; its dryness; its nearness to the surface; and, its similarities to basalt units which are candidates for the repository. After the selection of the Near-Surface Test Facility Phase I Site, the need arose for an additional facility to demonstrate safe handling, storage techniques, and the physical effects of radioactive materials on an in situ basalt formation. The committee reviewed the sites selected for Phase I and chose the same site for locating Phase II of the Near-Surface Test Facility.

3.0 SELECTION PROCESS

On September 27, 1977, a formal selection process was established for the Near-Surface Test Facility Phase I site to ensure proper input for and review of the actual selection. Upon defining the functions of the site, an analysis of the criteria which satisfied the site was made and a review of existing geologic and technical data was initiated. Preliminary sites which satisfied the selection criteria were picked. The sites were reviewed by a selection committee and a Phase I site was selected on November 3, 1977. Phase II site selection was initiated during the design of the Phase I facility. A review was made of the

sites selected for the Near-Surface Test Facility Phase I. The review indicated that within the scope of the Phase II Storage Test the site selected for Phase I also satisfied the siting criteria developed for the Phase II Test Facility.

4.0 SITE SELECTION COMMITTEE

H. B. Dietz	- Manager, Engineering Group (Chairman)
A. D. Krug	- Senior Mining Engineer
C. W. Myers	- Staff Geologist
B. H. Richard	- Manager, Geotechnical

This committee was supported by:

M. P. Board	- Mining Engineer
H. A. Hardy	- Quality Assurance Engineer
R. K. Ledgerwood	- Geologist I
D. R. St. Laurent	- Senior Mining Engineer

5.0 SELECTION CRITERIA

The Near-Surface Test Facility is divided into two primary phases. Phase I is for evaluating the thermal and mechanical response of basalt. Phase II will demonstrate safe handling, storage techniques, and the physical effects of radioactive material on in situ basalt. In order to be suitable, a site for Phase I and II must meet the following primary and secondary criteria.

5.1 PRIMARY CRITERIA

1. It must be in a basalt flow which is similar in chemical and physical properties to those basalt flows found at depth being considered as repository candidates.
2. The basalt flow must be at least 100 feet thick so that the experimental tests are not influenced by interbeds, weathered zones, etc.

3. The flow should be under approximately 100 feet of cover so as not to be influenced by weathering effects on basalt.
4. The basalt flow must be strong enough so that suitable openings may be safely maintained.
5. The basalt should be dry.
6. The specific location within the basalt flow must be typical of the central portion (entablature) of the flow as a whole and not significantly influenced by folding, faulting, alterations or anomalies in jointing patterns and other intraflow structural features.
7. The site must be secure from public intrusion and vandalism.
8. The location is to have sufficient lateral extent to develop a storage site and have a 100 foot buffer zone of undisturbed rock on all sides.
9. The site is to be located in a low seismic activity area so as not to pose a threat to safe operation of the test facility.

5.2 SECONDARY CRITERIA

1. Cost of development should be low.
2. Time required for development should be short.
3. The site should be readily accessible for equipment, personnel, etc.
4. The use of the site should not conflict with other intended uses.
5. The site should be environmentally acceptable.
6. The site should be adaptable to allow for the inclusion of additional functions such as remote handling tests, personnel training, etc.

6.0 REGIONAL ALTERNATIVES

Three main areas surrounding and within the Hanford Site were considered as potential locations (Figure 1). These were:

1. Rattlesnake Hills;
2. Saddle Mountains;
3. Umtanum Ridge-Gable Butte-Gable Mountain Area.

A preliminary review of these three areas indicated that several potential sites could be found within the Hanford Site, so an extensive investigation was not made of Rattlesnake Hills and Saddle Mountains. A

FIGURE 1
POTENTIAL SITE LOCATIONS

reconnaissance examination was made of about 15 square miles of the Umtanum Ridge-Gable Butte-Gable Mountain area on the Hanford Site and specific portions of the area were considered for potential sites.

Along Umtanum Ridge within the Hanford Site, the outcrops examined indicated uniform jointing and no anomalous structures in the Pomona Basalt. Placement of a near-horizontal tunnel into the Pomona Basalt may not provide sufficient rock overburden for safe construction and operation of the planned facility.

Two sites on Gable Butte were examined. Both sites evaluated consist of high cliffs of Pomona Basalt dipping at nine degrees northward. No detailed outcrop examinations were made at these locations, but nothing was observed that would violate the primary criteria. As with Umtanum Ridge, Gable Butte exhibits insufficient rock overburden.

Geology of the Gable Mountain portion best satisfies the primary criteria established. More is known geologically about this area because of direct observations of the high cliff exposures on Gable Mountain. Rock overburden will be greater on Gable Mountain than on Umtanum Ridge and Gable Butte portions.

From the field reconnaissance examinations, the committee judged Gable Mountain as the most suitable area and recommended specific sites should be selected and studied.

7.0 SELECTED AREA

Four sites on Gable Mountain were identified for final evaluation (Figure 2). All of the Gable Mountain sites have been determined as environmentally acceptable. See Figures 3 and 4 for the cross sections of the four Gable Mountain sites.

Site 1, located on the southwest portion of Gable Mountain, was selected primarily because of an extensive outcrop of the Pomona "entablature." This exposure provided initial evidence that a suitable site might exist at this location, but indicated that "flow out" structures were in the immediate vicinity. These structures could either reduce the usable portion in the area of the flow or they could invalidate the site. Cost of development at this site would be high due

FIGURE 2
SELECTED AREA

FIGURE 3

FIGURE 4

to removal of a substantial amount of talus from the cliff face. The facility design at this location was relatively fixed. It would require two openings, one slightly offset and below the other. These openings would be inside the mountain some 100 feet to 300 feet.

Site 2 was located on the north face approximately half way up the mountain. It was selected primarily because the geology at this site was judged similar to Site 1, and the talus slope described in Site 1 would be avoided. Development cost would be considerably lower than Site 1 and time required for development would be minimal. The facility design was similar to Site 1, but it would require more tunnel excavation to develop the test facility.

The north base of Gable Mountain was selected as Site 3. This site could be developed almost immediately with a minimum of preparation. The geology is not well known, but a gravity survey indicates that the formations dip steeply just north of this point. Tunnel excavation would be less than in Site 2, but water may be encountered during mining operations.

Location of Site 4 was the west end of Gable Mountain. This site provides the best access for personnel and utilities in comparison to the first three sites. Site geology indicates a thinning of the entablature of the Pomona at this end of the mountain. This location may not allow for the construction of additional facilities.

8.0 SELECTED SITE

The Selection Committee chose Site 2 on Gable Mountain as the most suitable site for the location of the Near-Surface Test Facility. It met all of the primary and secondary criteria and the committee felt this surpassed the other sites on Gable Mountain for the following reasons:

- o Cost and the time required for development are minimal;
- o Basalt thickness is sufficient enough not to be influenced by interbeds, weathered zones, etc.;
- o It is easily adaptable for the inclusion of additional functions.