Department of Energy
Nevada Operations Office
P. O. Box 14100
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Ellison S. Burton, Acting Dir., Siting Division, Office of Geologic Repository Deployment, HQ (RW-25) GTN

EXAMPLE APPLICATION OF TECHNICAL GUIDELINE WRITE-UP FOR CHAPTER 4 OF NNWSI EA

Per your request for information on preparing EA's made during the October 28, 1983 meeting at DOE/HQ, we are providing an example of a complete write-up for one technical guideline (i.e. paragraph 4.3.1.8 Human Interference and Natural/Resources). This example and its associated written guidance was prepared by the NNWSI EA Steering Committee and has been provided to all contributors in the NNWSI Project as an example for them to follow in preparing their assigned subsection in Chapter 4 of the NNWSI EA.

If you have any comments or suggested changes in our approach, please let us know at the earliest possible time. Any significant changes to this approach cannot be incorporated until after the December 15, 1983, when the unreviewed draft of Chapters 2 and 4 are provided to your office.

Donald L. Vieth, Director
Waste Management Project Office

WMPO:MBB-228

Enclosure:
One letter to TPO November 18, 1983
about guidance for Chapter 4 of NNWSI EA

cc w/encl:
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WM Record File 102.5
WM Project 11
Docket No.
PDR ✓
LPDR ✓
Distribution:
SCaplan
(Return to WM, 623-SS)

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PDR WASTE
WM-11 PDR

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NOV 18 1983

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GUIDANCE FOR PREPARATION OF TECHNICAL GUIDELINE DISCUSSIONS IN CHAPTER 4 OF THE NNWSI ENVIRONMENTAL ASSESSMENT (EA)

Please distribute this guidance to all persons on your staff responsible for preparing inputs to Chapter 4 of the NNWSI EA. Enclosure 1 is a strawman data and analysis write up for a single technical guideline, in this case, Human Interference. It is provided to you to serve as an example of what we want to see written in Chapter 4 of the EA. The basic guidance which was followed in the preparation of this example is shown in Enclosure 2. This guidance came from HQ and is simply a slight modification of the outline originally proposed by NNWSI to HQ on October 6, 1983.

Due to the severe time constraints associated with the imposed December 15, 1983 deadline for submittal of draft Chapters 2 and 4 to DOE/HQ, it is imperative that all portions of Chapter 4 be submitted so that they can be stapled together and forwarded to HQ. This example was prepared by the NNWSI EA Steering Committee in order to avoid rewriting any part of Chapter 4 for this December 15 deadline, rewriting and editing will occur later. All project inputs to Chapter 4 are expected to follow this example. If questions develop while trying to use this approach, please discuss the difficulties with your EA Steering Committee representative.

The contributing authors are asked to review their input to Chapter 4 of the EA and carefully consider how the material they are preparing can be combined with the other material to complete the subsection they are assigned. Position statements and rationales for the favorable or potentially adverse conditions should be written as shown in the example. If references exist, or are presently being prepared, succinct summaries of data supporting the position being developed by the author should be prepared and should cite references from which the information came. Do not simply attach a published reference or draft manuscript, but rather paraphrase the key information you think best supports the position. Both the EA Steering Committee and Sandia's performance assessment group must have this information by December 1. Sandia has responsibility for the majority of the qualifying condition positions, and will be unable to proceed without this information.

The draft input should be forwarded to the EA Steering Committee representative in your organization who is responsible for collating the material and distributing it to WMPO and Sandia by the deadline, December 1, 1983. These Committee Representatives are: Craig Bentley for Hydrology; Brad Meyers for Geology-Tectonics; Gerry DePoorter for Geochemistry; Keith Johnstone and Leo Scully for Rock Characteristics; and Mike Foley for Socioeconomic, Environmental, and Transportation.

Donald L. Vieth, Director
Waste Management Project Office

WMPO:MBB-562

Encls:
1. NNWSI EA Steering Committee Guidance
2. HQ Guidance

cc w/encls:
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NNWSI Project File

11/15/83
Version II
J. L. Younker

I. Organization of Human Interference Guideline (960.4-2-8)

The Technical Guideline for Human Interference addresses the general questions in 960.4-2-8.1 (Natural Resources) of the likelihood that exploration activities by future generations could interfere with the ability of the site to meet the NRC performance objectives for containment and isolation of nuclear wastes. A second part of this Guideline (960.4-2-8.2 - Site Ownership and Control) insures that the legal basis is adequate for DOE to obtain ownership and control of land, and all surface and subsurface mineral rights for the site to prevent future surface and subsurface activities from leading to radionuclide releases in excess of those specified by the NRC performance objectives and EPA technical criteria.

The Natural Resource Guideline contains one favorable condition and five potentially adverse conditions. The Site Control and Ownership Guideline contains one favorable and one potentially adverse condition. The NNWSI position for each of these conditions, together with the supporting rationale and data evaluation are contained in this document.

II. Statement of Qualifying Conditions

960.4-2-8.1 Natural Resources

The site shall be located such that--considering permanent markers and records and reasonable projections of value, scarcity, and technology--the natural resources, including ground water suitable for crop irrigation or human consumption without treatment, present at or near the site will not be likely to give rise to interference activities that would lead to radionuclide releases greater than those allowable under the requirements specified in Section 960.4-1.

960.4-2-8-2 Site Ownership and Control

The site shall be located on land for which the DOE can obtain, in accordance with the requirements of 10 CFR Part 60, ownership, all surface and subsurface rights, and control of access that are required such that potential surface and subsurface activities at the site will not be likely to lead to radionuclide releases greater than those allowable under the requirements specified in Section 960.4-1.

III. Evaluation of Human Interference Guideline: Relevant Data

Natural Resources: Energy and Mineral. Yucca Mountain has been extensively studied by geologic mapping and archaeological surveys (Pippin et al. 1982) covering the entire surface of the site, and by drilling approximately 20 exploratory drill holes at or near the site. In addition, an exhaustive literature search (Bell and Larson, 1982) was completed to develop a Level 1 Resource Appraisal in accordance with U.S. Department of Interior

guidelines for characterization of energy and mineral resources. A further study by Quade and Tingley (1983) updates and extends the data on mineral occurrences and mining activity for the Nevada Test Site and portions of Nellis Bombing and Gunnery Range. Evaluation of the only potential energy resource in the area is supported by work by Garside and Schilling (1979) and Trexler et al. (1979), who have studied hot spring occurrences northwest and south of the Yucca Mountain site.

Natural Resources: Groundwater Potential in Site Area. For the purposes of evaluating the potential for groundwater resources at or near the site, a Groundwater Resource Potential Map (Sinnock and Fernandez, 1982), prepared during NNWSI Area-to-Location Screening Activities provides a starting point. A regional groundwater flow model in and near the candidate site has been developed by Waddell (1982). This study provides the basis for understanding the distribution of hydrologic barriers, amount and location of recharge, and areas of groundwater discharge.

Site Ownership and Control. The data relevant to Site Ownership and Control for Yucca Mountain consist of the ownership documents for the three federal agencies which own the controlled area. Those include the DOE-owned Nevada Test Site which makes up the eastern portion of the parcel; the U.S. Air Force controls the northwestern portion through withdrawal for the Nellis Bombing Range; and, the Bureau of Land Management holds the southwestern portion in public trust. Permanent withdrawal and reservation of jurisdiction and control over surface and subsurface estates requires an act of Congress (Coldiron, Wm. H., Solicitor's Opinion No. M-36914). Bell and Larson (1982) have determined that these lands are currently free and clear of encumbrances arising under lease, right of entry, deed, patent, mortgage, appropriation, prescription, or otherwise. A plan has been developed (Richards and Vieth, 1983) which outlines the land use and withdrawal actions necessary for the purpose of site characterization, construction of the Exploratory Shaft, and for developing a high-level nuclear waste repository should Yucca Mountain be selected for one or both projects. This plan contains the actions necessary for land acquisition to meet the requirements of 10CFR60.121.

Assumptions and Data Uncertainty. Bell and Larson (1982) indicate that the existing information base is inadequate to make final projections of reserves, resources or levels of resource potential. Existing and past mining operations have been small, and small mining operations generally do not invest the capital necessary to accurately delineate reserves. In addition, information on delineated reserves is almost always considered proprietary and not released to the public. Quade and Tingley (1983) updated and extended the mineral occurrences and mining activities information and suggested that certain areas may required additional investigations to verify that no resource potential exists. Within NTS and the Nellis Air Force Range, much of the area has been withdrawn and access has been restricted for more than 30 years, thereby excluding even small-scale operations from this area. There is an undefined potential for low- to moderate-temperature direct or alternate use geothermal energy. At present, no evidence is available to suggest high temperature steam resources exist in the area that are suitable for generation of electric power.

Uncertainties about the hydrologic characteristics have produced ambiguities in the regional hydrologic model for the area described by Waddell (1982). The model is based on estimates of amount and location of principal recharge areas, distribution of permeable and impermeable rock units and locations of discharge from the regional aquifer system. Uncertainties in: (a) continuity of permeable and impermeable units; (b) tortuous flow paths (due to extensive faulting) limit our ability to readily extrapolate from one borehole to another. In addition, thick unsaturated zones in arid climatic settings are uncommon and the dynamics of recharge and flow mechanisms are poorly known. However, the approach used by Waddell provides the basis for sensitivity studies which can be used to determine the effects on flow patterns of major errors in estimates of critical input parameters such as recharge and barrier locations, or to estimate the effects of future groundwater withdrawal on flow patterns (Waddell, in preparation).

Uncertainties in the site ownership and control issues are related to the factors influencing negotiations between the Air Force and the Bureau of Land Management over land withdrawal. A further uncertainty to be considered is the difficulty in predicting future human activities with a high degree of certainty. Economic changes, changes in land-use patterns, and unanticipated technological developments can alter the potential for human interference activities. Short-term predictions are generally sound; however, long-term changes in social systems are difficult to predict with high confidence.

Analyses to Support Following Discussions. The analyses to support the following favorable and potentially adverse conditions and qualifying conditions are principally qualitative. Calculations by Waddell (1983, in preparation) will be used to estimate the effects of groundwater withdrawal on regional flow patterns. System performance assesement in support of the qualifying condition for this Guideline will be (may be) completed at a later date. Note: This section will differ among the Guidelines depending upon the requirements for analyses and/or system performance assessment.

IV-A. FAVORABLE CONDITION: Natural Resources 960.4-2-8.1. No known natural resources that have or are projected to have in the foreseeable future a value great enough to be considered a commercially extractable resource.

1) Position: There are no known natural resources that have or are projected to have in the foreseeable future a value great enough to be considered a commercially extractable resource. Therefore, the Yucca Mountain site possesses this favorable condition.

Rationale: Present knowledge of the status of energy related resources at or near the site suggests that: 1) there are higher grade geothermal resources nearby; 2) there is no potential for hydrocarbon resources; and 3) there is no indication of uranium resources. The energy resources appraised by Bell and Larson (1982) include: hydrocarbons such as oil, gas, oil-shale, and coal; low to high-temperature geothermal energy; and, radioactive fuel materials such as uranium and thorium. The specific mineral resources appraised include base and precious metals (e.g., lead), and associated mineral resources (e.g., mercury), and significant industrial minerals and rock materials (e.g., gravel).

The geology of volcanic areas is generally unsuited for the formation of commercial quantities of oil, natural gas, or other hydrocarbons (Bell and Larson, 1982). Minor amounts of uranium have been reported at Bare Mountain west of the Silent Canyon Caldera and north of the Site Vicinity in rocks similar to those in the Site Vicinity. They are not attractive uranium development targets. No mines or prospects for uranium or thorium minerals currently exist in the Site Vicinity.

Occurrences of precious and base metals east of the Site Vicinity in the Mine Mountain and Wahmonie Districts are illustrated in Table __. Information on the economic and geologic history of mining in these districts is limited because much of the land was withdrawn from the public domain as part of the Nevada Test Site more than 30 years ago. In the Mine Mountain district, available information suggests that several exploration tunnels and shafts were excavated in 1928. The Wahmonie District apparently produced an unrecorded amount of gold and silver sometime between 1905 and 1910, and again in 1928. From Bare Mountain southward to the Lee District, there appears to be some potential for development of limited quantities of gold, silver, tungsten, lead, and mercury. In the northern portion of the Bare Mountain District, claims have been staked over a large number of veins presumed to be metal bearing; these are in tuffs erupted from the Timber Mountain Caldera. However, the limited past and present production of gold, silver, mercury, and other associated minerals from the Bare Mountains suggests that future production, if any, will most likely be insignificant in size compared to national and regional production totals.

The possible spatial and temporal association of major base and precious metal mineralization with Tertiary volcanic caldera systems was tested by McKee (1979) to evaluate the potential for large undiscovered metal deposits in such settings. McKee found that tuffs and associated calderas generally are barren of economically important mineralization. Of 31 recognized calderas in Nevada, only two have ore deposits that have produced $1 million or more of base and precious metals. Of the 90 major metal mining districts in Nevada, only five are in silicic tuff, including caldera settings. The strong negative correlation of economically important base and precious metal production with silicic tuffs and associated caldera structures indicates that the discovery of large deposits of these metals in the Site Vicinity is unlikely.

In the Candidate Area a large variety of industrial minerals and rocks are present including clays, ceramic silica, zeolites, alunite, fluorite, sand, gravel, and lightweight construction aggregate (volcanic cinders, perlite an pumice). While these resources are substantial, they are not critical to meeting regional or national demands. Zeolite occurrences, generally associated with zeolitized tuffs, are known within the Site Vicinity. There is no evidence to suggest that these occurrences are unique or of a quality and extent to make them commercially valuable. Fluorite is widespread throughout the Bare Mountain District. Total production is estimated at less than 90,000 tons during the period from 1974 to 1976 (Bell and Larson, 1982). The overall commercial significance of these deposits in terms of fulfilling national or even regional demands is probably minimal given the abundance of high-grade, large-tonnage fluorite deposits in other areas of the country.

From the standpoint of the commercial value of groundwater, irrigation is not of concern in this portion of the United States owing primarily to the poor characteristics of the alluvium making it undesirable for agricultural use. The alluvium is coarse grained and drains rapidly except in the playa areas where concentration of salts makes it unlikely that crops could be grown. Underground pumped storage schemes require low permeability rock masses below shallow water tables to be economical. The depth to the water table at the site would make such a scheme uneconomical.

V-A POTENTIALLY ADVERSE CONDITIONS: Natural Resources

1) Indications that the site contains naturally occurring materials, whether or not actually identified in such form that (i) economic extractions is potentially feasible during the foreseeable future or (ii) such materials have a greater gross value, net value, or commercial potential than the average for other areas of similar size that are representative of, and located in, the geologic setting.

Position: There are no indications that the site contains naturally occurring materials, whether or not actually identified in such form that (i) economic extraction is potentially feasible during the foreseeable future or (ii) such materials have a greater gross value, net value or commercial potential than the average for other areas of similar size that are representative of, and located in, the geologic setting. Therefore, the Yucca Mountain site does not possess this potentially adverse condition.

Rationale: The resource potential survey of the region (Bell and Larson, 1982) which has been thoroughly reviewed in the discussion supporting the favorable condition for this Guideline, did not identify any energy, metallic or non metallic resources that were unique to the site vicinity or critical to foreseeable national needs. Those resources which were identified in the vicinity of the site were found to be of lower value than the surrounding region. In addition, the recently completed mineral inventory (Quade and Tingley, 1983) provides a complete field survey of mining districts to supplement information available in the literature.

Because the most abundant rock type in the Site Vicinity is ash-flow tuff, possible spatial and temporal association of major base and precious metal mineralization with Tertiary volcanic caldera systems was investigated by McKee (1979) to evaluate the potential for large undiscovered metal deposits in such settings. McKee found that tuffs and associated calderas generally are barren of economically important mineralization. Of the 90 major metal mining districts in Nevada, only five are in tuff. The largest production of gold and silver in Nevada is from Tertiary dacitic to andesitic igneous rocks that show the effects of pervasive postemplacement hydrothermal alteration. The strong negative correlation of economically important base and precious metal production with tuffs and associated caldera structures indicates that the discovery of large deposits of these metals in the Site Vicinity is unlikely.

A large variety of industrial minerals and rocks are present (e.g., clays). While these resources are substantial, they are not critical to meeting regional or national demands. Although substantial sand and gravel

resources exist in the Site Vicinity, nothing about them is unique or critical to meeting regional or local demands because similar deposits exist in all alluvial basins in the Candidate Area.

2) Evidence of significant subsurface mining or extraction for resources within the site if it could affect waste containment of isolation.

Position. There is no evidence of significant subsurface mining or extraction for resources within the site that could affect waste containment or isolation. Therefore, the Yucca Mountain site does not possess this potentially adverse condition.

Rationale: The resource potential survey of the region did not identify any evidence of significant mining related operations at the Yucca Mountain site. The entire area has been mapped by the U.S. Geological Survey and no significant subsurface mining activity has been reported. There is little likelinood that unknown excavations other than shallow prospect pits exist at the site. Known mining operations in the site vicinity are summarized in Table 1 and their status reported. A base map follows in Figure 1 to facilitate location of the metal deposits.

3) Evidence of drilling within the site for any purpose other than repository-site characterization to a depth sufficient to affect waste containment and isolation.

Position: There is no evidence of drilling within the site for any purpose other than repository site evaluation to a depth sufficient to affect waste containment and isolation. Therefore, the Yucca Mountain site does not possess this potentially adverse condition.

Rationale: Prior to commencement of waste storage-related activity two boreholes existed in the area of the site: water well J-13, located 7 km southeast of the site; and J-12 located approximately 15 km southwest of the site. The site is within an area of federally controlled lands, most of which were restricted in the early 1950's to prevent public access. The entire area has been mapped by the U.S. Geological Survey. Consequently there is little likelinood that unknown wells, boreholes or excavations other than shallow prospect pits exist at the site. The positions of J-12 and J-13 relative to Yucca Mountain can be seen on Figure 1, provided in the rationale for the second potentially adverse condition.

4) Evidence of a significant concentration of any naturally occurring material that is not widely available from other sources.

Position: There is no evidence of a significant concentration of any natural material that is not widely available from other sources. Therefore, the Yucca Mountain site does not possess this potentially adverse condition.

Rationale: The resource potential survey found no indication of material resources that were unique to the site or critical to national needs as reviewed in detail in the supporting information for the favorable condition for this Guideline. The lack of correlation of significant mineralization with volcanic rock types except for vein deposits indicates

TABLE 1

STATUS, NUMBER AND TYPE OF MINING OPERATIONS
FOR PRECIOUS AND BASE METALS
IN THE SITE VICINITY AND NEARBY AREAS
(Bell and Larson, 1981)

Location	Number and Status of Operations[b]	Type of Operations
Bare Mountain (gold, silver, mercury, tungsten, lead)	4 active 10 inactive 10 unknown status	Prospect Pits, Open Pits, Placer, Underground Tunnels and Shafts
Mine Mountain (silver, lead, mercury)	None active 3 inactive	Underground Tunnels and Shafts
Wahmonie (gold, silver, copper)	None active	Prospect Pits, Underground Shaft
Lee (gold, copper, tungsten)	None active 1 inactive	Prospect Pits, Shallow Diggings, Underground Shafts
Yucca Flat (Climax) (gold, silver, lead)	None active 1 inactive	Shallow Surface Diggings, Underground Shafts
Amargosa Desert (tungsten, iron)	None active 1 inactive	Prospect Pits

that limited mineral potential for these rocks is expected. Furthermore, the survey indicated that these resources which were identified in the site vicinity are also found elsewhere in the area and the alternate resources are of higher value or more easily extractable.

5) Potential for foreseeable human activities--such as groundwater withdrawal, extensive irrigation, subsurface injection of fluids, underground pumped storage, military activities, or the construction of large-scale surface-water impoundments--that could adversely change portions of the groundwater flow system important to waste isolation.

Position: There is no potential for foreseeable human activities -- such as groundwater withdrawal, extensive irrigation, subsurface injection of fluids, underground pumped storage military activities, or the construction of large scale surface water impoundments -- that could adversely change positions of the groundwater flow system important to waste isolation. Therefore, the Yucca Mountain site does not possess this potentially adverse condition.

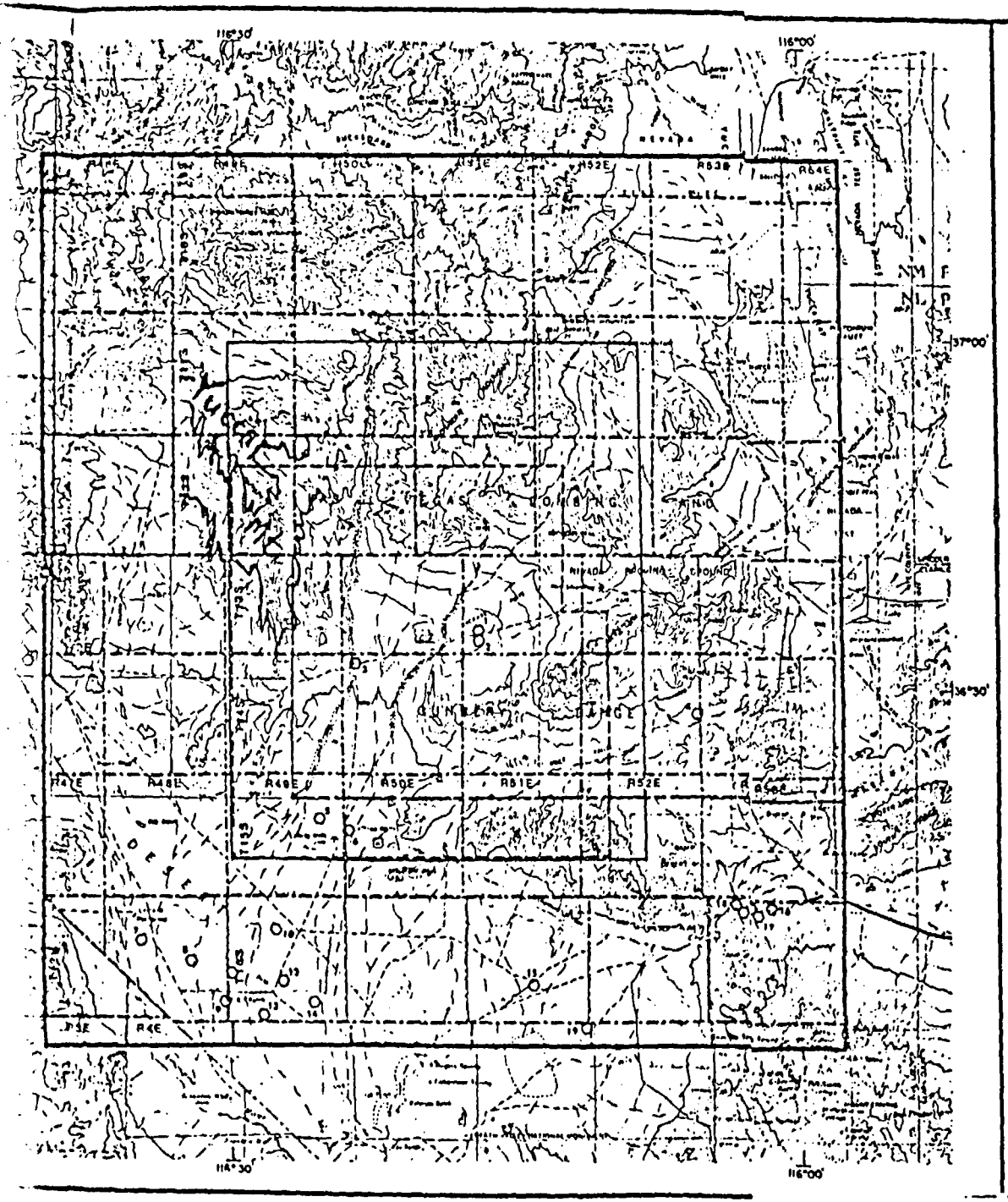


Figure 1. Base Map of Yucca Mountain

PLATE II

ENERGY RESOURCES

Elaine J. Bell and Lawrence T. Larson

August 1982

Symbol	Resource
⬡	**GEOTHERMAL** — Includes only springs and wells for which temperature and descriptive data are available.
⬡ U	**URANIUM** — Known occurrences; none in appraisal area.
⬡ 14	**REFERENCE NUMBER** — Refer to Data Table I.

BOUNDARY OF APPRAISAL AREA

BOUNDARY OF APPRAISAL CORE AREA
Area defined by nine 7.5-minute topographic quadrangles.

BOUNDARY OF NNWSI AREA

BOUNDARY OF NTS

Township-Range survey lines are from U. S. Bureau of Land Management Beatty and Pahute Mesa Surface Management Maps

5 0 5 10 miles
5 0 5 10 kilometers

Rationale: For the purposes of evaluating the potential for groundwater resources at or near the site, a Groundwater Resource Potential Map (Sinnock and Fernandez, 1982), prepared during NNWSI Area-to-Location Screening Activities provides a preliminary position favoring low groundwater production potential due to topographic drilling constraints (Figure 2). Waddell (1982) used a finite-element approach to establish acceptable agreement between simulated and measured values of groundwater flow. The model is based on the distribution of hydrologic barriers, amount and location of recharge, and areas of groundwater discharge. Using this model, the potential for adverse effects on the isolation capability of the site by modification of the groundwater flow system through foreseeable human activities such as groundwater withdrawal or fluid injection can be determined.

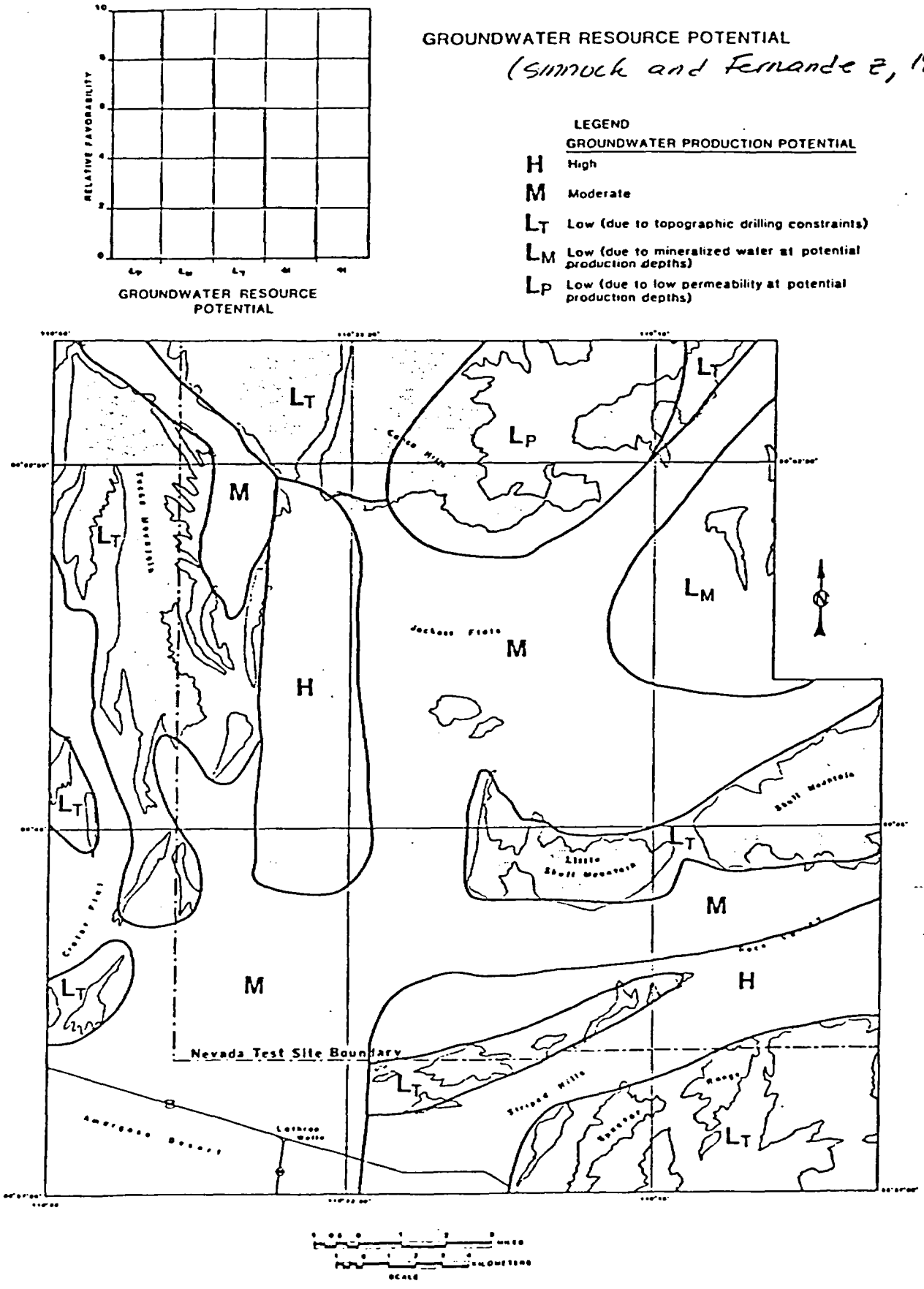
The Waddell (1982) study utilized known values of hydrologic potential within the study area and known conditions at the boundaries of the groundwater basin. The simulation technique involves parameter estimation and derives, by means of minimization of a weighted sum of squared residuals, values of parameters for the various zones throughout the modeled area. The resultant map of potentiometirc contours within the study area is illustrated in Figure 3.

(Note: The following paragraphs are, at this time, very qualitative; a modeling effort by R. Waddell is presently under way and will provide that data to quantify the discussion.)

The question of future exploitation of natural resources is concerned with the potential for human activities to modify portions of the groundwater flow system. The activities of concern include groundwater withdrawal, extensive irrigation, subsurface fluid injection, underground pumped storage, military activities or the construction of large-scale surface water impoundments. Irrigation is not of concern in this portion of the United States because the alluvium is very coarse grained and drains rapidly, except in the playa areas where concentration of salts makes it unlikely that crops could be grown. The rapid draining character of the alluvium coupled with the ephemeral nature of streams make the construction of large scale surface water impoundments unlikely. The depth to the water table at the site would make underground pumped storage schemes uneconomical. The potential for subsurface fluid injection to cause reactivation of movement along faults, coupled with the remoteness of the site, makes it unlikely that the site would be considered for subsurface injection of fluids.

The remaining activities of concern involve withdrawal of groundwater from the area to the extent that it could modify the groundwater flow system. The potential of groundwater withdrawal is constrained by topographic considerations at the site. Sinnock and Fernandez (1982) indicate that the most likely area for expected exploitation of groundwater resources is to the east of the site in Jackass Flats. Waddell (1984) (is going to) examine the potential effect that groundwater withdrawal in Jackass Flats could have on the regional flow system. The (fictional) results of his investigation are presented in Figure 4. For pumping rates of ___ liters/min. it can be seen that flow is still confined to the originally defined groundwater basin and that the natural discharge points of the basin are unchanged. Under steady

Figure 2. Groundwater resource potential at Yucca Mountain.



SAMPLE

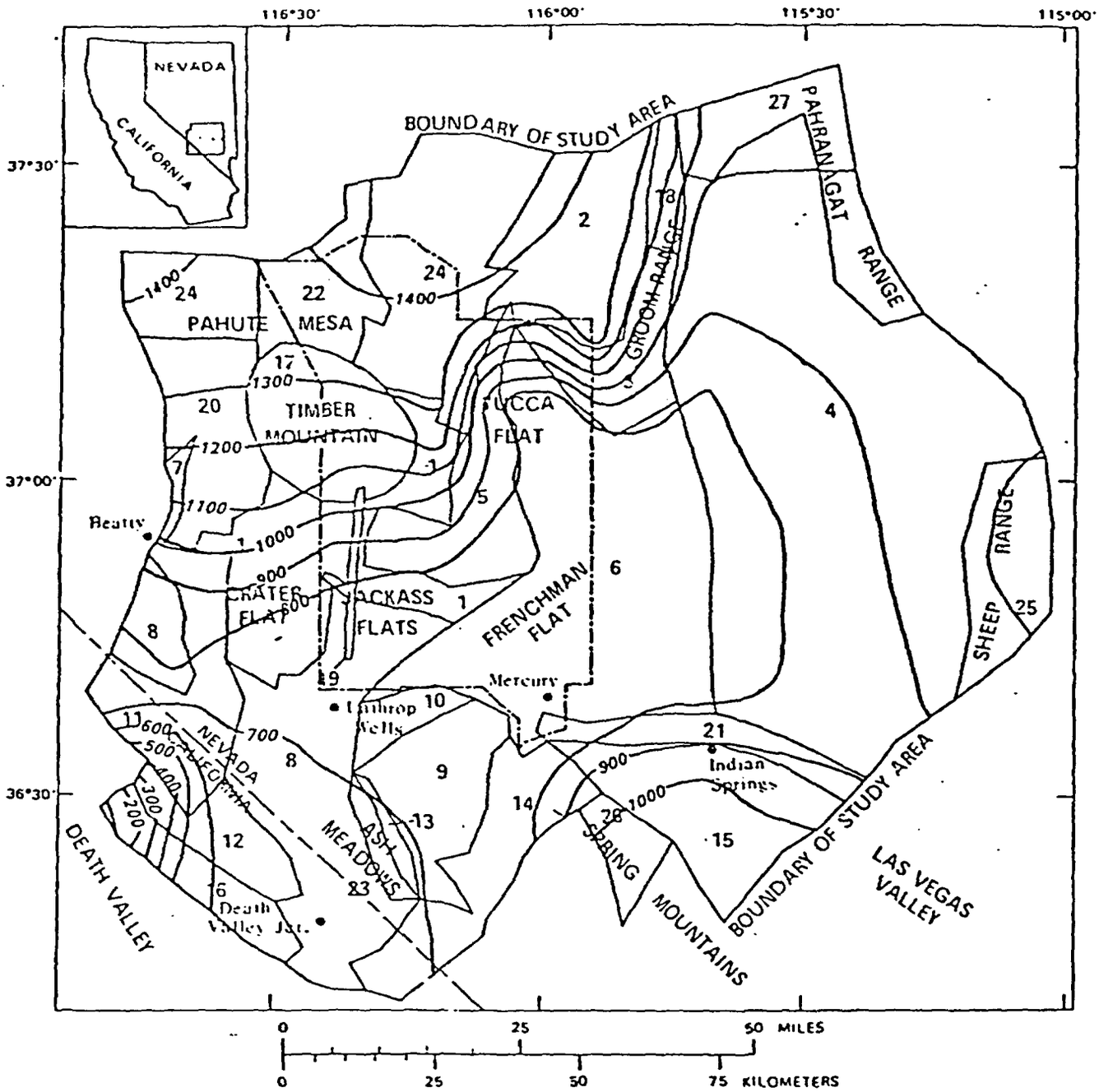
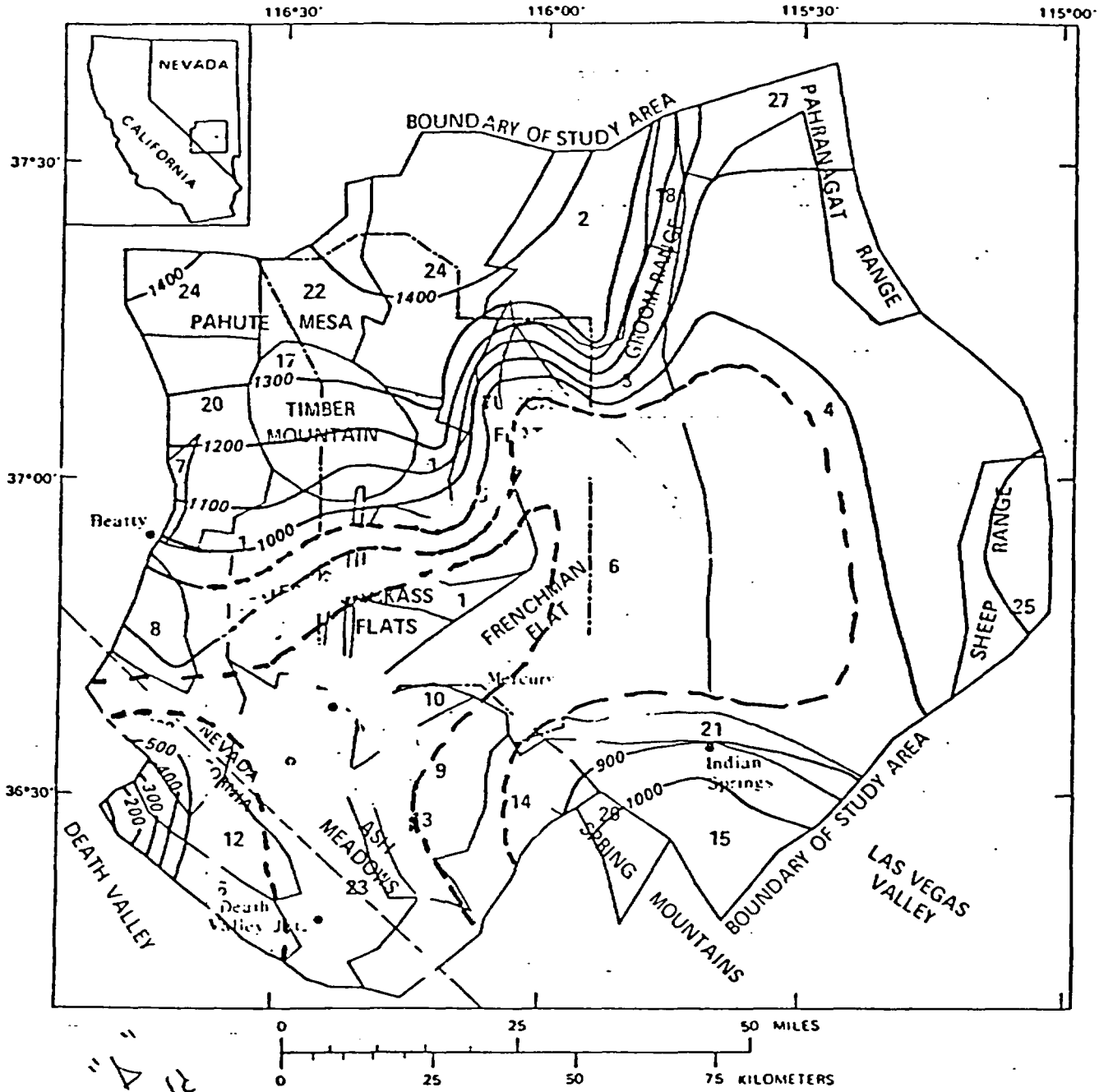


Figure 3. Nominal condition potentiometric map.

SAMPLE



EXPLANATION

—900— SIMULATED POTENTIOMETRIC CONTOUR--Shows altitude of simulated potentiometric surface. Contour interval 100 meters. Datum is sea level.

—26— ZONE NUMBER AND BOUNDARY

-·-·-·- BOUNDARY OF NEVADA TEST SITE

Note: Perhaps a "Δ" contour map would be useful as well

Figure 4. Potentiometric map for postulated withdrawal of groundwater in Jackass Flats --CAUTION: there is no factual basis for this map.

state conditions the estimated groundwater travel time from the repository to the pumping well is decreased by X%.

Uncertainties in the basic input information used to develop the regional hydrologic model for the area produces uncertainties in the simulation of the flow system by Waddell (1982). The model is based on estimates of amount and location of principal recharge areas, distribution of permeable and impermeable rock units and locations of discharge from the regional aquifer system. Uncertainties in continuity of permeable and impermeable units produces a fundamental question of the accuracy of the overall flow model. Because the southern Great Basin is highly faulted, tortuous flow paths can occur. The faults may limit our ability to readily extrapolate from one borehole to another. The unsaturated zone at Yucca Mountain is very thick and the dynamics of recharge are poorly known. However, the approach used by Waddell (1982) provides the basis for sensitivity studies which can be used to determine the effects on flow patterns of future interference activities, and ranges in uncertain input parameters.

IV-B. FAVORABLE CONDITION: Site Ownership and Control 960.4-2-8-2

Favorable Conditions. Present ownership and control of land and all surface and subsurface mineral rights by the DOE.

Position: The federal government controls all lands required for the site activities, and surface and subsurface mineral rights can be obtained in accordance with 10CFR60.121. Therefore, the Yucca Mountain site meets the requirements for this favorable conditions.

Rationale: The Yucca Mountain site is located exclusively on lands owned by the federal government. The northern two-thirds of the site is on the Nellis Air Force Bombing Range, the southern one-third of the site is on land administered by the Bureau of Land Management (BLM), and a portion of the eastern side of the site is on the Nevada Test Site, controlled by the Department of Energy. An application for temporary withdrawal of BLM land has been prepared; Use Permit No. DACA09-4-80-332 for the Air Force land has been extended for a period of one year to February 13, 1984; an application for a ten-year extension of this agreement is now being negotiated. Should the site be selected for a repository, an application for permanent withdrawal of the required land will be submitted in compliance with 10CFR60.121.

V-B. Potentially Adverse Conditions. Projected land-ownership conflicts that cannot be successfully resolved through voluntary purchase-sell agreements, nondisputed agency-to-agency transfers of title, or federal condemnation proceedings.

Position: There is no reason to believe that land-ownership conflicts will develop that cannot be resolved in accordance with Section 960.4-1, requiring DOE ownership, all surface and subsurface mineral rights, and control of access to restrict potential surface and subsurface activities.

Rationale: A plan has been developed (Richards and Vieth, 1983) which outlines the land use and withdrawal actions necessary for the purpose of site characterization, construction of the Exploratory Shaft, and for

developing a high-level nuclear waste repository should Yucca Mountain be selected for one or both projects. This plan contains the actions necessary for land acquisition to meet the requirements of 10CFR60.121. The current status of the DOE-Air Force-BLM relationship is one of cooperation and support. If Yucca Mountain is recommended to the Congress by the President and supported, then the initial land withdrawal request (20-year limit) will be forwarded to the BLM at the same time as the repository license application is sent to the NRC. A request for permanent withdrawal will probably not be submitted until repository decommissioning is approved by the NRC. The total land area, including the required 1 mile buffer for a repository at Yucca Mountain would be less than 25,000 acres.

VI. Statement of Position and Rationale for Disqualifier, if Present.

VII. Statement of Position on Qualifying Conditions.

Natural Resources. Current natural resources and potential foreseeable natural resources at the Yucca Mountain site are insignificant in size and estimated value, and are therefore unlikely to encourage interference activities which could lead to unacceptable releases of radionuclides.

Site Ownership and Control. Ownership and control of the Yucca Mountain repository land area required for compliance with 10CFR60 can be obtained by DOE. Present and projected land ownership and control of surface and subsurface mineral rights will limit the potential for human interference which could lead to radionuclide releases greater than those allowable as specified in Section 960.4-1. No non-resolvable land-use conflicts are anticipated.

Rationale:

Natural Resources. The minimal current value of natural resources, and the limited future potential for exploitable energy or mineral resources in the repository site area provide confidence that future human activities involving deliberate or inadvertent intrusion are highly unlikely, particularly considering the reliance to be placed on permanent markers and/or records (Kaplan,____). It is known, with high confidence, that there are no geothermal, energy or mineral resources which will be attractive to future generations, and preliminary studies suggest that groundwater withdrawal near or at the site is unlikely to alter the regional flow paths to the extent that unacceptable radionuclide release rates could results.

Site Ownership and Control. Current federal ownership, control of access and surface and subsurface mineral rights, combined with projected land ownership and control can be obtained by the DOE by relying on continuing cooperation with the U.S. Air Force and the Bureau of Land Management. Permanent land withdrawal via special legislation will be requested after repository decommissioning has been approved by the NRC.

FORMAT FOR PRESENTING THE EVALUATION OF THE SITE WITH RESPECT TO THE TECHNICAL GUIDELINES (960.4.2 AND 960.5.2)

I. A description of how section is organized

II. Statement of qualifying condition

III. Evaluation process

A. Listing of relevant data (references, their topics, and types of additional new data contained in the following discussions of favorable, potentially adverse and qualifying conditions)

B. Assumptions and uncertainty (general statement of adequacy of data to support positions)

C. Analysis (types of analyses contained in the following discussions of favorable, potentially adverse, and qualifying conditions)

IV. Favorable conditions

A. Position statement for each favorable condition

B. Brief statement of rationale (refer to position statement)

1. Critical data (cross reference other favorable and potentially adverse conditions)

2. Analysis (if appropriate)

3. Assumptions and uncertainty

V. Potentially adverse conditions

A. Position statement for each potentially adverse condition

B. Statement of rationale

1. Critical data (cross reference other favorable and potentially adverse conditions)

2. Analysis (if appropriate)

3. Assumptions and uncertainty

VI. Disqualifying condition

A. Position Statement

B. Rationale (Reference Chapter 2)

VII. Conclusion on qualifying condition

A. Statement of position

B. Basis for conclusion given the evaluation at favorable and potentially adverse conditions individually and/or collectively.