

ATOMIC ENERGY COMMISSION

SELECTION OF A CONTINENTAL ATOMIC TEST SITE

Report by the Director of Military Application

THE PROBLEM

1. To review the requirements for a test site additional to Eniwetok Proving Grounds for testing atomic weapons, and to make recommendation to the Special Committee of the National Security Council for the early development and use of at least one location.

CLASSIFICATION CANCELLED

BY AUTHORITY OF I. L. Cucchiere, CC, 11/29

BACKGROUND

DATE 11/30/78

2. The desirability of a continental atomic test site for the post-World War II Weapons Program was recognized as early as 1947. Such a proposal was considered during the early planning for Operation SANDSTONE. General Hull, as SANDSTONE Task Force Commander, later recommended consideration of a U.S. site following his experience with off-shore operations and extended supply lines during Operation SANDSTONE in 1948. As a result of General Hull's recommendation, the Armed Forces Special Weapons Project undertook a study of possible U.S. test sites, and this study, called "NUTMEG", is attached as Appendix "B". This study, while not conclusive but indicating the arid-Southwest as a preferred location, was laid aside in early 1949 by the AEC for possible later consideration in the event of an emergency.

3. At the request of Chief of Staff, USAF, the Armed Forces Special Weapons Project again in the summer of 1950 studied the

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subject of a continental site with the view of finding a suitable location for GREENHOUSE should use of Eniwetok be denied. The study provided the same indication that the Southwestern United States area was preferred, and gave population figures, corrected from 1950 Census data. Meteorological conditions were shown to be excellent for radiological safety in restricting the area down-wind which may be contaminated from cloud fall-out. The Joint Task Force Three Alternate GREENHOUSE plan called for an "austere" operation in that area. An examination of the Las Vegas Bombing and Gunnery Range in Southwestern Nevada was made in support of this plan by the firm of Holmes and Narver, by contract for AEC. Their report (Appendix "C") covers those facts which are apparently pertinent to the conduct of a GREENHOUSE-type operation.

4. Recent discussions in the AEC and the Department of Defense have led to a National Security Council directive of November 14, 1950, (Appendix "A") which directs the AEC, with Department of Defense assistance, to make this study and recommend a site for early development and use. A survey of the Las Vegas range, more complete than the Holmes and Narver examination, is now being conducted for the AEC by the Office, Chief of Engineers. The results of this survey will become available during the latter part of December, 1950.

DISCUSSION

5. In considering the need for an additional test site two fundamental uses are seen. The first is that of a site supplemental to Eniwetok and Amchitka for some purposes, capable of serving economy in terms of time, personnel, equipment and money, and, above all, to expedite the weapons development program. The second is that of an emergency alternate to overseas sites, at a location where its basic security and general accessibility cannot

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be jeopardized by enemy action.

6. Only Partial Solution. It should be noted, that, at the present time, no site within the United States can be considered a completely satisfactory alternate to overseas sites. If a relatively long time for site development were acceptable, on-continent sites outside the U.S., with suitable international arrangements, could offer advantages of remoteness for the high-order yields to be anticipated both in the fission and thermonuclear fields, and for the special radiological safety problems introduced by an experiment such as the underground shot now planned for Amchitka. The current urgency, however, centers on a site of much smaller capacity.

7. Criteria for New Site. The factors controlling the selection of a continental atomic test site include primarily the following:

a. Radiological Safety. Population density, favorable meteorological conditions and ability to predict them accurately.

b. Physical Requirements. Size, climate, topography, location and water.

c. Availability. High desirability of using Government-controlled land to expedite initiation of development for use at the earliest practicable time.

d. Operational Facilities. Good air and surface transportation, communications, power, nearby civilian community as a base for logistic support.

8. Radiological Safety. For the protection of the population existing near the test site, favorable meteorological conditions and wind structures, accompanied by the capability for accurate predictions, are necessary to permit firing of test shots at times selected for desired direction of drift and conditions of fall-out. Meteorological studies of various areas, similar to those included in the "NUTMEG" study have eliminated certain areas from further consideration, due to poor wind structure, frequency

of unpredictable weather changes or low percentage of days on which desirable meteorological shot conditions may be anticipated.

9. It is recognized that the problem of radiological safety is most critical in site selection. Not only must high safety factors be established in fact, but the acceptance of these factors by the general public must be insured by judicious handling of the public information program. Safety hazards such as those which existed for the 1945 test at Trinity can be greatly reduced by such means as paving the zero area to reduce dust volume, using higher towers, and shooting under weather conditions forecast for maximum safety instead of to a rigid schedule as was necessary for military reasons at Trinity. By such means as these, and taking advantage of more sparsely populated areas, it is believed certain continental sites would permit a substantial improvement in predicted safety over the Trinity shot (Appendix "F").

10. Finally, two broad conclusions have been reached by authorities who have considered this subject. These are:

a. Shots up to 25,000 tons TNT equivalent can certainly, and shots up to 50,000 tons TNT equivalent can probably, be detonated within acceptable safety limits in the continental U.S.

b. Results of actual shots and relatively low-order energy release should be utilized as a basis for estimating acceptable limiting yields for later shots, and the above limits may eventually be raised considerably.

11. These two conclusions have been considered at length, and there seems to be no doubt among experts that a continental site can be used safely for atomic testing of shots of relatively low order yields. There will of course be a specific examination of radiological safety factors in connection with and before each planned experiment, in the light of the nuclear composition and predicted performance of the weapon in question. Meanwhile, approval of a continental site for development and use can be sought without delay.

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12. Physical Requirements. The second criterion (paragraph 7) involves the physical characteristics of the area, such as size, climate, topography, water and location. The size of the area selected should permit the installation of several firing points with 5-10 miles between them or between each firing point and the control point. Thus, an area of several hundred square miles is essential. The climate of the area should permit the preparation and execution of experiments on a reasonably predictable schedule at any time during the year. The topography of the land should be flat; or have smooth and regular contours for ease and economy of construction and operation, as well as for visibility for photographic collection of data. Water supply sufficient for a base camp of approximately 2000 people is also a prime requisite. A geographical location as close as possible to the Los Alamos Laboratory, to enable accelerating the pace of the weapons development program is obviously a characteristic of such desirability that it could outweigh partial deficiencies in other respects.

13. Availability. Availability of the necessary land is the third criterion. For reasons of time it is almost mandatory that land already under the control of the U.S. Government be used, thus avoiding complicated acquisition processes, and economy would be served thereby. This is also desirable from the security and public relations points of view.

14. Operational Facilities. Operational facilities constitute the fourth important criterion. There should be good transportation, good communications, and adequate electric power. A nearby community on which to base transient living and logistic support for general construction operations, as well as for the interim support of the site, can add much to the economy and ease of developing and operating a test site of this nature.

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15. Foreign Sites Eliminated for the Present. In summary, the selected site must satisfy radiological safety requirements, contain not less than four or five hundred square miles of reasonably level land already under governmental control, be located as near Los Alamos as practicable, and have a number of the facilities required for operations already in place. These criteria, as applied to the site which is urgently needed now, point definitely to the continental United States rather than to possible sites in Deleted Alaska, Deleted which might have added advantages of remoteness. No overseas site is wanted now in lieu of Eniwetok or Amchitka.

16. Sites Within the United States. Within the United States, there are several areas whose use for atomic weapons testing has been considered in various surveys and discussions. These areas have been initially screened on the basis of comparative radiological safety, favorable and predictable weather conditions, location and availability. There have remained for final consideration, after screening, the following areas:

a. Alamogordo-White Sands Guided Missile Range in New Mexico (which contains the Trinity Area).

b. Dugway Proving Ground-Wendover Bombing Range, in Utah.

c. Las Vegas-Tonopah Bombing and Gunnery Range, Nevada.

d. Area in Nevada, about fifty miles wide and extending from Fallon to Eureka.

e. Pamlico Sound-Camp Lejeune area, in North Carolina.

17. Of the above areas, the first three are partially or wholly under the control of the Department of Defense, on a temporary withdrawal basis, and permanent withdrawal has been requested by the Office of the Chief of Engineers. Since the fourth and fifth areas are not Government-controlled, and there are

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indications of some delay in acquiring the necessary land, they were also dropped from further consideration. In this connection, it should be noted that recent reviews of the weather data for the Carolina Coastal area, which has certain advantages for the purpose in mind, have revealed that the apparently favorable meteorological conditions of wind and weather structures are based on average figures which, in reality, are seldom met. Examination of specific records, day by day, points up the strong possibility of long delays during a test operation while awaiting desirable weather conditions.

18. Las Vegas Best of Remaining Sites. Of the three remaining sites considered (Dugway, Las Vegas and White Sands) the latest AEC review confirms the judgments already expressed by the AFSWP, Los Alamos Scientific Laboratory and the Manager, SFO, that the Las Vegas location most nearly satisfies all of the established criteria for a continental atomic test site.

19. A comparison of total populations in a base area site plus a 90 degree possible fall-out sector, to a radius of 125 miles down-wind from site, shows the Las Vegas site as involving the fewest people, with Dugway having by far the most (Salt Lake City), White Sands falling between the two in this respect. In total area, the Las Vegas Range is the largest of the three, although this factor is important principally from the standpoint of Government-controlled security and radiological monitoring. White Sands is closest to Los Alamos, but logistic and base camp facilities and capabilities are inferior to those for the Las Vegas site. Transportation and communication are good at Dugway but not in the Western portion of the area where shot sites would best reduce the radiation hazards to the large population areas further east.

[REDACTED] [REDACTED] [REDACTED]

20. The advantages of the Las Vegas site have been listed in the Los Alamos Scientific Laboratory study attached (Appendix "F"). This site combines existing base facilities and transportation capabilities with required physical features and immediate availability. In addition, the problem of radiological safety is at once smaller and more easily controlled at and around this location than at either Dugway or White Sands. Finally, requirements and conditions at the Las Vegas location are not only superior relative to the other two sites, but are believed to be entirely acceptable in the positive sense for some of the most important tests now foreseen in the weapons program.

21. The Commission budget now before Congress contains \$1,000,000 for the initiation of development of a continental test site.

CONCLUSIONS

22. It is concluded that:

a. There would, of course, be outstanding advantages in having an atomic test site on the North American continent for a wide range of full-scale tests from, say, 1000 ton TNT equivalent to 500,000 ton TNT equivalent, or more. However, at present it is clear that site acquisition and logistic problems preclude consideration of remote continental sites, in Deleted Deleted or Alaska, for instance, as available for early and efficient use. On the other hand, less remote continental sites present questions of radiological safety that have not yet been answered for very high energy release and other special tests. Study and investigation should continue for an all-purpose on-continent site, as the body of information on full-scale testing increases, and as the world situation may change, but that is not the urgent problem of the moment.

b. The over-riding requirement now for rapid progress in the weapon development program is to have a supplementary site at which critical tests involving relatively low orders of energy release may be conducted without elaborate organizational and logistic arrangements. This sort of testing is an intimate part of the weapon research program and should be regarded as a routine laboratory activity.

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c. This site must by definition be readily accessible to Los Alamos by land and air. It must also have reasonably regular topography, offer adequate radiological safety, and it should be economical to prepare and operate. Radiological safety is primarily a matter of favorable and predictable meteorology and sparseness of population in the direction of prevailing winds.

d. In present circumstances, with particular regard to the present and desired pace of the weapons program, such a site should be on land already Government held and available for immediate development.

e. Site requirements can be met in the Southwestern U.S., specifically at the Las Vegas Bombing and Gunnery Range (Tonopah) (Appendix "E"), where it is certain that some of the most urgent tests now planned can be conducted with a degree of radiological safety substantially greater than that which obtained for the Trinity test in 1945. (Appendix "B")

f. Site preparation should begin immediately. A few low order test detonations are now likely to be required within three months.

g. Each atomic explosion at this site should be subjected to a separate radiological safety determination by recognized experts. It is possible that as the test program progresses, tests of very high energy release and of special nature may emerge as feasible, but it seems wise to limit the objectives as regards early tests.

RECOMMENDATION

23. That the Atomic Energy Commission:

a. Approve the requirement for continental test site;

b. Approve the selection of the Las Vegas site for immediate development and early use as a continental atomic test site;

c. Approve forwarding the memorandum of recommendation (Appendix "G") to the Special Committee of the National Security Council.

LIST OF ENCLOSURES

APPENDIX "A"

Memorandum from Executive Secretary, NSC
to Secretary of State, Secretary of De-
fense and Chairman, AEC.

APPENDIX "B"

Report of the "NUTMEG" Study.....AFSWP.

APPENDIX "C"

Report to the AEC Concerning an Emer-
gency Proving Ground - Holmes and Narver
Company.

APPENDIX "D"

Letter from Dr. Bradbury, Dir., LASL, to
General McCormack, Dir., DMA, USAEC on
the importance of the Laboratory develop-
ment plans and test needs.

APPENDIX "E"

Report by Dr. Reines of the 1 August 1950
Radiological Safety Conference.. LAB-J-1279.

APPENDIX "F"

Memorandum from J-Division, LASL, concern-
ing the desirability of the Tonopah Range.
LAB-J-1609.

APPENDIX "G"

Draft memorandum to the National Security
Council Special Committee regarding MERCURY.

*On file
Dir.
Military
Application*

APPENDIX "G"

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D. C.

See cover page for date
(12-13-50)

MEMORANDUM For The Special Committee of the National Security
Council for Atomic Energy Matters

Subject: ADDITIONAL TEST SITE

As directed in National Security Council memorandum dated November 14, 1950, the Atomic Energy Commission has made a review of possible locations for the required additional atomic weapons test site. The Department of Defense has assisted the Atomic Energy Commission in this review.

At the beginning, it may of course be said that there would be outstanding advantages in having a continental site for all atomic weapons tests, involving a wide range of energy release of from, say, (1,000) to (500,000) tons TNT equivalent, or more, and for tests of special nature. However, there are problems of site acquisition and logistics which preclude consideration for early and efficient use of very remote sites, as in Deleted or Alaska, and less remote continental sites present questions of radiological safety for tests of very high energy release and other tests which might involve a high order of radiological contamination. These latter questions may be answered satisfactorily as test knowledge increases through experiments, and as the world situation may develop, but they are not satisfactorily answered at present.

The Commission has therefore, after study, limited itself at this stage in its serious examination of possible sites to those which might meet the urgent requirements of the immediate weapons development program. The essential need now is for a site at which a few relatively low order detonations may be done safely and with minimum non-productive cost in time, effort and money at the earliest possible dates, preferably within the next two to three months. The Commission budget now before Congress contains \$1,000,000 for the initiation of development of a continental test site.

The criteria for such a site include primarily: ready accessibility to the Los Alamos Laboratory by land and air, good communications, adequate radiological safety, reasonably regular topography and prospects of economy of preparation and operation. There are two general areas within the continental U.S. where it is believed a considerable portion of the expected AEC testing program could be conducted without undue public radiological hazard. These are the South Central Atlantic Coastal area and the arid Southwest. There are four locations within these two areas where some of the facilities needed for operations are already in existence, so that a site could be developed for atomic tests at reasonable cost. These locations are:

- [REDACTED]
- a. The Las Vegas, Nevada, Bombing and Gunnery Range.
- b. The Dugway, Utah, Proving Ground.
- c. The White Sands, N. M., Proving Ground (contains the Trinity site used in 1945).
- d. The Camp Lejeune, N. C., area, North Carolina.

The Las Vegas site (see map attached*) has been selected as the most desirable. It has the following advantages:

- a. The site is within easy reach of the Los Alamos Scientific Laboratory.
- b. The weather and terrain conditions are such that it will be possible to use the site at any time during the twelve months of the year.
- c. An atomic weapons test site is immediately available within the approximately 5400 square miles of Government-owned land currently in use by the U. S. Air Force. It is possible to establish test points which will not unduly restrict continued practice bombing and gunnery operations except during actual test periods.
- d. Meteorological conditions and population density are such that some of the most urgent atomic weapons tests can certainly be conducted well within acceptable limits of public radiological safety. Each specific test operation would of course be subject to examination and approval by recognized experts.
- e. Many of the buildings, power supply requirements, transport and communications lines, etc., required for operations already exist at the Las Vegas range.

In comparison with the Las Vegas site, the Carolina Coast site, in addition to the disadvantage of its relatively great distance from Los Alamos, does not have the necessary Government-controlled land area, while Dugway and White Sands do not provide quite so high a degree of radiological safety.

It should be noted that development of the Las Vegas range as an atomic weapons test site would not eliminate the current requirement for use of Eniwetok, Amchitka or some other similarly very remote site for tests where the radiological hazards involved may be beyond the limits acceptable in the United States. Thus, there remains a requirement of some urgency to find a secure site alternate to Eniwetok and Amchitka for use in an emergency which may deny the use of Eniwetok or Amchitka. This point will continue to receive attention.

The Atomic Energy Commission recommends approval by the National Security Council of the development of a portion of the Las Vegas Bombing and Gunnery Range as an atomic weapons test site,

* Secretariat Note - On file in Division of Military Application.

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suggesting that the text of this memorandum is suitable for
presenting this recommendation to the President.

UNITED STATES ATOMIC ENERGY COMMISSION

Gordon Dean
Chairman