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REPORT OF COMMITTEE

on

OPERATIONAL FUTURE

OF

NEVADA PROVING GROUNDS

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May 11, 1953

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UNITED STATES
ATOMIC ENERGY COMMISSION
P. O. Box 5400
Albuquerque, New Mexico

May 11, 1953

Mr. Carroll L. Tyler, Manager
Santa Fe Operations Office
U. S. Atomic Energy Commission
P. O. Box 5400
Albuquerque, New Mexico

Dear Mr. Tyler:

The report of the Committee on the Operational Future of Nevada Proving Grounds is attached. It is in two parts. The first summarizes the Committee's findings and conclusions and presents its major recommendations. The second is the minutes of the January 14, 1953, meeting with attachments consisting of letters and of supplementary comments.

The Committee satisfied itself that there were no visible areas requiring further exploration at the time, and saw no need to activate a future organization. It remains subject to call in the event a need should develop.

CLASSIFICATION CANCELLED
BY AUTHORITY OF DOE/OC DOE 5650.2, III-12
Jose Diaz 4/14/81
REVIEWED BY DATE
Wilbur ~~A. Strauser~~ 4/13/81
By: W. Tench 615787

Sincerely yours,

Reuben E. Cole
Chairman

Enclosures:
1. Report of Committee
2. Minutes of 1/14/53 meeting w/4 attachments

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REPORT OF COMMITTEE ON
OPERATIONAL FUTURE OF NEVADA PROVING GROUNDS

The Committee's directive was: To review the original purpose of a continental test site; to analyze the changes in scope which have developed; to project requirements for the future, including the need for any other continental site; and to arrive at conclusions concerning future utility and use of Nevada Proving Grounds.

The following statement of findings, conclusions and major recommendations results from the Committee's discussion on January 14, 1953, and reflects the amplifications resulting from review of the minutes and conclusions by each member and by other interested individuals.

A. FINDINGS AS TO SCOPE, REQUIREMENTS AND EFFECTS

1. a. The basic reason for activating a continental test site was to provide Los Alamos with a backyard laboratory for diagnostic tests vital to the weapons development program. It was projected that these could be quickly-mounted, being held very soon after the Laboratory need developed, and with the results therefore being reflected in weapons development or manufacture months sooner than would be possible with overseas tests, which require long periods for planning and preparation. This economy of time was considered the major advantage of continental tests.

   b. It was also projected that continental tests would require less time in the field of the limited available number of qualified scientists and technicians, and that continental tests would be less costly than overseas tests.

2. a. The basic concept of continental testing is best exemplified by the first series, Operation Ranger. The series was proposed in November, preparatory work began January 1, 1951, five shots were fired between January 27 and February 6, and all technical personnel returned immediately to their laboratories.

   b. Since Ranger the requirements of other agencies have greatly increased the scope of test programs. This is best exemplified by Upshot-Knothole, which will include in addition to LASL nuclear tests:

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UCRL (Livermore) nuclear diagnostic tests.
Sandia Laboratory effects experiments.
DOD weapons effects tests.
FCDA and AEC civil effects tests.
Proof firing of nuclear weapons (the atomic cannon).
DOD troop training and indoctrination (Exercise Desert Rock).
US Air Force crew training.
FCDA radiation monitor training.
Major programs for indoctrinating uncleared and cleared observers

c. Preparatory Site work for Upshot-Knothole was begun in July, 1952. The content of the series, including the diagnostic tests, was made firm in late October. The operating period began March 2, 1953, with the schedule for ten detonations extending from March 17 through May 21, 1953.

3. a. Known future requirements and multi-agency proposals will at the least maintain the present pace and scope of continental tests and, if all are serviced, will materially expand the present pace and scope.

b. There is no point now foreseeable at which Los Alamos will no longer require NPG for weapons development tests, and Los Alamos makes a major point of its periodic requirement for "quickly-mounted" tests which do not allow months for multiple-agency planning and preparation nor for specific advance warnings such as those to the photographic industry. Livermore Branch UCRL will additionally require NPG for weapons development tests.

c. The requirements of the weapons development laboratories will approximate the effective capacity of NPG with regard to frequency, yield and type. Projections for future tests conform generally as to types with those tested in the past or planned for Upshot-Knothole. It cannot be projected accurately whether tower or air drops will predominate. It is not proposed that NPG be used for very large yield devices, but it has been proposed that there be air bursts of a higher yield than in the past or than planned for Upshot-Knothole.

d. There will continue to be requirements for military and FCDA effects studies, for military training and indoctrination, and for such uses as an exposure chamber.

e. There are developing proposals for use of NPG which go beyond the present utilization. FCDA is known to be considering "borrowing" a portion of NPG for a major civil defense test. The military is considering the conduct of tests in bad weather. There are proposals for tests of weapons systems, such as guided missiles, for tests of penetration missiles, and for blowing up a reactor.

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B. CONCLUSIONS

1. a. The primary value of NPG is its use for weapons development. The addition of effects experiments is a valid extension of the original purpose in order to make the greatest possible use of a single expenditure of fissionable material. All additions to the original purpose constitute interference in some degree.

   b. The complexity and scope of present operations are decreasing the economy of weapons development time originally proved during Ranger; and their frequency and duration are making heavy demands on available, qualified scientists and technicians, decreasing the factor of economy of manpower. The scope of the present schedule, the fact that costs of operation, maintenance and construction are higher at NPG than in more settled areas, and on occasion unrealistic target dates have increased costs above original projections, but continental tests remain much more economical than overseas tests.

   c. The scope of future utilization will continue as heavy as at present. Known plans and proposals would materially increase utilization. Future utilization should not be permitted to exceed the present scope and pace, as any further increase in the scope of test activities probably will limit the use of NPG for LASL and UCRL nuclear tests. Things which can be done other places should be done there.

2. a. Public safety is the major factor restricting the type and size of devices tested at NPG. This restriction is related largely to yield, to placement or mode of delivery, and to resulting radiation fallout in the NPG region, inasmuch as blast can probably be predicted sufficiently well to avoid major effects off-Site, and long-range fallout is not hazardous.

   b. There would have to be a very strong, over-riding reason to justify a surface or sub-surface shot exceeding one kiloton. A tower shot of more than 35 kilotons could be fired only under very stable, predictable conditions; a shot approaching that figure should be evaluated on the factors peculiar to it. The maximum size of an air burst should be determined by evaluation of the factors peculiar to the device, such as whether the fuse system is sufficiently reliable to offset the possibility of the device turning into a surface burst, and the expected contamination and blast effects for the device being exploded at the chosen altitude.

   c. Tests of nuclear missile warheads involving flight should not be attempted at NPG. Full-scale penetration weapons should not be tested without a thorough study--by competent persons--of risks involved. Foul weather shots should not be held, because scientific data cannot be obtained and because of public hazard.

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3. a. NPG does not have sufficient developed capacity for today's requirements, either technically or in living facilities. The increased requirements for Upshot-Knothole have stretched capacity to a point of concern. Eight persons are crowded into a living space at Camp Mercury built for four persons. There are insufficient working, eating and sleeping facilities at the Control Point for persons required to remain on duty there for long periods. There are too few developed firing areas for present schedules, the result being that a slight change in ever-varying surface winds can contaminate tower sites which are scheduled for subsequent shots in a series, causing very costly delays.

4. a. Future tests will create new problems, in addition to those considered by the Committee, even though the nature and scope of the program is not expanded further. For instance, propeller and jet drones present a new safety hazard for Upshot-Knothole.

   b. Problems will be magnified in any case, particularly on-Site contamination and facility lacks, unless facilities are expanded to meet the need.

   c. Existing problems other than the lack of facilities and the continuing expansion of the program are either in good shape or are being worked on with hope of successful solution.

      (1) Contamination in the Site area may be reduced by development of new firing sites and less frequent use of each site, by use of aluminum towers, by using higher towers, or by soil stabilization. There should be continued studies on the effect of economical types of surface stabilization. A capable health physics officer stationed permanently at the Site is an immediate requirement.

      (2) Radiation fallout has not exceeded permissible exposure in the highest reading recorded in any nearby off-Site inhabited locality. Good fortune has contributed materially, and management must continue to watch conditions, treating each shot as an individual event, and noting weather as late as possible before each shot. Weather studies, correlating predictions with zero-hour and post-shot fact, should be continued. It was the Committee's feeling that experience to date with tower and surface shots indicates there should be more care exercised rather than less care. No fallout level outside the 200-mile radius has approached the minimum conditions considered hazardous. Buildup of background outside this radius is not a foreseeable problem, but should be kept under observation.

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(3) Physical damage from blast has been relatively negligible. The present forecasting procedure gives good indications of probable damage although last minute variations in weather can change the forecasts and make it impossible to say flatly that damage can be avoided continuously.

(4) Prompt settlement of justified claims is a major factor in maintaining public good will and in reducing public reaction to blast and radiation hazards. Legislation providing for local recording and investigation of claims and for prompt, local settlement is seriously needed.

(5) The NPG region public's attitude toward tests is to some degree that of participants and generally is quite cooperative. This is also true of the more distant public. In each region, however, there remains a latent fear of radiation which may flare up given an incident or an accident and which should be continuingly anticipated by educational, warning, and reporting effort.

5. a. The criteria which led to selection of the Nevada Proving Grounds as a site have been proved by experience. The controls related to public safety then established have been met fully. Both criteria and controls remain essentially unchanged. No other known continental site will match as well these operational and safety requirements.

b. Developments to date confirm the decision to establish a continental test site and its location in Nevada. NPG can be developed to meet all foreseeable needs for nuclear diagnostic and effects tests of a nature which can be done at a continental site. There is no reason to consider alternative sites at this time.

C. MAJOR RECOMMENDATIONS

1. Do not increase scope further nor extend present participation. Key effects testing, save under the most unusual circumstances, to the development program.

2. Technical and support facilities are two sides of the same coin and the required items should be budgeted and provided, or the NPG mission should be cut back materially. With regard to firing areas, design the recorder stations and similar installations flexibly to permit several tower locations to be used with a single basic station.

3. Limit tests as follows:

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a. Type of devices to those previously tested or scheduled for Upshot-Knothole.

b. Yield: Surface or sub-surface shots, 1 kiloton; tower shots, approximately 35 kilotons; and air bursts, 50 kilotons until completion of a study to determine what air yields may be undertaken with adequate assurance of public safety with specific reference to the possibility of fuse failure.

c. No foul weather or in-flight nuclear warhead missile tests. No tests of penetration weapons without a thorough and competent study of risks.

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THIS DOCUMENT CONSISTS OF 22 number of pages No. 8 of 35 copies, series B

SUMMARY OF MINUTES

COMMITTEE ON OPERATIONAL FUTURE, NPG

a. The Committee was established by Manager, SFO, with concurrence of DMA. It met in SFOO on January 14, 1953. A summary of minutes and conclusions was subsequently circulated and all changes or supplementary comments are reflected in the following corrected summary or its attachments.

b. Those who participated in the Committee's discussion included:

Reuben E. Cole, SFOO, as Chairman
For AEC-Washington: Dr. John C. Bugher, Director, DBM; Morse Salisbury, Director, DIS; and the following from DMA: Captain J. T. Hayward, Deputy Director; Colonel V. G. Huston, Captain Harry H. Haight, Colonel R. F. Campbell, and Donald Mastick
For NYOO: Morrill Eisenbud.
For Sandia Laboratory: Dr. Everett F. Cox.
For LASL: Dr. Alvin C. Graves and Dr. John C. Clark
For SFOO: James E. Reeves, Given H. Dugger, and Richard G. Elliott (as Secretary).

CLASSIFICATION CANCELLED BY AUTHORITY OF DOE/OC
DOE SL50.2, III-12
Joe Diaz 4/14/81
DATE
REVIEWED BY Wilbur A. Strauser 4/13/81
B.J. W. Tench 6/5/87

c. Dr. Norris E. Bradbury, Director, LASL, discussed the change in concept of NPG utilization, the broad effects of such change, and something of his thoughts as to the future in a letter dated January 5, 1953, and read to the Committee in advance of discussion on January 14. The contents of the letter are entered in the minutes under related sections. It is reprinted in full as an attachment.

In addition, the minutes were reviewed by Dr. Herbert C. York, UCRL (Livermore Branch), who had no comments, and by Dr. Darol Froman, LASL, whose comments are noted where applicable in the minutes and are attached in full.

d. The corrections or other comments of Committee members resulting from review of the draft summary of minutes have almost without exception been incorporated into the text of the present report. The exceptions were outside the frame of Committee discussion or conclusion and are either foot-noted or attached. They are not incorporated into the text because they were not subject to discussion or rebuttal by other members of the Committee.

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e. The Committee did not touch on classification at NPG. Dr. Ralph Carlisle Smith, LASL, has analyzed this problem and his communication is attached in full.

A. SUMMARY OF CONTINENTAL TESTS, NPG

1. Three series, totaling 20 nuclear detonations, were held between January 1, 1951 and June 5, 1952.

Ranger: Preparatory work began January 1, 1951. Nuclear diagnostic tests were fired between January 27 and February 6. All were air drops over Frenchman Flat. Highest yield approximately 24 kilotons.

Buster-Jangle: Preparatory work began in June, 1951. Seven nuclear detonations between October 22 and November 29, 1951. Five were primarily diagnostic, two exclusively military. Six were used for military and other effects studies and three were used for troop maneuvers and orientation. Four were air drops (highest approximate yield 24 kilotons); one was tower (yield infinitesimal); one was surface (one kiloton); and one underground (one kiloton). All were in Yucca Flat.

Tumbler-Snapper: Preparatory work began December 1, 1951. Eight nuclear detonations between April 1 and June 5, 1952. Five were primarily diagnostic, three primarily for military effects. Four were used for troop maneuvers. Four were air drop (highest yield 31 kilotons); and four were tower (highest yield $14\frac{1}{2}$ kilotons). One was in Frenchman Flat and seven in Yucca Flat.

Upshot-Knothole (as scheduled): Final preparatory work began in November, 1952. Ten nuclear detonations between March 17 and May 21, 1953. Six were to be dignostic for LASL, two diagnostic for Livermore Branch, UCRL, and two for the military. Seven were to be tower, (highest planned yield 35 kilotons); two air drops (highest planned yield 31 kilotons); and one air burst of cannon-fired projectile (planned yield 14 kilotons). Eight were to be in Yucca Flat, two in Frenchman Flat. Seven were to be used for troop maneuvers, and for USAF crew indoctrination. Two involved major FCDA construction and experiments, and two were to include training of FCDA radiation monitors. In summary there are 30 programs scheduled, 10 for weapons development, 10 for military effects, and 10 for civil effects.

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B. AGENDA QUESTION NO. 1: "HAVE THE REQUIREMENTS AND REASONS FOR ESTABLISHING THE CONTINENTAL TEST SITE CHANGED SINCE ITS ESTABLISHMENT?"

2. Steps Leading to Activation of NPG

Mr. Tyler outlined the reasoning and the series of steps which led to activation of the continental site and to choice of Nevada Proving Grounds as the location.

The Los Alamos Scientific Laboratory program for development of nuclear weapons requires nuclear field tests. History's first such field test, at Alamogordo, was necessarily continental. The second and third, at Bikini, were necessarily insular. In 1947 the Laboratory programs had progressed to a point where developmental field tests were required and LASL proposed that the AEC activate a continental site. A survey disclosed possible sites on the coast of the Carolinas, at Alamogordo (N.M.), Dugway (Utah), and two sites in Nevada. Largely because of unresolved questions concerning off-Site hazards to the United States public and partially because of greater security of information it was decided to have the spring 1948 (Sandstone) series at Eniwetok as a shipborne operation.

Continental site consideration was renewed in 1949, during planning for Operation Greenhouse because there was a need for a pre-Greenhouse test. Outbreak of the Korean War in 1950 raised immediate questions concerning the security of a far distant Pacific site. As it progresse Korean logistics threatened serious interference with any overseas test operation. For all of these reasons, LASL strongly recommended late in 1950 that a continental site be activated.

Possible sites were again surveyed and checked against criteria such as: Density of population; weather, particularly for its effects on radiological safety locally and nationally; operational factors like air lanes, labor pool, transportation, living facilities; real estate availability; and security. Two southern Nevada sites were preferred, one at the present NPG and another further northwest near Tonopah, both within the Las Vegas Bombing and Gunnery Range which was Government-owned and was already a restricted area. NPG site was selected largely because of the operational factors, a distance of only 65 miles from Las Vegas, possessing an airstrip, good highways and living quarters nearby at Indian Springs AF Base. An unfavorable facto was lack of water. Low population density and meteorological factors were advantages shared by both Nevada sites but not by other continental sites surveyed.

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The Commission obtained the approval of eminent advisory scientists as to safety factors and then obtained Presidential approval. Construction began at NPG on January 1, 1951. The first test was shot January 27. Five were fired within ten days.

3. Reasons for a Continental Site

a. The basic reason was the material advance in pace of weapons development foreseen if Los Alamos Scientific Laboratory could have a backyard laboratory where developmental tests could be quickly mounted and quickly held when a field test was advantageous or requisite, and from which data could quickly arrive back in the Laboratory. Coupled with this primary reason were obvious secondary advantages in economy of manpower (particularly scientific), time (of scientists and in gaining new weapons goals), and of money.

b. There was little committee discussion of the very major contributions of continental tests to weapons knowledge, development, and variety and yield of stockpile, these results being accepted by those present.

c. There was some discussion of relative costs for overseas and continental tests. Mr. Cole pointed out that a Navy construction study compared Philadelphia and Marshall Islands costs, with those in the Pacific being higher by a factor of 2.2. He said this provided a rough comparison ratio for both construction and operations. There were other references to the reduced costs in Nevada in number of personnel, transporation, messing, specialized transport, maintenance of structures, etc.

Dr. Graves pointed out that there had been a very real economy of manpower in the sense of better utilization of available scientists with more time spent in their laboratory and less time spent in travel. (Note his subsequent reference to this point when discussing the effect of changes in NPG utilization.)

d. There was general agreement that the primary reasons for a continental Site have not changed.

4. Reasons for Selecting Nevada

a. These factors of location, particularly of better assurance of off-Site radiological safety, have been stated. There was brief discussion at this point of continental experience, with more detailed discussion later in the agenda.

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b. Dr. Bugher summarized the Committee's reaction to safety factors by saying that the original reasons for selecting NPG have been amply substantiated.

c. It was concluded that the criteria which led to selection of NPG as a site have been proved by experience, remain essentially unchanged, and have been met fully in operations. No other known continental site will match as well these operational and safety requirements.

5. Change in NPG Utilization

a. Ranger was the type of operation for which the continental site was activated. Five tests were held in 10 days, and were preceded by only 25 days of Site preparation. There was no necessity to formalize the nature of the tests nor the scope of the series six months or a year in advance. The series was solely of developmental tests for Laboratory purposes.

b. Since Ranger, continental tests have progressed from this simple concept to a much more complex one, and the operation has simultaneously progressed from simple to highly complex. In contrast to the nuclear diagnosis purpose of all Ranger tests, those since have been expanded to include military effects, civil effects military training and indoctrination, and a multitude of "fringe" projects.

c. DMA representatives said that the Commission had gone along with this expanded use of nuclear detonations as long as there was no interference with the AEC development program, and that the military had in general gone along with the thinking that they should adapt their requirements to what was possible in connection with detonations primarily for developmental purposes. It was recalled that the AEC attitude has always been that if nuclear tests are held, the AEC will conduct them. So, when the military has required delivery or yield which could not be fitted into a developmental test, it has been necessary to set up a test for them. (Dr. Froman subsequently noted of these two sentences: "Is this good?")

d. Dr. Bradbury wrote as follows on this agenda question:

> "In view of the primary purpose of the entire NPG setup, I am inclined to feel that medical and public relations problems are somewhat overemphasized in the selection of the Committee and that the real reason for the establishment of the proving ground may be overlooked.

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"With regard to the 'requirements and reasons' for establishing a continental test site, I do not believe that these have changed at all from the point of view of the LASL. I do believe, however, that the picture has changed enormously from the military point of view, and that the AEC has, in fact, accepted a changed concept. I regard the tendency to use the NPG for the purpose of weapon system tests (the forthcoming gun shot), for civil defense effects tests, for troop indoctrination and maneuvers, and for the reportorial press as quite outside the original concept of this site. Indeed this trend, if continued, can force us to abandon this site for no other reason than that the military have taken it over. Even now the use of this site by other agencies is reaching such a level that it may sometime be necessary to recall that this area was actually established at the specific request of the LASL for its own needs."

Dr. Froman supported Dr. Bradbury's comments in his communication based on the draft of minutes:

"I would like to point out that the name, 'Nevada Proving Grounds', is, to my way of thinking, both a misnomer and a confusion. I believe it was the consensus of opinion of those attending the Committee meeting and certainly felt strongly by several others at Los Alamos that the Nevada facility should not be, and was never intended by the AEC, to be, a proving ground. ...The original concept as well as the apparent feeling of the Committee is that the facility is a test site similar in concept, although of a completely different magnitude, to R Site at Los Alamos.

In a communication following distribution of the draft of minutes, Dr. Bugher commented as follows with regard to the original concept: "...I would like to have it a matter of record that the oversimplified concept which was entertained originally by the Los Alamos Laboratory concerning the NPG as a backyard quick-testing area was never realistic, and actual operations promptly disproved the soundness of the concept. The costs involved, and the magnitude of the issues concerned, give to such operations a character that involves far more than the details of weapons development. The principle of obtaining the maximum of necessary information from each detonation is unquestionably sound, and this principle should not be abandoned for reasons of convenience. The principle, re-expressed implies that effects testing, save under the most unusual circumstances, will be keyed to the developmental program."

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"...I feel that the original concept was approximately correct if one includes in it an understanding that effects, indoctrination, and public display objectives are admissible if they do not interfere appreciably with the primary objectives of weapons research and development."

6. Some Effects of Such Changes

a. SFOO and LASL representatives referred to the "interference" which such requirements and such tests cause. Washington representatives said that the field was always asked to concur in expanded test programs. SFOO representatives said they were not asked if such additions would interfere, they were asked "Can you do this?" (The DMA representative commented that this was in fact not the case.) and of course the answer is that anything of such a nature can be done if the Commission so directs, provided money and other resources such as time for preparation are provided, but that they do interfere and that they do affect operations, as for instance the time schedule established for Jangle with resultant construction and cost problems. Reference was made to the much longer preparatory period required for military effects and FCDA effects construction.

Dr. Graves stressed the interference which lengthening a series presents as to utilization of scientific and technical personnel. he pointed out that quite a few tests have been added solely for military reasons, mentioning Bikini, Windstorm-Jangle, Tumbler, Knothole and Wigwam plus the expansion in scope required on

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In a communication following distribution of draft of minutes, Dr. Bugher commented as follows: "The discussion relative to 'interference' which test requirements may have made in the programs appears to miss an essential point. The questions asked of the Test Organization relative to effects programs have not been precisely, 'Can you do this?', but rather, 'Is this effects programs feasible within the framework of the planned developmental test?'. The decisions of the Test Manager and the Scientific Test Director have been taken as final in such matters as far as we have been concerned, and it has been understood by us that the affirmative answer meant that the test did not interfere with the acquisition of developmental data. It is, of course, obvious that such effects programs increase the volume of work and responsibility carried by the Test Organization, but this should not be construed to be 'interference' in the sense of preventing the acquisition of data pertaining to the detonation itself."

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where existing facilities and capacity are equal to requirements, presenting a need for either limiting the mission or increasing the resources.

c. It was concluded that the addition of effects experiments is a valid extension of the original purpose in order to make greatest use of a single expenditure of fissionable material. All additions to the original purpose constitute interference in some degree. There should be no further increase in scope or extension of present participation. Things which can be done other places should be done there.

C. AGENDA QUESTION NO. 2: "WHAT CAN WE PREDICT FOR FUTURE USE OF THE NEVADA PROVING GROUNDS?"

7. a. General discussion was related to the purpose of tests, to the many requirements which can be developed if no halt is called, and to the possibility of increasing or decreasing utilization.

b. Fixed requirements. There was general agreement that NPG, in spite of recognized LASL-AEC objections, would have to continue to be used somewhat as at present, and that it would include developmental tests, military effects tests, FCDA effects tests, military training and indoctrination use, and provision of conditions required by Sandia Laboratory.

Possible requirements. Pointing to the artillery gun test and to the development of guided missiles, there was discussion of use of NPG for weapons systems tests and whether they could not be done elsewhere without nuclear warheads. A request for surface penetration tests was noted. There was reference to Wigwam and opinion was expressed that it would be done elsewhere by the military with only scientific guidance being provided by AEC and its contractors. Noted was a request from Argonne to blow up a water boiler, and a military feeling that we should stop holding tests under ideal conditions but should hold them in the most unfavorable conditions such as very heavy rain, snow or ice. Also noted was a Sandia Laboratory desire for a test in a canyon surrounded by hills. Also noted was a possibility for tests of ground to air missiles for detonation at 100,000 feet.

Dr. Graves referred back to his previous remarks concerning the contamination of sites for non-developmental purposes and to the effect on time and utilization of scientific and technical personnel resulting from prolongation of series.

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c. There was general concurrence that NPG should not be used for tests of weapons systems which can be held elsewhere. Penetration tests of full-scale weapons would create radiologocal-safety hazards which could not be risked (see subsequent notes on surface and underground shots). Discussion opposed the Argonne proposal on the basis that it was contrary to the NPG mission, that it would add contamination unnecessarily, and that the same data could be obtained otherwise, elsewhere. There was considerable discussion of the improbability of obtaining heavy weather at either Eniwetok or Nevada within a schedule and to the considerable hazards which would result if such conditions were used in Nevada. There was acceptance of use of NPG by Sandia in interim periods for non-nuclear tests and of providing for Sandia nuclear-related requirements when this was possible within the framework of developmental tests. There was opposition to any missile tests.

d. It was concluded:

That there is no point now foreseeable at which Los Alamos will no longer require NPG. It will be used additionally by Livermore Laboratory. There will continue to be requirements for military and FCDA effects studies, for military training and indoctrination, and for such uses as an exposure chamber. Future utilization will continue as heavy as at present. It sn should not be permitted to exceed the present scope and pace.

D. AGENDA QUESTION NO. 2.a.: "TYPES OF DEVICES TO BE TESTED?"

8. a. Devices foreseen for the future will approximate those fired in the past. Scientific representatives saw no clean-cut basis for projecting whether there would be more or fewer tower shots vs. air drops, although accepting the greater desirability of air drops from viewpoint of on-Site and off-Site contamination.

Dr. Froman commented in his later communication as follows: "I wish to add my strong approval of the Committee's position that weapons tests held in the most unfavorable conditions which can be produced by rain, snow, and ice should not be part of the Nevada Test Site operations. This is true not only in view of the reason given (above) with respect to safety but also because foul weather conditions are likely to interfere seriously with the technical observations and because scheduling for such events becomes practically impossible.

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b. Yield brought considerable discussion both here and under subsequent questions. Dr. Graves said there were no visible requirements or proposals for yields higher than Upshot on tower devices but that there might be for air drops. Dr. Cox discussed the very high yields which could be undertaken for air detonations without hazardous blast effects.

Dr. Bradbury wrote as follows on this point:

> "With regard to your question as to types of devices that we expect to test, there can be no firm answer. In the original concept of the continental site, such a question would not even have been asked since it was then understood that we would use a continental site for urgent development work which required full nuclear test, and that such tests might arise at any time but could not be predicted in character or number. We are trying to recapture some of this earlier flavor by postponing indefinitely any firm decision regarding operation DOMINO and letting this operation be one which we will conduct in a simple fashion when and if it is required and with prior notice comparable to the original RANGER operation. It is my personal opinion that both air and tower shots will be required for the indefinite future; that they will cover all ranges of yield up to as large a figure as experience will seem to permit. I am also of the opinion (but less strongly) that LASL shots in the future will tend more to air drops with simple measurement of yield and less to complicated experimental observations of tower shots.
>
> "Any devices to be tested should not create uniquely new problems of contamination or blast, and yield alone should be an adequate measurement of the problem to be expected in any given proposal. It must, however, be clear that in an experimental operation the yield frequently will be quite unpredictable and only a "probable" value can be given which may be exceeded or missed entirely. However, such problems only change the effects at any given location by very small factors--factors much smaller than that within which any resultant widespread effect can be predicted."

Dr. Froman noted in his later communication: "...types of devices thought of for the future will approximate those previously fired and those being planned for Upshot. My impression is that some of the Upshot devices are not very close to any which have been tested previously in Nevada."

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E. AGENDA QUESTION NO. 2.b.: "CAPACITY, OR LIMITATION ON CAPACITY OF PROVING GROUNDS?"

9. a. There are five developed shot areas in Yucca Vasin and other air drop areas in Frenchman Flat. The present series requires that at least one Yucca area be used twice for tower shots. If meteorological conditions are as forecast the wind blows radioactivity away from the portion of the area to be used for the second shot. If wind happens to be toward that area, contamination can prevent its use on the time schedule set. Use of a tower area as frequently as every six months presents a serious decontamination problem. Use every two years permitting time for contamination to decay would greatly reduce the problem of preparing a firing area for another detonation.

b. One of the five areas is now being developed with two firing sites swinging 60 degrees around the central bunker. Old zero points have been cleaned up and are being re-used. Development of two or more (probable limit is three) firing sites around each NPG bunker is prevented by lack of money, needed for instance to install coaxial cables from bunkers to new firing sites. Development of any one firing site costs approximately $1,000,000. Cleanup of any one site costs approximately $50,000 to $60,000 but involves time because of contamination and, if there are too many tower shots, may result in labor difficulties. While there is now no premium pay requirement for decontamination work, this probably will eventuate.

c. Another factor discussed was cost of decontamination vs. cost of towers of more than 300-foot height. A 500-foot tower will cost three times as much as a 300-foot tower because of increased material required and increased labor costs for hazard measured by feet above ground. More metal gives more contamination both on site and at distant points due to weight of metal vaporized. One aluminum tower is being used this time and contamination results vs. those from steel towers will be studied.

d. Five types of surfacing around towers are also being tested in Upshot-Knothole to determine effect on contamination. All are economical. They involve compacting or very light surfacing over compacted earth.

e. NPG is now laid out for ten firing areas in Yucca Basin, with additional air drop areas in Frenchman Flat. Use of towers in the latter is not considered desirable and there may be limitations on air drops there because of nearby and regional off-Site effects of blast, particularly at Indian Springs. (Dr.

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Cox commented that there is no support for this from the viewpoint of blast effects.) If all side canyon locations are fully developed, the very maximum number of firing areas possible is perhaps 20. The major possibility for development is the installation of up to three firing sites around a centralized bunker in each firing area. This type of development decreases the capacity of each firing site for installation of various effects structures and equipment and for use by troops

f. The consensus was: Given the money for feasible development within NPG and by limiting shots each year to not more than ten or twelve, there is no limitation as to NPG capacity as regards number of shots; capacity for housing personnel will be a limitation before capacity for firing sites (reference is made to capacity at Camp Mercury as regards water, housing, etc.); and, it is cheaper to develop NPG further than to activate another Proving Grounds.

F. AGENDA QUESTION NO. 2.c.: "RESTRICTIONS ON USE OF PROVING GROUNDS?"

10. Discussion indicated that the restrictions are: The physical capacity previously referred to with regard to firing sites and to camp facilities; on-Site contamination vs. various factors including frequency of use; and off-Site hazards related to yield. New discussion relates largely to yield.

Blast. Pre-zero-hour high explosive detonations at ground level present fairly accurate predictions of off-Site blast.

Surface and sub-surface. Experience with one kiloton devices makes it unrealistic to consider firing larger yield because of site contamination and off-Site radiological hazards. Test management would be very uncomfortable about any shot of more than one kiloton and even a small increase in projected yield would be cause for serious study.

Tower. These should be fired only in Yucca, create problems of Site contamination, and may present problems as to off-Site radiation hazard. All factors surrounding the projected shot must be evaluated, but speaking generally yields of up to 35 kilotons may be fired. Anything approaching that figure requires careful advance evaluation.

Air deliveries. Dr. Eisenbud said he would not be concerned, because of distant radiation, over air bursts of up to 100 kilotons. Dr. Cox said that blast would not concern him up to 500 kilotons,

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although bursts at higher altitudes than now projected would require development of a new h.e., pre-test, blast forecasting system inasmuch as ground-level detonations would not accurately forecast blast effects for level detonations.

Mr. Tyler was not certain at what maximum figure he would become greatly concerned, but thought it would be in the 99½ to 100 kiloton range. Doctors Graves and Clark said that the biggest limitation on yield of air bursts was the possibility of fuse failure and detonation on or near the ground, effectively resulting in a surface or sub-surface shot's conditions. Dr. Cox said that a fusing failure was no more than a one in 1,000 possibility but granted that one could occur on any shot. There was discussion of a fusing system change. Dr. Graves concluded that 50 kilotons would be established as a general planning maximum, that higher yields probably could be tested, but that test management would want to evaluate all factors before projecting yields higher than 50.

*Dr. Bugher commented as follows on the question of air burst yield:

> "The limiting consideration that a fuse failure on an air drop with possible detonation at or near the ground should probably be made more emphatic. This is a very real limiting value on the size of detonation which would be considered for an air drop."

*Dr. Freman commented as follows:

> "I do not fully understand the reasons behind the Committee's apparent feeling that the yield of air burst tests should be limited to the order of 50KT because of the possibility that the fusing system might fail and the test turn out to be a surface burst. It seems to me that a factor of 2 or so in yield is completely meaningless insofar as public safety from contamination is concerned and that one should consider contamination as being really different only for an advance in yield by a factor of 10, other conditions being the same. The Committee will not admit surface burst exceeding 1 KT because of contamination. Consequently, I cannot understand how it can differentiate between a 50 KT air burst and one 2 or 3 times this big on the basis that the test may burn out to be a surface burst.
>
> "It is a little academic to allow the possibility of 50 times the chosen limit but rule out 150 times. It seems to me that

*This comment was submitted by letter for this Report and was not subject to discussion or rebuttal by other members of the Committee.

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if one takes the small probability of fuze failure at all seriously then one must limit air burst to a number less than 10 KT. I, therefore, recommend that the yield limit on air drops of estimated yield above 10 KT be based on the premise that the fuse system is sufficiently reliable that we can neglect the probability of the device turning into a surface burst. Consequently, the maximum size of an air burst should be selected on the basis of the expected contamination and blast effects for the device being exploded at the chosen altitude."

G. AGENDA QUESTION 2.d.: "WHAT SHOULD BE DONE TO INCREASE THE CAPACITY OF NPG?"

11. This was largely a summarizing discussion, resulting in the following expressions. One method is to return to a simpler operation in which NPG's capacity is equal to the technical and living requirements. Another method is to stabilize the NPG mission at a scope not exceeding Upshot-Knothole and quickly providing technical facilities such as firing sites and other facilities such as housing to match the existing requirements. There should be no effort to increase the present large numbers of troops being inserted into operating areas. There can probably be an expanded use of tests as exposure chambers for AEC purposes. FCDA faces a Congressional mandate not to become a research organization and must necessarily depend on AEC or DOD data which, within reason, can be obtained.

H. AGENDA QUESTION NO. 3: "WHAT WILL BE THE EFFECT OF FUTURE TESTS?"

12. The three sub-questions here were: Will they create new problems? Will they increase the magnitude of present problems? and, How will local conditions influence the type and size of tests?

It was considered that these had been adequately discussed previously or could be summarized in the conclusions. Discussion centered largely on whether the mission of NPG was to be expanded further, in which case there would certainly be new problems and the old problems would be magnified.

I. AGENDA QUESTION NO. 4: "EXISTING PROBLEMS: HOW CAN THEY BEST BE COPED WITH?"

13. Radiological contamination in the test area.

a. Some of the answer has been indicated previously as to tower height, less frequent use of towers or the same firing site,

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stabilization of firing site soil surfaces, and minimum surface or sub-surface placement

b. On-Site radiation presents a major problem because of cleanup and other work which must be performed in areas involving three-tenths roentgen exposure or more per week. The light soil results in internal exposures being a considerable problem.

c. Dr. Clark and Mr. Cole discussed the industrial safety situation and procedures at NPG, and Dr. Clark recommended the immediate employment of a qualified health physicist who could be oriented during the coming series and take over after the series. He described requirements for action on the problems now existing and the development of sound procedures. After a year or more, he thought, the physicist's work might conceivably be continued by a less-qualified rad-safety supervisor. It was believed that there are sufficient problems for a good man and that there are opportunities which would attract a qualified man.

Dr. Eisenbud noted experience in NYOO and said that the primary requirement is for someone who is willing to work closely with the labor crews in order to understand fully the details of their work; high school graduates with somewhat more than average enthusiasm and common sense have successfully looked after the radiological-hygiene requirements in similar situations; monthly visits by properly qualified health physicists would of course be required in order to provide orientation for the individual assigned.

d. There is less requirement for medical personnel, as physicians in Las Vegas can handle the work, but there is no health physicist personnel in the area to be drawn on.

14. Contamination in the 200-mile off-Site region.

a. There was discussion of experience on ground and tower shots, and of the good fortune which has on occasion caused highly-radioactive clouds to wend their way in between communities.

Dr. Thomas White, LASL, subsequently questioned whether the work available at NPG would be attractive to a well-qualified health physicist.

Dr. Bugher commented in his later communication that he "disagreed with this point of view and stated that especially in the developmental period of the health physics program a well-qualified health physicist with a broad scientific background is essential, and that we could not concur in a plan to entrust such a vital function to persons without adequate background."

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17. Claims procedures and limitations.

a. The beneficial effect of the blast claims procedure on public acceptance of blast damage was noted, with all elements being considered essential: Local recording and prompt investigation of claims, and prompt settlement under the Tort Claims Act of those which are justified and of less than $1,000. It was noted that this procedure is followed only on a verbal non-objection by the Department of Justice with the observation that if any question arises it may have to be re-evaluated. Conferees agreed that inability to use this procedure would be critical in the blast damage picture.

b. Mr. Lamb's claim for damage to his herd of cattle and the Groom Mine claim for losses resulting from a shutdown-evacuation are proceeding. Lamb's claim will exceed $1,000 and he will have to proceed under the procedure of suit in the Federal Court of Claims. The Groom claim has been referred by SFOO to Washington. The poor public relations inherent in a delayed procedure requiring employment of an attorney, the claimant's preparation and presentation of investigative data, and the delays normal to Federal Court of Claims suits was stressed.

c. DMA representatives advised that the Office of the General Counsel was preparing legislation, possibly for introduction this session, to give the AEC authority for settling claims similar to that which the Armed Forces have. The importance of such legislation to test operations was referred to repeatedly in the conference.

18. Public attitude toward tests.

a. Mr. Elliott summarized the situation within the Site region, as regards officials and public, as being quite cooperative. They have accepted blast damage, rather gingerly accepted scientists' assurance of non-hazard as to fallout, and generally welcome the NPG activity. There will be continuing instances of local irritation, as with losing employees to higher pay jobs at NPG or delays in settling radiation claims. But, the general attitude is cooperative. Radiation presents a continuing threat to public relations; while the fear is latent it can come into the open at any time; and should be anticipated by continuing public-related education, reports, etc.

b. Mr. Elliott recalled at this point that the mission of the NPG region public information activity was to assist test management by achieving the understanding and cooperation of the Site region public so that unthinking public reaction could be removed as a pre-shot consideration, and by otherwise facilitating

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test operations by providing a channel between management and the public. The primary mission is not to publicize participants nor to hold open shots, although both of these activities have undoubted value. This primary mission has been achieved, but is not static and must be maintained.

c. Mr. Salisbury discussed the national public's attitude, summarizing it as "good" with the exception of a few points where there have been radiation fallout flareups. He stressed that this attitude of acceptance could change quickly in the event of situations such as threatened last spring at Chicago when fallout coincided with a radiation accident at Argonne. He summarized general public attitude as: "Those fellows (in the atomic energy program) know what they are doing; their record is good" but predicted that one incident of injury would switch this attitude and seriously jeopardize continued use of a continental site.

d. Mr. Salisbury also brought in future on-Site problems, particularly the problem of whether Congressmen and Civil Defense directors should be permitted by the DOD to accompany troops in foxholes. He stressed the difficulty in keeping news correspondents, present at open shots, out of foxholes if others not in uniform were permitted there. The expressed attitude of the meeting was that no one not in uniform should be in foxholes during open shots.

19. Cost of construction and related problems.

Mr. Cole referred to high costs in money and time which resulted from the Test Organization's successful effort to meet a DOD time schedule on Jangle, mentioning that the data which was assertedly required by the following January 1 has, to the best of his knowledge, still not been disseminated or incorporated into military procedures. He stressed that complex construction requires time, and particularly requires time if high overtime is to be avoided.

20. Conclusions as to problems were:

a. Test management will not be surprised if future tests create new problems, even though the nature and scope of the program does not expand further. For instance, jet drones present a new safety hazard for Upshot-Knothole.

b. Problems will be magnified in any case, particularly on-Site contamination and facility lacks, unless facilities are expanded to meet need.

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c. (1) Existing problems other than the lack of facilities and continuing expansion of the program are either in good shape or being worked on with hope of successful conclusion.

(2) Contamination in the site area may be reduced by development of new firing sites and less frequent use of each site, by use of aluminum towers, by using higher towers, or by soil stabilization. The Committee particularly recommended continued studies on the effect of economical types of surface stabilization. A capable radiological officer stationed permanently at the Site is an immediate requirement, although there was some difference as to whether he must be a health physicist.

(3) Radiation fallout has not exceeded permissible exposure in the highest reading recorded in any nearby off-Site inhabited locality. Good fortune has helped and management must continue to watch conditions, treating each shot as an individual event, and noting weather as late as possible before each shot. Weather studies, correlating predictions with zero-hour and past-shot fact, should be continued. Actually it was the Committee's feeling that more care rather than less care should be exercised due to experience to date.

(4) No fallout level outside the 200-mile radius has approached the minimum conditions considered hazardous. Buildup of background is not a foreseeable problem, but should be kept under observation.

(5) Physical damage from blast has been relatively negligible. The present forecasting procedure gives good indications of probable damage although last minute variations in weather can change the forecasts and make it impossible to say flatly that damage can be continuously avoided.

(6) Legislation providing for local recording and investigation of claims and for prompt, local settlement is seriously needed.

(7) The NPG region public's attitude toward tests is to some degree that of participants and generally is quite cooperative. This is also true of the more distant public. In each region, however, there remains a latent fear of radiation which may flare up given an incident or an accident and which should be continuingly anticipated by educational, warning and reporting effort.

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(8) Unrealistic target dates have the most adverse effect on construction cost.

J. AGENDA QUESTION NO. 5: "DO DEVELOPMENTS TO DATE CONFIRM THE DECISION TO ESTABLISH A CONTINENTAL TEST SITE AND ITS LOCATION AT NEVADA? IF NOT, WHAT ALTERNATIVES ARE SUGGESTED?"

21. The first part of the question has been answered previously.

a. There was some additional discussion of the alternate site on the Las Vegas Bombing and Gunnery Range located nearer Tonopah.

Dr. Bradbury commented as follows on this point:

"I believe that NPG was originally selected after exhaustive study as the most favorable location in the continental U. S. Accordingly, I do not believe that a more favorable location can be found. We must either live with no continental test site, or live with this one under what circumstances are permitted. Needless to say, I hope that a firm stand as to the technical necessity of a continental site can be maintained in spite of the understandable nervousness of those whose major objective is amiable public relations."

b. It was the Committee's concensus that there would be no advantage and in fact considerable disadvantage in activating another site and no reason at this time to consider such activation.

c. It was concluded that: Developments to date confirm the decision to establish a continental test site and its location in Nevada. NPG can be developed to meet all foreseeable nuclear diagnostic and effects tests of a nature which can be done at a continental site. There is no reason to consider alternative sites at this time.

ATTACHMENTS:
1. Ltr Dr. Bradbury to C. L. Tyler, 1/5/53
2. Memo Dr. Froman to R. E. Cole, 2/3/53
3. Memo Dr. Bugher to C. L. Tyler, 1/30/53
4. Memo Dr. Ralph Carlisle Smith to R. E. Cole, 5/8/53

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January 5, 1953

CLASSIFICATION CANCELLED
BY AUTHORITY OF DOE/OC DOE 5650.2, III-12
Jose Diaz 4/14/81
REVIEWED BY Wilbur A. Strauser DATE 4/13/81
By: W. Tarch 6/5/87

Dear Carroll:

...In view of the primary purpose of the entire NPG setup, I am inclined to feel that medical and public relations problems are somewhat overemphasized in the selection of the Committee and that the real reason for the establishment of the proving ground may be overlooked.

I would like to comment briefly on certain of the factors which you propose that the Committee consider:

With regard to the "requirements and reasons" for establishing a continental test site, I do not believe that these have changed at all from the point of view of the LASL. I do believe, however, that the picture has changed enormously from the military point of view, and that the AEC has, in fact, accepted a changed concept. I regard the tendency to use the NPG for the purpose of weapon system tests (the forthcoming gun shot), for civil defense effects tests, for troop indoctrination and maneuvers, and for the reportorial press as quite outside the original concept of this site. Indeed, this trend, if continued, can force us to abandon this site for no other reason than that the military have taken it over. Even now the use of this site by other agencies is reaching such a level that it may sometime be necessary to recall that this area was actually established at the specific request of the LASL for its own needs.

With regard to your question as to types of devices that we expect to test, there can be no firm answer. In the original concept of the continental site, such a question would not even have been asked since it was then understood that we would use a continental site for urgent development work which required full nuclear test, and that such tests might arise at any time but could not be predicted in character or number. We are trying to recapture some of this earlier flavor by postponing indefinitely any firm decision regarding operation DOMINO and letting this operation be one which we will conduct in a simple fashion when and if it is required and with prior notice comparable to the original RANGER operation. It is my personal opinion that both air and tower shots will be required for the indefinite future; that they will cover all ranges of yield up to as large a figure as experience will seem to permit. I am also of the opinion (but less strongly) that LASL shots in the future will tend more to air drops with simple measurement of yield and less to complicated experimental observations of tower shots.

Any devices to be tested should not create uniquely new problems of contamination or blast, and yield alone should be an adequate measure of the problem to be expected in any given proposal. It must, however,

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be clear that in an experimental operation the yield frequently will be quite unpredictable and only a "probable" value can be given which may be exceeded or missed entirely. However, such problems only change the effects at any given location by very small factors - factors much smaller than that within which any resultant widespread effect can be predicted.

I have no particular comment on the specific questions of contamination, its minimization and removal other than these are, of course, technical questions well worth considering.

With regard to the last point: the abandonment of NPG for a more favorable location, I believe that NPG was originally selected after exhaustive study as the most favorable location in the continental U. S. Accordingly, I do not believe that a more favorable location can be found. We must either live with no continental test site, or live with this one under what circumstances are permitted. Needless to say, I hope that a firm stand as to the technical necessity of a continental site can be maintained in spite of the understandable nervousness of those whose major objective is amiable public relations.

Norris E. Bradbury
Director

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February 3, 1953

R. E. Cole, Director, Office of Engineering and Construction, SFO
Darol Froman

COMMENTS ON DRAFT REPORT OF MINUTES OF THE COMMITTEE TO STUDY THE OPERATIONAL FUTURE OF THE NEVADA PROVING GROUND
TAD-1124

1. In general the comments of those attending the meeting and the Summary Conclusions are in very good agreement with my own ideas on this matter. I will comment briefly below, however, on a few of the points.

2. Although it was not a point of the discussion of the Committee and probably is not appropriate in this memo, I would like to point out that the name, "Nevada Proving Grounds, NPG", is, to my way of thinking, both a misnomer and a confusion. NPG has been used for a long time to mean Naval Proving Ground, Dahlgren and is so interpreted by many people. I believe it was the consensus of opinion of those attending the Committee meeting and certainly felt strongly by several others at Los Alamos that the Nevada facility should not be, and was never intended by the AEC to be, a proving ground. (We understood that Nevada Test Site had once been approved as the official name.) The original concept as well as the apparent feeling of the Committee is that the facility is a test site similar in concept, although of a completely different magnitude, to R Site at Los Alamos.

3. I note that the LASL representatives withheld expression of opinion on the point that the original concept of the continental site mission had been basically over simplified, perhaps. I would like to go a little further than withholding expression of opinion in that I feel that the original concept was approximately correct if one includes in it an understanding that effects, indoctrination, and public display objectives are admissible if they do not interfere appreciably with the primary objectives of weapons research and development.

4. I wish to add my strong approval of the Committee's position that weapons tests held in the most unfavorable conditions which can be producted by rain, snow, and ice should not be part of the Nevada Test Site operations. This is true not only in view of the reason given with respect to safety but also because foul weather conditions are likely to interfere seriously with the technical observations and because scheduling for such events becomes practically impossible.

5. In connection with the advanced notification to the photographic industry of a projected series of tests it might be pointed out if we simplify the tests appreciably, as is being suggested for Domino, it may be essentially impossible to make such notification as much as 6 months in advance. The Commission can, however, always guess at such dates and inform the industry of postponement or cancellation.

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Jose Diaz 4/14/81
REVIEWED BY DATE
Wilbur A. Strauss 4/13/81
By WOC 6/5/87

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6. In the Conclusions it might be best to say that the types of devices thought of for the future will approximate those previously fired and those being planned for Upshot. My impression is that some of the Upshot devices are not very close to any which have been tested previously in Nevada.

7. I do not believe that public safety is an appreciable factor restricting the number of tests per year but rather it is a factor which restricts the kinds of devices which may be tested.

8. I do not fully understand the reasons behind the Committee's apparent feeling that the yield of air burst tests should be limited to the order of 50 KT because of the possibility that the fuzing system might fail and the test turn out to be a surface burst. It seems to me that a factor of 2 or so in yield is completely meaningless in so far as public safety from contamination is concerned and that one should consider contamination as being really different only for an advance in yield by a factor of 10, other conditions being the same. The Committee will not admit surface bursts exceeding 1 KT because of contamination. Consequently, I cannot understand how it can differentiate between a 50 KT air burst and one 2 or 3 times this big on the basis that the test may turn out to be a surface burst. It is a little academic to allow the possibility of 50 times the chosen limit but rule out 150 times. It seems to me that if one takes the small probability of fuze failure at all seriously then one must limit air bursts to a number less than 10 KT. I, therefore, recommend that the yield limit on air drops of estimated yield above 10 KT be based on the premise that the fuze system is sufficiently reliable that we can neglect the probability of the device turning into a surface burst. Consequently, the maximum size of an air burst should be selected on the basis of the expected contamination and blast effects for the device being exploded at the chosen altitude.

9. My personal opinion is that the extent of secondary objectives and benefits for other than AEC agencies and the number of observers for operations in Nevada should be severely limited in accordance with the housekeeping facilities.

Darol Froman

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Carroll L. Tyler, Manager
Santa Fe Operations Office

January 30, 1953

John C. Bugher, M.D., Director
Division of Biology and Medicine, Washington

COMMITTEE TO STUDY OPERATIONAL FUTURE, NEVADA PROVING GROUNDS

BM:JCB

The draft report of the subject Committee is a far more polished product that the comments of the secretary would imply. The comments which follow deal with only minor matters.

1. With respect to the discussion (on "Purpose"), including Dr. Bradbury's letter, I would like to have it a matter of record that the over-simplified concept which was entertained originally by the Los Alamos Laboratory concerning the NPG as a backyard quick testing area was never realistic, and actual operations promptly disproved the soundness of the concept. The costs involved, and the magnitude of the issues concerned, give to such operations a character that involves far more than the details of weapons development. The principle of obtaining the maximum of necessary information from each detonation is unquestionably sound, and this principle should not be abandoned for reasons of convenience.

2. The principle above, re-expressed, implies that effects testing, save under the most unusual circumstances, will be keyed to the developmental program.

3. The discussion relative to "interference" which test requirements may have made in the programs appears to miss an essential point. The questions asked of the Test Organization relative to effects programs have not been precisely, "Can you do this?", but rather, "Is this effects program feasible within the framework of the planned developmental test?". The decisions of the Test Manager and the Scientific Test Director have been taken as final in such matters as far as we have been concerned, and it has been understood by us that the affirmative answer meant that the test did not interfere with the acquisition of developmental data. It is, of course, obvious that such effects programs increase the volume of work and responsibility carried by the Test Organization, but this should not be construed to be "interference" in the sense of preventing the acquisition of data pertaining to the detonation itself.

4. Related to this matter, the magnitude of the developmental and effects programs must obviously be determined by the adequacy of the facilities. If the development of the test site has been determined by Bureau of the Budget action rather than by scientific and military

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Jose Diaz 4/14/81
REVIEWED BY W. Bur A. Strauser DATE 4/13/81
BY W. Tesch 6/5/87

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requirements, then the fact and the degree to which such action has in fact controlled the developmental scientific program should be made a matter of record.

5. The last sentence of the first paragraph (on-Site effects of contamination) might better read: "Use every two years, permitting time for contamination to decay, would greatly reduce the problem of preparing the site for another detonation."

6. The limiting consideration that a fuse failure on an air drop with possible detonation at or near the ground should probably be made more emphatic. This is a very real limiting value on the size of detonation which would be considered for an air drop.

7. I would like to add (to discussion of rad-safe requirements) the following: "Dr. Bugher disagreed with this point of view and stated that especially in the developmental period of the health physics program a well-qualified health physicist with a broad scientific background is essential, and that we could not concur in a plan to entrust such a vital function to persons without adequate background."

8. "Summary Conclusions": This section is an excellent job of expressing the consensus of opinion of the Committee.

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THIS DOCUMENT CONSISTS OF 3 number of pages No. 8 of 35 copies series B May 8, 1953

E. Cole, Chairman, Committee on Operational Future, NPG

Dr. Ralph Carlisle Smith, Los Alamos Scientific Laboratory

CLASSIFICATION AT CONTINENTAL TESTS

1. In the initial operation at Nevada Proving Grounds, many precautions were taken, based on considerations involving not only security but also safety. Operation Ranger involved a small, well-knit group hence most of the procedures did not place too great a burden on the activity.

2. It was soon learned that some of these precautions were unnecessary and to a large extent unrealistic on a continuing basis.

3. Security classification had been placed on many items of information which were available to the general public through rather obvious means. For example, shot day and approximate shot time were compromised by announcements of the CAA, movements of construction personnel within areas, safety warnings to surrounding communities, local open radio circuits, and various other activities coming to a climax at shot time. Newsmen in the surrounding hills were able to get early burst pictures, using photo-electric cells for tripping the camera shutter. They also obtained good pictures of the post-shot cloud and, with available published data, were able to determine whether or not tower shots, air bursts, or underground shots were involved. In fact, they were able to tell from the general appearance whether or not a large or small yield device had been detonated. The general accessibility of the area makes it impossible to prevent anyone interested from determining ground zero, using simple triangulation techniques. Furthermore, if anyone is interested, he can obtain ball of fire pictures as well as blast and ground shock data rather readily.

4. In addition, over the period of time, military participation has greatly increased. The original order, on Buster-Jangle, was that Desert Rock troops could have access to the area but could not have information on the effects of the detonation on equipment and the like, particularly as a function of distance. Such data has been graded Restricted Data. However, from the first series of tests on, the Desert Rock troops who as a rule are only cleared for military Confidential, have been given access to nuclear detonation gross effects on equipment as a function of distance from Ground Zero. Furthermore, there has been considerable pressure for non-Q-cleared military photographers to enter the area to take photographs prior to and during the nuclear detonation. The complication has also arisen that the device is open to visual observation by Desert Rock troops and cameramen during the time the device is being raised to the top of the tower, and because the face of the tower cab must be removed for setting up of equipment and for observation of the device at the time of detonation.

CLASSIFICATION CANCELLED BY AUTHORITY OF DOE/OC DOE 5650.2, III-12
Jose D. Garcia 4/14/81
REVIEWED BY Wilbur A. Strauser DATE 4/13/81
By: W. Tauch 6/5/87

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5. From the technical program standpoint, complications have arisen in that military personnel interested in the program are not always Q-cleared, but still have potential access to Restricted Data. This not only involves recovery of shot data, but also access to Restricted Data in the hands of AEC contractor personnel. Although many precautions are taken to have all such persons Q-cleared in advance of the test series, it is not always accomplished in time. For example, in discussions on proposed measurements, it is necessary to give approximate yields to the military personnel involved.

6. VIP briefings have created similar complications relative to access on Restricted Data by personnel not cleared by the Commission. The scientific personnel directly concerned with the program are specifically excluded from contact with the VIP groups in technical discussions because of this clearance complication, whereas the military organizations are able to present discussions of their work and give access to Restricte Data to the VIPs who are not Q-cleared.

7. In any event, it is difficult to explain to the U. S. press and to Congressional observers that we can arbitrarily grant open access to a shot yet consider similar access to other shots to be highly classified. This difficulty is complicated when large groups of troops are given similar access on most shots.

8. It seems clear from the foregoing that the activities in the continental test program are complicated from a classification standpoint which, if not realistic, should be modified.

9. a. It is submitted that the classification standpoint is not realistic at this time, if one looks at the complications that are mainly based on the fact that gross effects of detonations are graded Restricted Data. This decision has been made on the ground that gross effects give an indication of the yield of the nuclear detonation. Therefore, if it should be determined that the approximate yields of test devices detonated in the United States do not affect the national defense or security, then the gross effects which have been published as a function of yield (See the Effects of Atomic Weapons) would not be classified, thus simplifying many of the security problems.

b. The question then is: "Is the classification of the yield of continental detonations realistic?" First, we have either announced publicly or have not objected to at least semi-official confirmation of the fact that we can produce nuclear devices having yields up to approximately a hundred kilotons. See the statements by Senator Ed. Johnson, Congressman Hebert, Commissioner Dean, and others, as well as the fact that FCDA uses a fifty kiloton yield as the nominal device for which to plan. The Effects of Atomic Weapons gives scaling laws and curves with yields going up to a hundred and two hundred kilotons. Furthermore, we have indicated that yields of such great magnitude as to require safety precautions not available in the United States are involve in the overseas tests.

c. It is clear, therefore, that even if one were to compromise the yield of a specific nuclear device detonated in Nevada, it would not indicate the capabilities of the United States. Second, an alert agent or any casual, qualified observer would be able to estimate the approximate yield from off-Site observation, using basic data given in the Effects of Atomic Weapons as a reference point. Yields are estimated at great distances using light and sound observations. Third, at no time do we indicate whether or not a device is a stockpile weapon. As a matter of fact, most of the devices do not correspond to stockpile devices, although sometimes they have only minor modification therefrom. Consequently, we would not necessarily release information on stockpile devices if the yield was compromised. Fourth, it is not necessary that we announce yield accurately nor is it necessary to announce yields publicly at all. However, it is suggested that we might use the technique employed on non-classification of implosion as described in the Declassification Guide.

10. In other words, it is suggested that the yield of continental nuclear detonations not be considered information affecting the national defense and security, so long as it is not identified as the yield of a stockpile weapon. However, no announcement of accurate yield need be made, but information which is classified solely because it might provide an estimate of yield should no longer be classified.

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