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In early Jan 59, made some preliminary estimates of the monitoring system for the system proposed for a test band. The figures are an overall initial cost of Three Hundred and Twenty Seven Million an annual operation costs of Seventy one Million Dollars.

411668

January 1959:

It is noted that a working group has been established for further study of high altitude explosion phenomenology and related diagnostic test objectives. Feasibility studies and experiments on the balloon pinex have included flying the tower in a horizontal position and although the analysis is not complete it now looks feasible to do a pinex experiment on a balloon shot. There is mention made of meteorological research being done within J-Division concerned mainly "with obtaining machine analysis and forecasts of the wind field in the portion of the Pacific Ocean bounded by the meridians 170 West and 140 East and the parallels 3 South and 36 North. The method of machine-wind analysis used in the Typhon program has temporary abandoned." The new method is discussed at some length and if it proves successful, "the time lag between receipt of station observations and completion of analysis of the wind field at several levels will be cut from some hours to minutes."

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Correspondence in January 1959 indicates some discussion in planning relative to possible missile impact location systems in the Eniwetok area, perhaps with reference to upcoming R&D testing on missile systems. PMR seems to be playing a heavy role in the overall ~~in the overall~~ program.

BU

study by Headquarters ARDC dated January 1959 covers the Atomic Weapons Effects Test Program addressed to Operation WILLOW scheduled for EPG 1960. In brief it states that "In general, these Atomic Tests Proposals are designed to obtain information on phenomena of high altitude explosions, ballistic missile and satellite destruction mechanisms, blackout and other communications disturbances, the ARGUS effect and protective construction. Also included are proposals on the operational aspects of a nuclear test; viz, weapons carriers and sounding rockets."

BV

In January of 59 Molnar of Sandia proposed to DMA an AEC high altitude test to be carried out by the Labs, fired from Johnston Island to a height of like 100 kilometers and instrumented heavily by the AEC Laboratories. The planned date was no earlier than 1960 or 1961.

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Correspondence over the next few months makes it quite clear that separate AEC and DoD thinking is developing diverse ideas of what high altitude effects programs might look like. The DoD planning effort seems to be centered in AFSWP, the forerunner of DASA. The first meetings addressing coordinating these efforts took place in mid-April 59. From this time on planning on the AEC side seemed to be done jointly between Sandia and LASL and the code name for the committee was BUZZER and it was chaired by Taschek of LASL. Note that there is reference to the past accomplishments in planning for such testing by a Panofsky panel.

Later in the year, increasing interest is shown in AEC participation, support and interest in high altitude weapon effects. Starting in January of 59, joint discussions between the Military, that is, ARPA and AFSWP, and the AEC began to address the joint planning for high altitude detonations effects studies and a little later in the year, detection of such detonations and surface detonations by satellite.

Y

NVOO Central Files

Miscellaneous Files Reviewed, June, 1975

OX #

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Contained herein are a number of files on the medical and health and Rad-Safe aspects of NTS operations. The gentleman in REECO concerned with such things is the manager of the Radiological Safety Department, William S. Johnson. Also involved in this correspondence during the moratorium is Major Gordon Jacks, then in Albuquerque. Included here are records by REECO of the radiation exposure to the various mining crews in Area 12 doing mining operations during the moratorium. Overall gamma radiation exposure to each crew accrued during periods of time <sup>60</sup>~~as~~ indicated as well as the radiation level shown at various points in the tunnels, for instance in the main tunnel of U12E and in the <sup>03</sup>~~02~~ drift at the end of May, 1959. Correspondence indicates that among others the following at the Laboratories were concerned with radiation levels to personnel and in various NTS areas: R. Scott Bybee, Livermore-Nevada and Jerome E. Dummer of LASL.

Jan  
59

The following notes cover the first half of calendar year 59.

Colonel Leo A. Kiley became Technical Director and Assistant Deputy Chief of Staff under WET as of 1 April 59.

"The primary mission of the Weapons Effects Tests Group during this reporting period was to maintain a continuing capability for fielding a weapons effects tests organization should the existing nuclear test moratorium be cancelled and the U.S. resume nuclear testing. In connection with this mission, very close liaison has been maintained by an interchange of visits between staff personnel of WET and Headquarters DASA in order to effect a close coordination of effort and to better understand the mutual problems involved should nuclear testing be resumed." It is noted that the moratorium has emphasized the need to put on paper WET's methods of Field Operations and thus they have been preparing standard operating procedures and directives which cover both NTS as well as overseas test activities, as well as their functions as Sandia. WET participated in meetings on "Pacific Test Planning," including JTF-7, the labs, etc. on "How to resume testing under conditions which would make firing urgent and which would not permit use of the existing Pacific Proving Ground."

Note that Kiley came to Field Command from being Chief of the Biophysics Division of AFSWP. In this role Kiley served on the NTS Planning Board and, on 4 June 59, presented the DOD effects program for Operation Trumpet. Within the group, planning is proceeding for certain projects to be carried out on Trumpet should it be permitted in the future.

7. The documentation for Vortex at Site Able begins in the beginning of 1959 with a confidential document describing the site as a fast criticality facility at the NTS and says the following things about it. "The installation will completely contain debris from detonated device assemblies including the fissile materials (plutonium, U235). The facility will be designed for a 150 lb explosive limit including nuclear yield. The total installation required to fire one shot per week and to process all the debris is estimated to cost approximately \$4 million dollars." A somewhat abbreviated facility is estimated to cost approximately \$2-1/2 million dollars. Experiments to be conducted in such a facility are described as: (1) hydronuclear devices in which the mass of fissile material is adjusted to give a nuclear yield which is negligible when compared to the explosive in the assembly, (2) device safety test to determine the performance of abnormally detonated configurations with nuclear yields held within specified limits, and (3) equation of state hydrodynamic and initiator studies making use of fissile materials but giving no nuclear yield. A preliminary construction schedule which would provide for construction to begin immediately indicates that the operational date for the site would be 1 August 1960. Note that discussion of such a facility and direction for people to consider the steps necessary to construct it was documented by a Mr. Bruce Crowley as early as May of 1958.

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Construction actually did take place and continued right up through the resumption of testing in 1961 with some initial types of testing planned for the facility in 1962.

\* The discussion around early January 1959 addressing the upcoming meeting of the Eniwetok Proving Ground or EPG Planning Board includes a message from Reeves to various addressees. I will list these addressees here since it might have some correlation to a list of members of the EPG Planning Board; Starbird, Rear Admiral Edward Parker who was head of AFSWP, Al Graves, H. E. Grier (EG&G), Sam Howell (H&N), F. W. Hohner (USAEC, Los Angeles), and Duane Sewell (LRL).

1959

A 2 January TWX from Task Group 7.1 (LCDR Snure) to Cmdr. JTF-7 states that EG&G, after looking into a mobile trailer or van for certain diagnostic and firing and timing functions, states that there is such a van under construction for the Plowshare program but that to get the full capability envisioned and they don't specifically know what it is but they would guess that about 120 days lead time would be required to develop such a mobile capability.

C

Here is a 2 Jan.<sup>59</sup> message from Bradbury to Starbird which discusses in part the assignment of various classes of weapons to one or the other laboratory and in particular some specific developments in testing as well as the feeling Bradbury has that neither laboratory should be given the responsibility of weaponizing a development of the other laboratory. Bradbury seems to favor the assignment of classes of weapons

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for development by weight of the device with the various classes being assigned in alternating order. In other words, since LASL has been assigned the 1500 lb. and the 6000 lb. class, Livermore should have the 3000 lb. class. The message goes on and sets out a table of suggested assignments of various devices and various weapons systems to the two laboratories. This data as well as a message from Teller to Starbird on 9 Jan. and a joint message from both labs on 15 Dec. are all a result of a joint lab meeting on 15 Dec. 58 on assignment of weapon programs.

Meeting #61, 5-7 January 1959:

The Commission provided a detailed discussion of the Geneva test Ban talks for the GAC, which will be extracted for our files.

NH

Here is what is equivalent to the Livermore program letter dated 6 Jan. 59 from Bradbury to Starbird concerning the LASL program for calendar years 59 and 60. He talks about the uncertainties due to the test moratorium and the fact that the lab needs to consider expanding their research activities not only for the present lull in testing but with an eye to the future when a test ban agreement may be signed and the weapon program would be correspondingly decreased. As research areas which might warrant some expansion he specifically discusses fundamental research, particularly in the field of accelerators; space research; solid state physics; and possibly plowshare type activities. Noting the other programs, including Sherwood and Rover (where a significant shift of test division personnel into this program is going on), he specifies what the lab regards as its directive at this time: first, to "continue to the most satisfactory completion possible those weapons for which LASL has the formal design and development responsibility; second, to maximum the development of further weapons using devices such as the Phermex and computational capabilities; third, to keep

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AEC informed as clearly as possible as to the technical benefits to be obtained from a resumption of testing at any given time under whatever restrictions or lack of restrictions that may be present at that time. As for this latter point, he expands "this promises to be an increasingly difficult task, and even for the short length of time which the current 'moratorium' has been in effect, one may detect some decrease in enthusiasm to plan hypothetical test programs, particularly under the heavy restrictions which seem currently in some degree of favor at high levels. Moreover, the intensivity of testing operations during 1958 followed by the current uncertainties is resulting in a drift of individuals away from the testing type of activity. This is true both at Los Alamos and with its contractors such as EG&G- where the problem has been further complicated by funding restrictions. In general, the longer the current uncertainty exists, the longer it will take to re-establish a weapon test activity at any specific degree of technical competence. Short of a national crisis involving a test of the most extreme urgency, it might now - after the short time since Oct. 31 - require as much as a year or two to re-attain the degree of skills existing in 1958 because of loss of personnel or their drift into other activities from which they will not easily be removed. This should not be interpreted as a total loss of testing ability but rather that any initial resumption of testing will be at a somewhat lower level of technical elegance than has heretofore be deemed appropriate."

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Here is a 6 Jan. 1959 report entitled, "Factors in Planning and Conducting an Atomic Test Detonation in the Opensea," based on activities and meetings held in late 1958 which considered the following. The development by JTF-7 of the capability for an opensea test response capability of 3 months lead time which would utilize an LSD ship which would carry either an Army barge or a Navy LCU for the device carrier. A certain type of Naval Task Group is envisioned which would include the two types of craft just mentioned as well as a destroyer and about 3 other ships and some P2V aircraft and helicopters. It is envisioned by the author of Task Force J 3 that fireball photography could be accomplished by installation of a camera in conjunction with the fire control radar on the destroyer and that AEC would have to determine what other austere instrumentation could be provided. A feasibility test to investigate the capabilities of an LSD with either a barge or a LCU in various sea states and the handling problems associated therewith is recommended.

Here is a report of a meeting held at Headquarters JTF-7 on 8 Jan. 59 which discusses with PMR the requirements for the use of EPG as a down-range impact area for Air Force ICBM's.

JA

8 January-TWX from Hertford/ALO to Starbird addresses the problems ated to the proposed relaxation of one-point criteria.

C

8 January Starbird sent a TWX to Reeves, Info. labs, in which he horized the construction of 3 LRL safety tunnels and 4 LASL safety es at NTS and states that such is to be done within funds already ilable to ALO.

Here is an 8 Jan. 1959 message from Starbird to LASL and Livermore which gives Starbird's proposed introductory remarks before upcoming hearing with the JCAE to update the results of Hardtack. Among other details of the accomplishments of the Hardtack series and its impacts in contrast to other previous atmospheric testing and NTS testing, Starbird mentions the test moratorium now in effect as follows: **PA**

"With the suspension of testing forecast to occur on 31 Oct. it was necessary that we revise radically our plans and attempt to complete <sup>before</sup> ~~the~~ 31 Oct. as much as possible. Specifically, it was necessary for us to try to finalize designs that were near completion (final design) but for which further tests were still necessary."

Thus he notes what the original intent of the NTS phase of Hardtack was prior to the plans for a moratorium and what the revisions of the program was in some detail and the results of the shots in the Sept.-Oct. 58 time frame as to their success and lack of success.

The first half of calendar year 59 shows plenty of discussions and testimony in the areas of reactor testing at the NTS and also of fallout contributions from all of the nuclear tests to date. The information on fallout is to be presented to the JCAE special sub-committee on radiation and, at least in part, will be a presentation by Wright Langham on "biospheric contamination from nuclear weapons tests through 1958."

DMA prepared for the JCAE a composite report of the future activities and status of the three laboratories for approximately a 10 year period in the future and submitted this apparently in Sept. of 59.

A 12 January 59 TWX within the Army notes that Walt Chestnut of GC Dewey Company will be doing some work for the Army very soon on the effects of the various ABM systems such as the NIKE-ZEUS.

LI

A 12 January TWX from Sanders of ALO to Starbird, Graves, etc. proposes a 1 day meeting of the EPG Planning Board with representatives of participating agencies to address drawing up alternate plans for launching a short but austere type of overseas operation should we get the opportunity. The date of the meeting later was changed to 28 January. (Mention of equipping diagnostic ship and rehabilitation of Liberty Ships).

C

About this time, mid-January, there is documentation that Harold Brown will return from the Geneva negotiations in February and that a replacement for him as principal technical advisor is required. Both Graves and Ogle are mentioned.

There is considerable discussion in this time period of the appropriate formula to use for containment of underground shots at the NTS.

Also in this time period there is reference to some documentation generated by Herman Hoerlin in regard to LASL interest in high altitude related research.

A 15 Jan. 1959 memorandum from Task Group 7.3 to Commander of JTF-7 discusses a deep water mooring feasibility test. It is noted, "During Operation Hardtack precision deep water mooring was attempted for the first time. In this design three of four legged moors were used in 1000 fathoms of water, and YC used as mooring buoys. The procedure, however, introduced great dangers to personnel on board the YC's during handling of the mooring tackle." There were significant problems with the number of visits that had to be made to the moor and with the problems of small boat handling in high seas and the overall personnel risk was considered unacceptable. "After the completion of Operation Hardtack, the staff of Task Group 7.3 made an extensive study of a more practical three point moor which would reduce these dangers and which would allow fully instrumented YC's or targets vessels to be placed in the moor as required." This design of a new type of moor is now complete and a feasibility test to prove out the design is considered necessary and JTF-7 is requested to arrange for such a test off of Nassau. Whether this test was in fact done is not clear here.

CV

on the facilities at Palmira, Christmas, Canton, and Howland-Baker. Further correspondence in the same period of time between Task Force Headquarters and the various Task Groups such as Al Graves in 7.1 indicate that what is being investigated is a possible openseas testing capability. A 15 Jan. message from ALOO to DMA, AFSWP, LASL, Livermore, etc. notes a 28 Jan. meeting to address these alternatives which will think of such things as alternate locations and methods, including air drop, balloon, or drone aircraft operating out of non-trust territories such as Christmas or Johnston; openseas firing techniques using barges, LCU's, or Liberty Ships; etc. The labs are to identify the devices which would be tested in a quick, short, austere operation as well as the minimum diagnostics that would be acceptable and therefore the minimum instrumentation. that approximately five months notice would be available." JA

Meeting #1456, 15 January 59:

The Commission was told that Harold Brown of the US Delegation at Geneva was to be temporarily replaced by Kenneth Street, Deputy Director NG

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of Livermore. After considering the matter, McCone said any replacement of Brown should be on a permanent basis as the Delegation must have continuity in scientific advice and the General Manager agreed to further look into this matter.

Meeting #1457, 16 January 59:

From a meeting with Senator Anderson of the JCAE, Mc Cone reported that Anderson felt it was unfortunate that the Department of State had not discussed the test cessation with the JCAE before entering into the negotiations because the JCAE might have been able to forestall Congressional comments. They might have been able to dissuade Senator Core from making his proposal. Commissioner Floberg noted that the Commission also was not properly brought in to the discussions prior to negotiations. NG

A 16 January 59 memo within LASL for distribution from George I. Bell is titled "Suggested Conclusions on PLOWSHARE and Related Topics," and is -1087. He states SMAB II has considered what type of PLOWSHARE program if y LASL should undertake. Some of the general observations are that peaceful plications of nuclear explosives will be made and will be of long range value the U.S., that the AEC and Weapons Labs should stimulate such development, d that the present moritorium conditions may limit a PLOWSHARE program. reover, the presently developed weapons are not developed with PLOWSHARE plications in mind and therefore are not normally coincident with the quirements for peaceful applications. Also, the group feels that it appears kely that if weapons tests continue, much of future testing will be underground. er briefly reviewing some specific PLOWSHARE proposals the group makes some ommendations for Los Alamos: that formal consideration be given to designing ices specifically for peaceful applications; that a small, full-time working up of about four to six people be established to investigate underground onations and include in their considerations: diagnostic weapons tests erground, repeated detonations in a single container, and performing under- und tests in order to make long-range detection difficult, clearly this up, which could draw to a major extent from J Division activities and erience, would develop LASL attitudes and programs which would be of value both PLOWSHARE and future testing.

In a more general vein, it seems apparent through this time period that vermore is earnest about selling specific proposals in the PLOWSHARE area areas LASL is content to consider the possibility of carrying out testing, e various proposals as to which have merit, what methods might be utilized even address planning, etc.

JP

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M & R Records Center

334 Panel on High Altitude Detection" Folder

The first several entries in the folder are reports from various authors on the subjects of high altitude test detection and capabilities to perform tests in outer space. The first report by Richard Latter, dated 21 January 59 is entitled "Detection of High Altitude Nuclear Explosions." He begins by noting that the Conference of Experts address some aspects of detecting outer space tests, at altitudes above 30-50 kilometers; they concluded it possible in principle to detect such explosions by various means including detection of prompt and delayed Gamma, detection of neutrons, visible light detection, and ionospheric disturbance detection, by a set of instruments on satellites and also on the surface. Latter points out that information from tests as well as studies done since the conference have indicated the methods may be different and not quite so easily used and that the question really wasn't addressed out to deep space. His study addresses the various regimes of interest by altitude and concludes what he believes to be the most likely possibilities for setting up a detection system as follows: detection of tests below a few hundred thousand kilometers by measurement of prompt Gamma rays by a system of six satellites located at about six earth radii. Detection of tests beyond a few hundred thousand kilometers by measurement of x-rays on about three satellites at an altitude of three to five hundred kilometers in the equatorial plane. Use of solar and lunar satellites to detect any detonations behind the sun or moon, probably using x-ray detection. And finally ground based measurements of ionospheric disturbance for detecting explosions below one thousand kilometers.

JR

Logs of documents that were included in the J3 files are contained in this folder and although most of the documents do not show up in this folder and ~~are~~ probably been destroyed, the lists of titles and dates on which these things were prepared of some interest. Several memoranda and messages are listed from 21 January 59 through 18 November 59 on the subject of aerodynamic balloons, "quick and dirty" balloon shots, development of the aerodynamic balloon program (presumably by Sandia). Finally, in November, the status of the Aerocap Balloon development program. On more general subject, there were a number of messages, between DMA and the Operations Offices and the contractors and the Labs on testing policy, planning for overseas testing, and just general test planning which began in late October 58 and really picked up speed in early 59 with numerous studies and meetings and correspondence addressing possible requirements for testing, methods of testing, locations for testing, etc. Included are some studies of upper atmospheric tests, study of surface wave problems, and plenty of detail addressed to the open sea concept and the questions as to the details of set-ups on the ships and the locations and the practices, etc. Note that Curry wrote a memo for record on 21 January 59 on "Facilities at Christmas Island." ~~was~~ Detailed study of the open sea concept, <sup>based on</sup> ~~from~~ the number of studies done, seems to have continued into May of 1959 and not to be addressed much later than that time.

A folder entitled Area 12-General Tunnels: an interesting letter in this folder is from Sam Howell, then manager of engineering and construction for Holmes & Narver, to Mr. Allaire, director of the Nevada Operations for ALO. It is dated 16 January 1959 and is a current update of H&N's projects for the NTS. Howell notes that LASL has had authorized the drilling of four

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500-ft deep cased holes in Area 3 and that the status is that bid documents are ready to issue to the prospective bidders. The project for three safety tunnels to be done in Area 14 for LRL is in an inactive status as is the LRL Dolomite shaft and tunnel project. In progress are 300 ft and 850 ft exploratory drill holes in Dolomite for LRL and the USGS which are presently inactive due to questions which H&N has asked which have not received answers. A study of inclined and vertical shafts in tunnels (specifically U12e for LRL) will commence 19 January 1959 when criteria become available. Thus, of these high priority AEC projects, only one is in a status where H&N can actually take immediate action on it.

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1959

19 January

At Geneva Conference, US and UK announce they will no longer make test ban agreement contingent on general disarmament accord.

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Moratorium and Logan event changed plans. Jan 1959 report from LRL to AFSWP proposes Jericho for Feb 1960 series of Nevada tests requested by Sec Def (for planning). DoD was to fund most of \$6.5 M costs. Teller noted to Starbird in 21 Jan. 59 letter that LRL portion would be funded within the Whitney Program.

FR

A 22 January 59 message from Jane Hall to DMA notes that LASL has no specific plans for PLOWSHARE at present.

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23 January 1959, J-3 Report: Preliminary studies have been made quick and dirty overseas tests at various locations using balloons in open sea shots. Along these lines JTF-7 and Task Group 7.3 personnel visited Los Alamos on 12 January to discuss overseas requirements. On 13 January Duncan Curry and 2 other LASL personnel attended a J-6

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EG&G meeting to discuss opensea operations. At this meeting it was concluded that an airborne control point is not necessary if the Navy will put an LSD within 16 miles of the zero site. On \* 6 January Brig. Gen. Geo. Duncan of JTF-7 visited Los Alamos on an orientation tour and to discuss the future of testing by JTF-7 and Task Group 7.1. The J-Division Leader held a meeting on 15 January to determine the LASL position as to whether or not Task Group 7.1 should be continued and remain at Los Alamos in view of the changing missions of J-Division, the critical shortage of housing, the test moratorium, and task force recommendations regarding the future task force organization. The consensus of opinion within LASL was that a need exists for a scientific task ~~xxx~~ group organization which should be as free as possible for military control, and perhaps this can best be accomplished by continuing the scientific task group with an organizational structure which would get out from under the control of the task force staff. Furthermore at the request of Lt. Col. Byrne of Task Group 7.4, Paul Guthals is helping the Air Force to justify bringing 2 more B-57B radchem sampling aircraft into the squadron due to 2 recent crashes.

23 January 1959, J-6 Report: As for Eniwetok, all design work requested for the future is in the \* mill and scheduled out from February through June with maintenance continuing at the site on existing stations and facilities. As for discussions with JTF-7 including J-3 and J-6 personnel, the general conclusion reached was that the most feasible scheme for opensea testing seemed to include an LCU as the shot vehicle with an LSD acting as the mother ship. As for NTS, construction has been authorized for 4 new 500-foot holes and a number of modifications have been requested for the surface

facilities. Furthermore procurement of electrical cable and  
EBRX coax and necessary rehab work on the alpha and HRT stations  
have been requested. Pinex-on-a-balloon test is being conducted  
at NTS. Also there is discussion at this time of proposing a  
new EBR CP structure for LASL. Cost estimating is going on  
for basic tunnel configurations as well as experiment stations in  
both tunnels and vertical shafts.

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Here are three memos of interest dated 23 January, 23 January, and 27 January  
1959 respectively, all from Duncan Curry to Al Graves on possible sites and  
details relevant to those sites for planning for overseas test operations  
be they based at Johnston, Christmas, Midway, or Eniwetok Islands, or to  
be performed in the area south of Hawaii. One of the memos looks into the  
feasibility of the various areas in comparison with one another; the second  
TWX is entitled "Quick and Dirty Balloon Shots at Johnston and Christmas  
Islands" and has a map with some details of Christmas Island; and the  
third memo, dated 27 January, is entitled "Additional Weather Information"  
and includes weather information over the ocean as well as at Christmas

BM

Meeting #1459, 26 January 59:

Among other items in relation to the Geneva talks, the Commission  
recommended that Dr. Sterling Colgate of Livermore be sent to Geneva  
to replace Harold Brown as the technical advisor.

NG

27 January 1959, J-10 Report: This report notes that J-10 has been consulted by the Air Force in connection with detection of atmospheric or exoatmospheric tests from a location between 20 and 50 earth radii and that blackboard calculations have been made to look at the method of using x-ray excited air fluorescence.

BY

29 January 1959, J-12 Report: It is noted here that the feasibility study of a balloon pinex technique is going on and that a pinex tower has been flown in a horizontal position.

Meeting #1461, 30 January 59:

NG

Paul Foster presented a draft letter to the Commissioners which would go to the Secretary of State with the AEC's position currently in regard to the test ban talks at Geneva, a letter which had been prepared in accordance with McCone's guidelines. Libby expressed concern over the implication that additional seismic data could not be obtained in less than one year but Starbird explained that, while two nuclear tests could be

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carried out in 6 and 8 months respectively, the evaluation of seismic data would require at least a year; evaluation of a high altitude detection shot would require even more time. The Commissioners then approved as revised a letter to Secretary Dulles.

Note that around the beginning of 1959 there is a marked decrease in the frequency of discussion of anything having to do with weapons developments, weapons testing, and to a certain extent the test ban discussions at Geneva.

<sup>59</sup>  
A 30 Jan. message from AFSWC to ARDC notes that the 28 Jan. meeting brought a firm requirement from the labs for six B-57D type aircraft in the event testing in the Pacific is authorized. Also it says "The DMA and local AEC representatives consider resumption of Pacific likely enough so that they are requested authority to complete work now on the long lead time support requirement. It was anticipated

Here is a 30 Jan. 1959 document #SWPET 960 from Admiral Parker (Chief of AFSWP) to DDR&E on the subject of, "High Altitude Weapons Effects Program for Operation Willow." It notes that following the initial proposals by AFSWP to Dept. of Defense officials on planning for tests to obtain nuclear weapons effects information from high altitude and underwater detonations, discussions have been held with the ballistic missile defense steering group and have led to a fairly detailed program and laid out in this document for effects measurements. The two general categories of the program entitled "Willow" are for shots and associated effects measurements primarily for the purpose of answering the services information questions for types of high altitude weapons effects other than Argus and secondly, for shots and measurements primarily for the purpose of answering the services requirements for Argus effects. The fiscal planning for Willow has already begun since AFSWP presented a budget to the Bureau of the Budget in Oct. 58 and DDR&E in

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Jan. of 59 for a program costing about \$60,000,000. Only \$17,000,000 is currently contained in the fiscal year 60 appropriations for AFSWP and thus \$39,000,000 more would be required from the Dept. of Defense to conduct Operation Willow in the calendar year 1960. These cost estimates do not include provisions for delivery vehicles or instrumentation platforms. In general, Admiral Parker requests that the category one program (non-Argus) be technically approved and that action be taken to obtain the necessary funding. In order to conduct the operation in mid 1960, orders for the carrier and experimentation vehicles must be placed no later than 1 Mar. 59. These so called category one high altitude program consists of four shots as follows with equal priority:

1. A 350,000 ft., night, 250 kiloton shot
2. A 350,000 ft., day, 250 kiloton shot
3. A 125,000 ft., night, 250 kiloton shot
4. A 125,000 ft., 1.7 kiloton shot.

The first three shots would be launched from Johnston Island (the Redstone system is recommended) whereas the fourth shot would be conducted similar to Yucca, launched from an aircraft carrier in the waters off Johnston Island. As for the first three shots, if the Redstone system is not feasible, then the Sergeant (XM-20) system is noted as a possibility. As for the fourth shot, a balloon system is recommended. A great deal of detail is presented for the execution of the first four shots with various types of rocket borne instrumentation (in detail) and project numbers assigned for 30 or 40 different types of measurements for different purposes with the project agencies and cost estimates already laid out. Such agencies as BRL, NOL, AFCRL, Lockheed, etc. are already involved to some extent in the planning apparently.

As for the Argus type of high altitude testing, recommendations are to defer any decisions on this program (Category 2 high altitude program) until after a comprehensive meeting at LRL in Feb. on the results of past tests and the status of this particular branch of science.

February 1959:

PT

As would be expected, J-Division is involved more and more in activities outside of test related areas and have several things going on that are listed

in the physics section of this status report. These fall roughly under the headings of Radioactivity studies and Nuclear energy levels, Gamma ray detection, explosion containment, and Stellar models. In the area of explosion containment, a number of charges have been fired in a 6" pipe; shots are done with and without Na Cl loading showing "only slightly larger strain for no Na Cl loading than those with a complete filling." The indication is that some of these tests are being done to investigate the feasibility of a practical container for one-point safety tests which would be fully contained. Calculations so far indicate that such a practical container can be built. Further, a few shots (up to 10 grams) have been fired in a dural sphere.

In the test data analysis section, a long discussion of specific phenomena and indications from the ~~Teak~~<sup>Teak</sup> event is presented. In addition to further tests and discussions of the airborne pinex system, a feasibility study has begun to design a pinex experiment in a 1,000 foot vertical hole.

Calculations based on Teak and Typhon of energy deposition from high altitude explosions have been provided in discussion of airfluorescence and space detection techniques.

Discussion of construction and activities at both EPG and NES seem to be virtually the same as were found in the J-Division progress reports and I will mention only the exceptions such as the fact that aerial mapping of 40-mile canyon and Yucca flat has been requested.

There are certainly indications that the McMillan-Eisenhower meeting in the late winter or early spring of 59 had the British proposing that we (the West) offer a controlled test ban agreement with a temporary moratorium on certain nuclear tests at Geneva and the various agencies were providing the President with their most justifiable stands on how to handle such a position so that Eisenhower could decide what to do. After Defense, AEC, CIA, and Killian had worked on this along with State, Herter sent a memo to the President on 23 April concluding "that proposing an extended uncontrolled moratorium on high altitude, outer space and underground tests, even if the Soviets agreed to negotiate a controlled suspension of atmospheric tests, is an undesirable course of action at the present time. Such a proposal would undercut our basic principal of effective control, and would be unlikely to increase Soviet interest and serious negotiations.

PV

Memoranda beginning in Dec. of 1958, shortly after the moratorium began, indicate that JTF-7 personnel are investigating with the Navy support personnel, the possibility of utilizing LSD ships containing LCU barge type ships for conducting an open sea test operation. Apparently the LCU's would contain the devices or at least the targets and would be carried to open sea using the LSD. Further correspondence indicates that the Navy was planning to transfer six LCU's to the Commander of Task Group 7.3 per correspondence in Feb. 59. Also correspondence in Apr. 59 indicates the feasibility studies being done which would allow the gun mounts on the LSD type ships to be used in conjunction with the Mark 56 radar on the LSD to aim various types of diagnostic instrumentation equipment at the LCU at the time of detonation for open seas testing and diagnostic coverage.

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In Feb. of 1959, members of JTF-7 further investigated this concept and visited and inspected a Navy LSD called Fort Spelling. After inspecting the ship, Col. Vest and whoever else was with him made the recommendation that future planning for the use of a LSD as the Command ship be discontinued and that an AGC type of vessel be employed as the Command ship, AOC and floating hotel. This use of an AGC would greatly enhance the communication capability of the Commander. I am not sure what operation they are talking about planning for, unless it is just a general open sea test capability. CV

A 31 Mar. 59 memorandum within the Navy discusses the target ships which were used on Hardtack. They are three destroyers: the USS Fullam, (DD-474), the USS Killen, (DD-593), and the USS Howarth, (DD-592). The use of Navy ships for Operation Willow as presently planned is detailed. Of the three destroyers only the Howarth is to be retained to be used as a target in Operation Willow and should be retained at the present location until a target ship outfitting

activity is selected. Willow is called a surface and underwater test program for weapons effects information and this memo just addresses the Navy's support requirements. One other large ship is to be selected as a requirement for exposure to weapons effects in an unmanned configuration at a planned tactical delivery range for sub-surface nuclear ordinance. The objective is to demonstrate ship, component and systems response to weapons effects. Several other ships are noted and would be used to measure various effects and such things as severe hull damage and damage to super structure is noted. As for mooring, "A joint bureau of ships-CTG 7.3 study has evolved a plan for mooring the above targets in deep water without the use of mooring barges as in Hardtack and at considerably less expense, effort and time. A requirement for mooring barges therefore is not given at this time since it is expected that a mooring test about May, 1959 will demonstrate the feasibility of improved mooring plan."

LE

Another Livermore paper, COT-59-13, dated 1 February 59, is entitled "Preliminary Feasibility Look at Outer Space Testing" by Olen Nance and R. Stephen White. The system that they proposed would be for testing nuclear devices in outer space and providing the appropriate measurements. This preliminary study addresses a station at about 160,000 kilometers with done by: a detection pod separated ten kilometers, earth satellites, and earth ground stations. The concept generally calls for using a Livermore device on board an ATLAS with upper stages, to be launched from Johnston or another isolated Pacific island with the first actual weapons test being conducted about 18 months from go-ahead.

Thomas Wainwright wrote a Livermore paper #COT59-15, dated 2 February 59, which refers to Latter's test detection system as being proposed by Latter and Bethe together and Wainwright's brief paper discusses the possibility of escaping detection by using various kinds of shielding.

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A 3 Feb. 1959 document written by JTF-7 and in particular Col. Watson of J-3, addresses planning for two alternatives for future overseas testing which are: A. A hurry-up test of 90 day lead time utilizing ~~open sea~~ open sea testing and, B. A full Operation Willow about mid 1960. The other staff organizations of Task Force 7 are requested to study the two concepts and recommend their manning levels to function under each of the concepts based on certain assumed changes within the Task Force as follows. For the 90 day open sea testing concept, it should be assumed that Task Group 7.1 would be not involved but that Headquarters of JTF-7 would handle those functions and that Task Groups 7.2, 7.3, and 7.4 would be reduced to minimum planning staffs following a decision to move to this concept. EPG would be reduced to a caretaker status and would not be involved in such a concept. The phasing for the

reduction of staff personnel to this particular concept would be about 6 months after a decision was made to go ahead with it. As for Operation Willow, a planning letter #JJC/S-80530 of 18 Nov. 1958 is cited in reference and the following assumptions are made: Since there is a possibility of overlap at the Eniwetok and Johnston Island phases, the Headquarters Staff should be capable of being split up for the simultaneous conduct of both phases. Task Group 7.1 would be abolished with its functions taken over by JTF-7 Headquarters. Task Group 7.2 would be reduced with H&N taking over most of the previously assigned housekeeping duties. 7.3 would remain unchanged and Task Group 7.4 would exist as a planning group.

All of the staff organizations are requested to present their proposals to the Chief of Staff of JTF-7 not later than 9 Feb. 59. The replies from the various groups are attached with very little mention or comment on substance of the proposals and their assumptions.

Here is a 3 Feb. 59 report from JTF-7 which provides projected Task Force manning levels for a 90 day open sea concept and a fullscale Operation Willow about mid-1960. JA

Another paper, by Westervelt, on 5 February 59, is entitled "Magnetic Storm: A Possible Effect of Nuclear Explosions in Space." Westervelt addresses theoretically the magnetic disturbance or storm which would be caused by nuclear detonations at altitudes of many earth radii. He estimates the character of the disturbance and feels that the presently operating network of detection stations around the world can already make the appropriate measurements and should be able to discriminate what disturbances would be caused by such a detonation versus other natural phenomena. LE

Here is an important 6 Feb. 1959 transmittal letter and report from Hartford to Starbird, subject, "Weapons Testing - Alternate Methods and Locations," with the minutes of the 28 and 29 Jan. meeting at ALOO on that subject. Graves got copy No. 8 of this secret document. JA

Correspondence in this time period indicates that DASA is preparing and requesting studies on certain safety problems such as eye burn and tsunami, as well as doing data reduction from Hardtack, planning for Jericho and Willow, as well as thinking about Trumpet which is being held off for the time being, and doing some long range test planning. JA

Here is a 6 Feb. 1959 message from Headquarters Air Force which notes that the Army has asked if J.I. can be made available for their use as a target launching site for IRBM's. Approximately 200 personnel would be stationed there and 2.6 million dollars programmed for the construction, support facilities, and special inclosures. These targets which would be launched from J.I. serve for testing out the Nike-Zeus system installed at Kwajalein. JA

All of these studies just mentioned were provided to Bradbury prior to a meeting which he attended on behalf of LASL on 6 and 7 February <sup>59</sup> in Washington. Apparently, this was the first meeting of the "Panel on High Altitude Detection" and I gather that Panofsky is the Chairman, and that Teller, Molnar, and Starbird are also in attendance. A message from Starbird to these three Lab directors on 13 February notes that Panofsky is planning to call a second meeting of the panel in about two weeks since he feels this will be required to come up with a "final report." Starbird, who was in attendance, directs the Laboratories as follows: Livermore, with Sandia's assistance, should develop a detailed plan for instrumenting and firing an outer space weapons test, including ideas on carrying an effectiveness of shielding. "The Lab best qualified to examine the question of the satellite instrumentation should do so. This would include both the Fluor approach described by Dick Latter and the proportional counter suggested by Panofsky. In discussion after Bradbury left, Panofsky several times suggested that LASL might undertake development of such instruments. "I made no comment at all concerning this, not knowing LASL's abilities in this regard." Starbird asks LASL if they can, with Sandia, undertake such an evaluation on this instrumentation and the potential usage. Bradbury forwarded this request to Graves, Ogle, Kellogg, Taschek, Rosen, Mark, and Goerlin.

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6 Feb. 59 minutes of 28-29 Jan. meeting held at ALOO on "Weapons Testing -

Alternate Methods and Locations", attended by labs, DMA, JTF-7, AFSWP, AFSWC, and AEC contractors. Conclusion was that EPG could respond in 3 months and an 8-shot operation could be completed there before any alternate location could be readied. Realizing that use of EPG might be denied, alternates were studied. Open sea shots using LSD/LCU were assumed. JTF-7 felt they could reorganize and respond in 3 months. Base for open seas operation should be Pearl Harbor (most economical and fastest) if hot dry runs can be accomplished in vicinity. Further exploration of alternate bases (Hilo and Johnston in addition to Pearl) is recommended. Further, ALOO recommends labs and contractors be authorized to define LCU/LSD requirements and do engineering. Details of population, cost, time scale, method of operation, etc., for each location is set forth.

Graves, Ogle, and Curry attended for LASL. Many other locations than mentioned above were addressed. Graves got copy 8 of 22.

The hydrodynamic tests performed on Yucca Lake using trailer 13 were a Livermore project described in the following 12 February 1959 TWX from Dwayne Sewell to Starbird DMA. "These tests are primarily associated with the program and the Canary device program. They represent essentially all the hydrodynamic tests on these two programs and a curtailment of test activity would cause a significant delay in the programs. The next few months represents a period of relative high activity but not beyond the capability we always plan on at NTS. It has been our policy to maintain Sugar bunker in a state of readiness to accept hydrodynamic shots." A number of tests in

the Tony program, Canary program and Wren program and XW47 program over a period of months at the Teabag and Sugar bunker sites are tentatively projected by Sewell's TWX.

After reading this misunderstanding from Brown, Loper sent a memo to Keeney on 20 Feb 59 to clarify the DOD position for the record. It is that any treaty should only allow a test ban where there is an adequate inspection and detection system already. This further means that the initial treaty can be based on the conference of experts system but will not necessarily exclude from the test ban those tests that can't be adequately handled. The new hard tack data should be introduced to demonstrate "the need for progressive improvement of the system." The commission set up by the treaty must positively and without any possibility of veto work towards progressive improvement of the coverage of the system.

PV

The basic two points he feels the DOD wants to make would be to support the US demand for a threshold in any test suspension for the time being and a requirement for further improvement.

These folders contain report after report and study after study and letter after letter addressing the various technical problems in Geneva but not addressing the need in the US test community to do any tests or keep any readiness particular.

Just to indicate the relationship of organizations and the types of discussions going on, Starbird sent a letter to Loper on 10 Feb. 59 quoting from the information from Harold Brown (then the AEC rep. at Geneva) on his interpretation of the directives that the DOD was giving to their people in Geneva. Starbird here quotes Brown's words which in part try to summarize how they read the DOD (and General Loper's) directives, and since Starbird feels there is some misunderstanding, he takes it straight to Loper to try to straighten out the misunderstandings. Finally he suggests that Loper make his position clear to <sup>Sperry</sup> ~~Sperry~~ Keeney who is about to proceed to the delegation in Geneva.

PV

3. A <sup>59</sup>16 February 1965 TWX from LASL J-1 to JTF-7 Cmdr. apparently in response to some previous queries notes that in the event of open seas testing that LASL would have to put approximately 65 persons aboard the LSD and about 8 persons on each of the other 2 vessels which would probably be destroyers to operate various instrumentation. The point here is that apparently JTF-7 is doing some active thinking and planning for various types of operations should we return to testing. F

A 17 February TWX from Starbird to the labs and ALO notes 3 recent high explosive shots at Carlsbad and repercussions that they caused internationally, most especially the propaganda use which the Soviets got out of them. Starbird asks certain restrictions on future similar firings and puts on some limitations but just seems to emphasize that such tests may well provide the Soviets great propaganda impact and already we seem to be greatly worried about whatever our actions will cause the world to think no matter how clean we are. C

There is considerable documentation in this time period of the problem of the safety of devices which cannot now be tested but which might in fact be weaponized and transported, stored, carried, etc.

In 1958, planning for Operation TRUMPET included proposed balloon shots. Livermore is considering about a half a dozen whereas LASL was considering just a few.

A memorandum from J.H. Wendell of Task Group 7-1 at LASL on 17 February 59 is sent to a number of people in LASL as well as Sandia. The subject was aerodynamic balloon developments and specifically systems that might be utilized for the EPG for structure testing. The main source of information was H.G. Laursen of Sandia, who were presently developing this capability. The lengthy memorandum contains all sorts of details, and answers to specific questions about the capabilities, development schedules, etc. for such balloons. At the present program rate, the balloons could be available for production about January of 1960. Note that the concept is in development and is certainly not yet a reality. Note also that apparently the Task Group of 7.1 corresponded to Group J-3 of J Division at LASL.

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An 18 February message from Starbird to Bradbury and Teller states that Herbert York (DDR & E) has just stated that the Air Force has proposed installing various facilities to permit laboratory-type investigations of high altitude nuclear effects. York has thus requested the AEC's assistance with the Air Force exploring the possibility of this work and perhaps performing some of it in AEC laboratories with the assistance of certain Air Force personnel. Starbird requests the Labs assist the Air Force in determining the way to go and make recommendations to him. Other correspondence on this subject is noted to appear in 310.1 Upper Atmospheric Physics Group Files.

LI

Note that there is very little mention of effects of weapons tests and any great deal of attention being given to this in the AEC correspondence at least through 59 and well into 1960.

A folder entitled, "Willow Plan" contains numerous documents and not just a report on planning for this operation and among other things contains two letters and packages of documentation from Task Force J-3 dated 18 Feb. 1959. The two letters are addressed to the Commander and addressed the proposed Joint Task Force reduction under a "hurry up" open sea concept and also a manning level for the planned operation Willow. The folder contains not only the inputs from the various staff organizations and task groups within JTF-7 as of the Feb. date for manning up and executing the two different concepts of testing, but also later documentation in relation to the specifics for Operation Willow. It should be noted that in addition to other recommendations, the recommendations made by J-3 to Joint Task Force 7 staff indicated that for both of the test concepts Task Group 7.1 be deleted and their functions absorbed by the Headquarters staff. Also of some interest is that there was a Willow planning group which existed in Dec. of 1958 and a sub-group known as the Future Weapons Effects Planning Board which was chaired by a Col. Bart of DASA and was meeting in Dec. of 1958 to address the long range requirements for weapons effects testing as envisioned by the services and AFSWP. CV

In correspondence from the AEC to its operations offices and to JTF-7 around the middle of Feb., the conference on and discussions of alternate methods and locations for weapons testing are addressed and the letter to JTF-7 indicates "the availability of the LSD to our contractors and laboratories is apparently the principal mile stone in realizing a readiness concept of 5 months for an open seas operation. If a particular LSD could be designated for our use now, early access to its drawings would be most valuable for design and engineering, planning purposes. Accordingly, it is requested CJTF-7 attempt to obtain designation and drawings of a particular LSD and forward the information to ALOO for appropriate dissemination." JA

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4. An 18 February 1959 TWX from Starbird to Hertford with info. to Bradbury and others references a memo from ALO dated February 6, 1959, Subject: " Weapons Testing - Alternate Methods and Locations." In reference to the results of the planning conference which apparently was held by ALO recently, Starbird concurs that Eniwetok is the preferential solution from the AEC standpoint should it be available for future testing but agrees that it is gratifying to know that the conference worked up a reasonable alternative should return to EPG be denied, and this alternative apparently is an open sea test capability. DMA authorizes ALO to take certain preliminary actions to begin to develop a readiness capability for open seas testing: (a) the labs are authorized to submit design criteria to H & N, Sandia and EG&G for the LCU's and for modifications of an LSD to a diagnostic ship. (b) ALO is to authorize H & N, Sandia and EG&G to proceed with design and engineering for LCU shore vehicles, design for modification of an LSD, and design of timing and firing and diagnostics systems. (c) ALO is to explore further the use of Pearl Harbor and Hilo for such a test capability.

JTF-7 notes that by separate correspondence they are proceeding with the procurement and designation of the appropriate naval ships for this capability. Starbird finally emphasizes that all these investigations and activities relative to alternate methods and locations should be conducted in a low publicity manner to avoid the misinterpretation that we are proceeding towards nuclear testing. By a TWX dated 19 February 1959 Hertford passes on to LASL, Livermore, EG&G, H&N and others the DMA authorizations for proceeding with the open seas test capability feasibility studies and planning. Hertford proposes that in light of the low profile desired for this study that perhaps it could be accomplished by a one-time

complete investigation in Oahu and Hilo by a small committee and requests the labs and EG&G to comment on this proposal and recommend personnel to work on such a plan. AL Graves response on 27 February to Hertford's proposal is that it seems to be a good idea as to how to prepare this feasibility study and that Duncan Curry of LASL will be the designee from our laboratory.

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19 Feb. 59 personal letter from Starbird to Molnar (Sandia) on Sandia's high altitude test proposal. Reference to a 14 Jan. 59 proposal and earlier (19 Nov. 58) letter from Fowler. This is a joint LASL/Sandia diagnostic shot proposal. Starbird has suggested to AFSWP a joint AEC/DOD high altitude program and an Albuquerque meeting

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AFSWC History Office

BU

A 20 February 1959 TWX from the 4950th to its subordinate units notes that ARDC has forwarded a requirement for six B-57D aircraft to Headquarters, Air Force. Furthermore the TWX generally reaffirms the requirement to plan for and be ready for and continue to revise and update operating procedures and plans documents towards the possibility of returning to testing. It also states that the Chief of AFSWP states that there is no date set for test site activation and that resumption of testing will be dependent upon the outcome of Geneva negotiations. The 4950th stresses that no actions should be taken which would jeopardise or reduce the Air Force capability for continuing development of test capabilities or maintenance the capability to resume testing immediately following the end of any moratorium.

The entries in this folder go up through 1950 and then there is a gap with the next document dated 19 February 59. This a memorandum on the subject of "immediate requirements for Seismic data from underground explosions." notes that additional underground tests are needed to resolve many of the existing uncertainties in estimating an effective system such as the one proposed by the Conference of experts and sets out a number of proposed tests which they should be done within the next twelve months to determine the direction and magnitude of the further research program. It also notes that the Berkner panel is now looking into an overall planning study for Seismic research. The suggested list of shots includes several nuclear tests in various media, including granite, as well as decoupled tests, and HE shot for comparison. Also, the suggested instrumentation is set out in order to gather the appropriate data to learn about the effects of decoupling, the signatures of various tests, etc. This specific program it is felt could be begun within seven to ten months. The memo was written by the Deputy Technical Director, D.H. Rock, and was sent by Starbird to the Labs and Operations Offices for their comments. The test proposal notes many of the previous tests underground to date and the work done by and presently being done at Livermore in the area of Seismic detection. Ogle wrote some comments on the cover of the LASL transmittal letter as follows: "Seems to me we have no "need" for underground shots. We can comment that if underground firing only is resumed that shots might partially satisfy the requirements to fire in a different medium than before. Watt is working on theories of "decoupling"-even though he is at Livermore."

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59 A 21 Feb. message from CINCPACAF to the Air Force Chief of Staff concurs in the Army's request for J.I. for their purposes and suggests that the first avenue to pursue is to transfer the island outright to the Army.

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Note that at this time, messages concerning planning for and estimating requirements of an openseas concept were transmitted from LASL without any classification and that this upset the Washington people because they felt this

was an extremely sensitive subject to discuss with the Geneva negotiations ongoing and they requested that such information be classified.

JA

Meeting #1476, 24 February 59:

Libby reported on a cable from the US Delegation at Geneva requesting guidance on answers to the latest Soviet proposals which concerned the number of detonations for peaceful purposes to be permitted the two countries and reciprocal rights concerning inspections. The Commissioners agreed with Libby's proposed reply "on inspection rights with respect to replacement parts for weapons stockpile for peaceful purposes." Copies of these messages are in the files here .

NG

24 February 1959, J-3 Report: It is noted here that Al Graves, Ogle, Avery, and Curry attended a meeting at ALO on 28 January to discuss alternate sites and methods for conducting overseas tests. In addition to the correspondence which I have taken notes on from other locations on this particular meeting and study there are a number of J-3 pieces of paper that are listed here that addressed this area and they are: J-3-W-23, J-3-GO-322, J3-GO-312, J3-GO-313, J3-GO-314, J3-GO-315, J3-GO-319 and J3-W-29. It is also noted here that Scripps is making waterwave predictions for proposed overseas shots.

BY

On a new subject, here is a 24 Feb. 59 letter from Gen. Fulton of ARDC to Headquarters Air Force making a plea for allocation of two B-57C dual control aircraft to Air Force Special Weapons Center. There are two purposes that such aircraft would serve; primarily dual control aircraft are required for pilot training and checkout; secondarily, the requested aircraft would be used as sampler control aircraft during actual nuclear sampling operations. The rest of the correspondence indicates that the Air Force accepted this proposal but it is not clear whether they did in fact go ahead with the authorization of two B-57C's.

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26 February TWX from the Commander, JTF-7 to various Task Groups and 4950th stresses that since the Geneva talks are going on that any discussion relative to planning for Operation WILLOW in particular and generally to planning for any future nuclear tests be treated as extremely sensitive. A 2 March TWX from the Chief of ~~AFSWC~~<sup>AFSWP</sup> to AFSWC notes that by knowledge that the US is planning for future nuclear testing may be damaging to the Geneva negotiations and therefore all activities relative to test preparations should be conducted so as to avoid disclosure

This panel it turns out was a committee of the PSAC and this accounts for the invitation to the members to a second meeting of the panel on <sup>59</sup>27-28 February to go over the preliminary draft report of the Panofsky panel as well as their comments LE which are to be submitted prior to this meeting. The invitation came from the White House, Spurgeon Keeny. Contained in this folder is a copy of Bradbury's (with the help of the Staff) brief comments on the situation regarding space testing and detection. The objectives of a space testing system in priority order are: improvement of weapons and warheads; obtaining scientific information about space and nuclear explosions in space and other weapons effects; and obtaining information addressed to a possible detection system of space weapons testing. He briefly estimates the priority weapons developments which might require testing at this time and estimates the types of and quality of measurements which could be made on outer space tests. He concludes that, if space testing is legal as opposed to testing in other environments, we should come as close to the earth's surface as possible avoiding the fall-out argument which means that deep space tests would not be desirable and that lower level testing at altitudes as low as Teak and Orange would be the way to go. As for the question of a complete ban on testing where space testing would be illegal, he doesn't feel we would attempt then to use this regime but would then concentrate on the detection of space tests. One interesting opinion of Bradbury's expressed is "that "breakthroughs" in the atomic weapon business are both unlikely and unlikely to be achieved through space testing." He carried these comments with him to the 27-28 February meeting.

March 1959:

PT

In the discussion of activities at various testing areas there is a section intitled "Los Alamos 1. site" which says "In a meeting with USGS personnel, it was established that one, there isn't enough information available to determine if there are ground water contamination problems and 2, the preliminary report on the geology of the area will not be available until mid-May. A study of the area south of White Rock resulted in the opinion by both USGS and J-Division that it is not suitable for 1. shot holes."

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Cp. In parallel with the Buzzer Committee work and the study of the question of detection of high altitude bursts and use of satellites for detection was the blossoming area of problems of anti-ballistic missile defense and the effects of nuclear weapons on such systems. These questions seem to get a lot of emphasis on LASL starting in about March of 1959. The classified section of this correspondence contains a great deal in this area.

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Note that the purpose for which the Buzzer Committee was set up was to study and plan for the implementation of the Panofsky report system for test detection.

A letter to Starbird from Glen Fowler of Sandia on 2 March 1959 is titled "The Role of Sandia in Project Plowshare" and is a good source of Sandia's view of their own role in continuing Plowshare experiments and also is notable in that Fowler might be an excellent person to interview as to

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the status of Plowshare and the real activity involved therein at this time.

Here are some probable questions and answers which might be used in a hearing with the Congressional Appropriations Committee and are published by Col. Jeffrey of JTF-7 on 2 Mar. 59. Included are statements of response capabilities such as readiness to do a 3 to 4 shot limited proof test series on a 90 day basis and a more extensive effects test series on a 9 month basis, both using the EPG. The current population at the EPG is stated to be about 1800, about 1000 of which are military (564 Army and 407 Air Force). The total U.S. investment in the EPG to date is about \$50,000,000 with well over \$10,000,000 estimated as required for all agencies to support the EPG on a standby status continually. (annually)

JFA

3 March 1959, Rover Program Report by Keith Boyer: There is evidence starting about this time and a little bit before this that J-Division is about to get very involved in the Rover program.

BY

3 March 1959, J-6 Report: As for weapons testing at EPG ~~is~~ it is noted that design for future work continues and is still on a hurriedly schedule of completion. Further it is stated that EG&G can meet a 90-day deadline if there are not simultaneous operations at NTS and EPG. As for NTS, bids for the 4 500-foot safety holes were postponed a week to 24 February; the pinex-on-a-balloon testing was successfully completed; exploration of holes in area 3 is continuing but with some difficulty due to equipment damage; and several other minor type items at NTS are noted here. As for Los Alamos J-6 states that a survey was made of various areas in Los Alamos with a view toward reactor testing.

BY

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By a 3 Mar. 59 memo to other staff organizations of the Joint Task Force, Col. Watson of J-3 discusses the, "Preparation of Operations Plan for: JTF-7 Conducted Open Sea Atomic Tests Series." All the other parts of the Task Force are requested to provide their inputs to J-3 for the preparation of an open sea operation plan per an attached operation plan outline. The approach is outlined in the first paragraph as follows: "Should a change in the national policy of the United States provide for <sup>the</sup> ~~a~~ resumption of atomic test detonations, several devices would require immediate proof testing. The expected yield of these devices will preclude their detonation within the continental limits of the US. Political consideration may also preclude the use of the EPG as well as trust territory waters for testing purposes. Therefore, an appropriate plan must be established by JTF-7 for the quick test of atomic devices in a suitable area of the open sea." The concept which is spelled out in detail would be for a quick test response of not more than 5 months after the decision which consists of an eight shot series with yields from 200 kilotons up to 8 megatons, conducted on the open sea by means of a small Task Force utilizing ships and aircraft as appropriate. The ships selected center around the LSD/LCU configuration. The primary area thought of for conduct is centered about 300 miles southeast of the island of Hawaii with a secondary area about 300 miles south of Johnston Island. As for diagnostics, they are limited to ship mounted instrumentation and radio chemical sampling by B-57 aircraft.

5. Cross referenced here is a 3 March 1959 message from Cmdr. JTF-7 to DMA and others which plans for a requirements conference at JTF-7 Headquarters on 10 March and is filed in "353.4 Planning" Folder.

FK

Further correspondence in reference to that conference such as Starbird's message dated 5 March elaborates to the effect that ~~XXXXXXXXXXXX~~ the conference will develop specific planning factors to enable the formulation of a detailed operational plan for the possible conduct of a hurry up open sea atomic test series. This conference was postponed until further notice and apparently not rescheduled at least right away.

The last piece of correspondence in this folder is a 3 March 1959 TWX from the Commander of JTF7 to the Director of DMA, the Commander of Task Group 7.1, the Commander of the 4950th test group at Kirtland, and the Commander of Task Group 7.3. Subject of the TWX is a planned conference to be held at JTF7 headquarters in Washington on the subject of future test planning. Specifically, the conference is to formulate the detailed operation plan for the possible conduct of a "hurry-up" open sea atomic test series as discussed at a 28 January 59 meeting at ALO. The conduct of the test, of course, would depend on a change in the national policy that would permit resumption of atomic testing, the requirement for early proof tests relative to certain devices, and being denied the EPG due to political considerations. Furthermore, it would be to assure the continuous capability for joint Task Force 7 to conduct a timely test series should the national interest so dictate. The general concept of operations would be to commence testing three to five months after a decision to proceed, have about 8 detonations of LASL and Livermore devices ranging from about 200KT up to 8 megatons and that these devices would be detonated in the open sea, 300 nautical miles southeast of the island of Hawaii using the combination of LCU ships as zero <sup>sites</sup> ~~sights~~ with LSD mother ships. This concludes the notes on the Eniwetok   
 test plan folder.

FZ

Here is a 4 Mar. 59 memo for DDR&E from DASA on the subject of "High Altitude Weapons Effects Program for Operation Willow." This follows discussions of Argus at a recent meeting at Livermore on the subject from 4 to 18 Feb. and states, "the conclusion reached by the AFSWP and the services is that the shell effect of trapped

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electrons is not one of sufficient military value to warrant specific further investigation at this time. It is believed, however, that certain effects on communications and radars and other effects at the conjugate point and at surface zero resulting from trapped electrons and/or fission debris do warrant further investigation." It goes on to state how this would fit into the AFSWP technical measurement programs and would require the inclusion of two additional shots from Johnston Island with modifications to place emphasis on measurement at the conjugate points.

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4 Mar. 59 memo to DDR&E from Parker (AFSWP Chief) on High Altitude Weapons Effects Program for Operation Willow. Notes that Feb. 59 meeting at LRL on Argus concluded that the shell effect of trapped electrons didn't have sufficient military value to warrant further specific investigation at that time. However, effects on communications and radar and conjugate point effects do warrant further investigation. 30 Jan. 59 memo proposed a Category I High Altitude Program of 4 shots for Army, Navy, AF, and AFSWP. This memo adds two more shots at J. I.: 250 kt at 1000 km and 1 MT at 190 miles. Parker requested approval of new program with two more tests and says a coordinated plan for the WILLOW High Altitude Program will be worked out and submitted.

4 March 1959, J-10 Report: In relation to LASL activities in the area of high altitude phenomenology, in addition to the extensive data reduction going on for the high altitude shots during Hardtack, Hoerlin has been providing technical and scientific advise on high altitude phenomena to visitors from at least a dozen different agencies mostly DOD agencies such as AFSWC and AFSWP over the last few months.

FQ

In a letter on 6 Mar. 1959 from Gen. Anderson (Commander of JTF-7) to the Air Force Chief of Staff, Anderson refers to the proposed transfer of JI from the Air Force to the Dept. of the Army for the purpose of missile test operations. He notes that: "JTF-7 operations from Johnston during the Newsreel phase of Operation Hardtack established that it is the only suitable location readily available to the United States from which high altitude nuclear test detonations can be conducted. The suitability of the Island is due to its remote location from other populated areas which eliminates most of the hazard of eye retinal burns to indigenous populations.

This location also offers the additional advantages of minimum interference with international transportation and communications systems as well as favorable weather most of the year." Going on, Anderson requests that any future action in regards to transfer of the Island or future use of the Island provide for other activities such as JTF-7 in order not to compromise its future utilization as a test site.

A 7 March 1959 letter from the Deputy Secretary of Defense (Donald A. Quarles) to Mr. McCone, Chairman of the AEC notes that in reorganizing the Department of Defense and planning for a greater consolidation of atomic weapons activity in AFSWP the advisability of maintaining JTF7 on a permanent basis is becoming questionable in light of the current test moratorium. He states that "it seems probable that significant economies might accrue through transfer of the Task Force to the armed forces special weapons project under the new terms of reference. On the other hand, the possibility that future tests might have to be conducted on very short notice argues for the maintenance of the Joint Task Force on an active status."

**AFSNP**

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Quarles requests McCone to have the AEC join the DOD in studying the various ways for the military responsibilities in atomic testing to be properly and effectively related to the AEC responsibilities, to study the proper organization for future test conduct, and to look into the adequacy of the existing agreements between the AEC and the DOD pertaining to testing. In a letter dated April 9, 1959, Mr. McCone fully agreed with Mr. Quarles plans for such a study and designated General Starboard of DMA as the AEC representative to join in the group, with the chief of AFSWP and the Commander of JTF7. In the letter McCone stated "the present test moratorium and the uncertainty as to the future of the international negotiations with respect to a test control agreement have created new problems that may require changes in our organizational plans for the <sup>speedily</sup> ~~speedily~~ and efficient mounting of an overseas test operation if authorized and necessary."

In the interim, Herbert Loper then Assistant to the Secretary of Defense (Atomic Energy) sent a memo to Major General Anderson, then with <sup>a certain AF organization</sup> and Rear Admiral Parker, chief of AFSWP on the subject of the organization of future test operations, dated 17 March 1959. He referred to Mr. Quarles proposal for a study of the test organization for future operations and reiterated the recommendations that the group would be asked to provide on the organization for future testing, arrangements that should exist for the DOD and AEC to support each others test requirements, and any modifications deemed appropriate as to the current agreements for maintaining the Pacific proving grounds or supporting and conducting tests. Further, he stated that without awaiting any further action to be directed from their recommendations they should proceed with agreeing on and implementing any functional or manning changes that are within their own authorities. Attached to Loper's

memo is a paper that apparently his office wrote entitled "Factors Bearing on the Organization and Planning of Future Weapons Tests" which essentially gives his views of what the study group can best provide in the way of recommendations and a brief view of the highlights and present status of the current testing probabilities and test organization relationships. Of interest, he states "the recently proposed consolidation of military responsibilities for testing in a single agency combined with the uncertainty as to the future of testing has suggested to the Joint Chiefs of Staff the feasibility of inactivating JTF7 and assigning its functions to the AFSWP." Furthermore, it is noted that there is a number of possible tests in areas and lists them in decreasing order of probability as follows:

1. Underground testing in Nevada.
2. Underground testing in Nevada plus high altitude tests from JI.
3. The same as (2) plus underwater and/or very high altitude shots at sea.
4. Same as (3) plus high altitude shots at Eniwetok.
5. Same as (4) plus low yield atmospheric shots in Nevada
6. Same as (5) plus atmospheric shots at Eniwetok limited as to numbers and total fission yield.

This paper feels that the present organization, <sup>of</sup> ~~JTF7~~, is based more or less on business as usual which they feel to be No. 6 above which includes underground and atmospheric shots in Nevada, high altitude shots at Johnston Island and Eniwetok, underwater shots, very high altitude shots, plus atmospheric shots at Eniwetok. Further, he makes the remark that I don't understand that "since a number of factors point to the possibility of such a situation arising as early as mid-1960, the organization requirements

required for this contingency need careful examination." The situation referred to is apparently the simultaneous conduct of diagnostic tests at Eniwetok, high altitude weapons effects tests at Johnston Island, and very high altitude shots from the south pacific. Further interesting remarks are "it will be observed that regardless of conditions imposed upon future testing, AEC and DOD programs are likely to be less inter-dependent technically in the future than they have been in the past. Weapons effects programs will be directed primarily toward objectives which would require special effects shots. It is probable that AEC diagnostic shots will be set up on a "when ready" basis rather than an extended series, thus allowing limited time for coordination with weapons effects programs. Mutually supported activities will be quite as important in the future as in the past; however, the dove-tailing of technical programs should be far less complex."

27 March 1957 Trip report written by the 4926th relates to a trip to LASL on the subject of the future of nuclear cloud sampling. The conclusions were

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"The B-57 type aircraft can adequately take care of LASL sampling requirements for surface shots within the immediate future. A minimum of 16 of these are required for a dual shot capability. Modernization to another type aircraft should be programmed for as soon as possible. LASL should be advised as to the replacement aircraft for the B-57 in order that sampling equipment may be developed.

We should plan for support of LASL in development of an air launch sampling rocket system.

LASL will provide us with a statement of requirement for supporting an air launch sampling rocket system.

LASL will provide us with a statement of future requirements for manned aircraft sampling support. This will probably cover the time period 1961 to 1965 or the "foreseeable future".

As for recommendations, Col. Kidd says that if the consolidated (LASL and Livermore) Laboratory requirements for sampling support do not specify six B-57D's, we should cancel our request to AIDC for this model and request the 4926th we augmented by B-57B's. This recommendation was in line with the fact that Dr. Cowan at LASL did not feel that the D's were needed as Livermore had requested. I believe this requirement for the D was justified soon hereafter by a requirement for the additional altitude capability.

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A further meeting to address specific planning for conducting an over seas test series if we are denied the EPG is to be addressed in a conference in Arlington Hall on 10 Mar.<sup>59</sup> with all pertinent agencies represented. The assumption would be operations beginning 3 to 5 months after direction with 8 detonations between 200 kilotons and 8 megaton and each lab having 4 of the devices; the location would be 300 nautical miles southeast of the island of Hawaii. JA

Not only was discussion going on in the United States as to preparing a plan for and methods for alternate means of conduct of Pacific atmospheric tests, but also a visit by pertinent JTF-7 personnel to the appropriate military commanders and locations in the Hawaiian area was being set up in the Feb.-Mar. time frame. JA  
The plans for a 15-21 Mar. inspection trip were cancelled by the manager of ALOO. In the May time frame, the AEC personnel were estimating the shore based requirements in the Hawaiian Islands to mount an open sea type test operation and addressing the methods by which such an operation would be carried out. 1

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"Assistant to the Secretary of Defense (Atomic Energy)" Retired Files

14802;2/21:55-5

Of some interest in the overall question of what the public feeling and information given to the public on the fallout question, here is a speech presented by Libby at the University of Washington on 13 March 1959 on "Radioactive Fallout." After a lengthy discussion of world wide fallout mechanisms and patters and statistics in various locations, Libby concludes as follows: "the future course of the fallout investigation is well set and is now proceeding on an international scale so that without a doubt the major questions about the fallout mechanisim will be answered within the foreseeable future. Remaining, however, will be the tremendous problems of the biological consequences of fallout radiation. We shall make no attempt here to consider these. It is, however,an area of uncertainty so large that only the most conservative treatment of the permissible body burdens of fallout isotopes is tolerable and this conservative treatment indicates that care and caution must be taken about the matter of additional radioactive contamination. The US AEC has consistently tried to reduce the magnitude of the fallout from the atomic testing and it is clear that the new technique of testing underground can further greatly reduce world-wide fallout. It is to be hoped that other nations will adopt this procedure, even tho it is sometimes difficult and more trouble. It does have one advantage, however, in addition to ilima-ting fallout; it makes the test schedule independent of weather. With further development of procedures it ought to be possible to obtain most of the results on weapons design with this technique. Of course the proof testing of weapons in their carriers might not be possible underground but the critical question of whether the warheads operate and give the yields and behave as they should, can be answered by this method which is fallout free. No one who has studied radioactive fallout has any desire to unnecessarily increase the amount of it in anyway but it is a risk and hazzard which is limited and which can be considered relative to the advantages gained. It is necessary to watch it and to control it as carefully as possible."

This panel published their first report on 16 March 1959 and it covered the range of detection from ten to the fifth to three times ten to the eighth kilometers. That report did not deal with the altitude up to fifty kilometers, which had been covered by the 1958 Conference of Experts and stated that in the range from ~~fifty~~ fifty to ten to the fifth kilometers, detection appeared to be technically feasible and satellite systems would include this range but terrestrial methods be less expensive. Following this initial report , it was felt that more detail was needed in the intermediate range and so the "Report on Detection in the Altitude Range 50-100,000 kilometers," was published on 26 May 59 after review by the principal panel members and detailed discussions by various working groups. The report addresses in some detail the various methods of detection in this altitude regime, by earth based systems measuring visible light and electromagnetic effects, by satellites measuring the Argus shell changes as well as other measurements, and various ways of measuring other disturbances. A "terrestrial system" is proposed as an interim system with the most complete method coming later to be a satellite system at an altitude of about thirty thousand kilometers. LA

The agenda of a 17 March 1959 meeting of the GAC Weapons Sub=Committee at LASL includes a discussion by Graves on horrors of underground and outer=space testing. The agenda also includes ~~the~~ a discussion by ALOO of the make-up of the stockpile and which Lab has made which devices; a description of those weapons now in development at LASL; and possibly a discussion of clean weapons. PB

Jane Hall, who writes this memo within LASL notes that this list of subjects may be able to counteract certain impressions received by GAC members when the full committee visited Livermore in Nuly 1958.

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An 18 March Trip Report written by Col. Wignall refers to a trip to Headquarters, ARDC and JTF-7 on 9 and 10 March where a number of items were discussed, including attending the "Operation EARLYBIRD Planning Conference" at JTF-7. Referred to first of all were the discussions transferring Indian Springs from ARDC to TAC and the fact that this transfer was presently in the state of negotiation. Secondly the B-57 replacement aircraft situation was discussed at some length and the AFSWC requirements were clarified to ARDC. Third, it is stated that at JTF-7, he learned that the Army is taking over both Johnston and Kwajalein to serve as missile launch points, both on a contract basis with the Navy writing the contract for Kwajalein support. As a result of planned activities at Kwajalein, the requirement for increasing MATS activities at Eniwetok has gone away. Next, discussions looked at the reductions that had taken place in the Army detachments at Eniwetok, Task Group 7.2, where earlier the Army had determined that reducing to the level of 396 personnel was as low as they could go, they have now unilaterally reduced their strength to 224 and JTF-7 is making a considered effort to get the Army to reconsider its position but are not optimistic. The impact of this personnel cut on support provided to the Air Force is substantial. The EARLYBIRD planning conference was postponed and will be rescheduled for some time in late March. Among his conclusions, Col. Wignall feels that paper work must be provided to ARDC to increase the B-57 inventory of the 4926th from 10 to 12 aircraft. A 30 March 1959 memo within the Special Weapons Center notes the following projects: Kiwi, Sounding Rocket Launch from B-57, EARLYBIRD, WILLOW, JAVELIN, and Reactor Hazards.

...the notes concerning  
sending a group of people to inspect the Hawaiian facilities during the week  
of 15-21 March 1959 and these pieces of correspondence are contained also  
In folder "353.4 Planning".

FK

9 On 19 March, Teller sent a letter to Starbird on the Division of labor  
or PLOWSHARE expressing the opinion that it is a very rich field in which to  
work and that "no one laboratory can hope to exploit as completely as the  
subject warrants." He feels strongly the need for some competition and assistance

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from other groups, including those specific fields in which Livermore has begun work.  
He expresses pleasure at seeing Sandia Corporation becoming involved in underground  
experiments and "would find it fully justified if Los Alamos would work on some  
appropriate modification of underground recovery of isotopes or of energy." Generally  
he seems to be urging DMA to involve and stimulate interest in PLOWSHARE type projects  
while emphasizing the benefits of it to the Livermore scientists and the need to maintain  
interest in PLOWSHARE and continue this good work.

There is no change in the notes here in the LASL level of interest in general  
or in specific projects and that is all of interest through 1962 in this folder.

Meeting #1488, 20 March 59:

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Libby reported that Harold Brown, now at Livermore, had replied by  
message to Libby's questions regarding control of a test ban on atmospheric  
tests. He felt Brown's proposal was a more practicable plan <sup>than</sup> ~~that~~ currently  
being considered at Geneva and said the proposed plan involves "approximately  
14 control stations, ~~parametrical~~ <sup>parametrical</sup> air inspection with no direct fly over,  
no reference to a "threshold" limit, and no provision for inspection teams."  
This reply, prepared on short notice, seems to be "adequately feasible" to  
Libby and thus he has requested Brown to prepare an alternative study with  
respect to control of nuclear testing by the use of satellites.

A 20 Mar. 59 memo from Agnew to MacDougall indicates that Agnew feels LASL needs specific devices to put their effort into for specific objectives by a certain time in order to make the most of their talents and to really ~~answer~~ PG the hard questions. He suggests a tentative list of 12 devices to be considered by the FWC for those things which the lab might devote themselves to and further

feels that a date such as 31 Oct. 59 should be set by which to have each of the specific device objectives in hand. He notes his reasons behind suggesting certain of the devices and the status at the present time of almost all of the designs which are in one stage or another of completion. He states "the suggestions included herein are certainly not sacred nor are the time scales but I have the feeling that if we don't sit don't and plan out some definite program, nothing will happen. . . . It should be realized that it is only by endeavoring to complete a test device in detail that most of the hairy and crucial questions ever arise and are investigated." Also of interest are Froman's comments on the cover sheet and in the margins of this Agnew memo. Froman agrees with only about 1/3 of the 12 suggestions for development and feels that even developing those will not change the country's defense posture much. Also he doesn't see the sense in taking them through the hardware stage but feels that simply drawings would be enough and just generally feels that there are too many suggestions to close together and that it is just making work for people who apparently might be better employed doing other things.

Some replies from the weapons labs and operations offices to a question or set of questions from Starbird in about June 59 seem to indicate that DMA and perhaps people higher than them want an explanation as to why systems and devices are more and more costly all the time and the weapons developments seem to take longer and longer. The general tone of the replies is that one of the most common developments being made in weapons is to make them smaller to attain the same yield and this leads to the use of certain materials which are much more costly hence increasing the cost. The complexity of the systems is noted. As for the length of time to attain a new development in a weapon or in the technology, this is mostly the result of the fact that the field is no longer new and that to make a truly significant improvement is much more difficult than if was 10 years

PG

previous. In reading further it seems that these questions may in part be based on the problems with the interrelationship between the complex DOD systems and the AEC devices that must be carried. This may have something to do with the "wooden" bomb concept which was to simplify the early design to take into account the relationship between the carrier and the device and not incur the cost or run into problems at the end of the line.

Here is a cross reference to a message from Teller to Bradbury dated 23  
ch 59 which was filed in "353.4 planning," which has been destroyed. The  
ber BY-59-35 (copy 1 of ~~XX~~ COC-128 enclosed) in which Teller states that

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thin a period of some months, the AEC Labs will find themselves in a position  
ere they will be allowed, either by treaty or by unilateral declaration, to carry  
t tests underground and at high altitude.

Discussions in this time period addressed the question of techniques of  
alysis by radio chemistry in the underground environment and, among other things,  
notes that LASL has as yet done no radio chemistry under underground tests since  
wan notes that "all the experience is at Livermore." Cowm nevertheless makes  
rtain quantitative and qualitative comments on the advantages and disadvantages  
radio chemistry in that environment and concludes at the end that, whereas LASL  
y not be as optimistic as Livermore, he is certainly not pessimistic.

For instance, on 24 March 59, McCone sent Killian a letter on the Broagner  
report supporting the need for tests with both high explosives and nuclear de-  
vices to address seismic research. Further the AEC supports a joint effort among  
themselves, NASA and DOD to explore outer space testing.

PV

20 and 24 March, 1959, J-1 and J-3 Reports: These reports document the fact that estimates of LASL office space and support requirements for possible overseas tests for the Hawaiian area are being made. J-3 notes that the LASL director has decided that for the present time continuing Task Group 7.1 is in the best interests of the Laboratory and that the

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-10-

lab will continue to support the headquarters of Task Group 7.1. Various meetings and visits concerning the overseas test capabilities and planning were held, including a visit by personnel from JTF-7 to J-3 to discuss the current planning for future DOD effects tests and to obtain a better concept of the hot dry run problems as documented in J-3-W-38 dated 9 March 1959.

24 March 1959, J-11 Report: Paul Guthals reports here on the status and activities in the cloud sampling area. Conferences have been held with Air Force representatives of the 4950th Test Group, the LRL chemistry group, and the LASL radchem group to reexamine the requirements for aircraft samplers in the foreseeable future as well as the period after 1960. Briefly the results are that a total of 16

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B-57 aircraft will be needed for any overseas operation and one possible breakdown is that 4 of these would be B-57D's to take care of Livermore requirements in ~~the~~ the 55 to 65,000-foot altitude range and the other 12 aircraft would <sup>be</sup> B-57B's. This array would give dual shot sampling capability for 2 shots within a 24 hour period including surface, subsurface and air bursts up to 40 to 45,000 feet altitude. Further it is noted that after the beginning of 1960 the continued economical use of B-57's may be in question due to problems of support and maintenance. The 4950th is studying these problems with the thought being given to planning for a replacement system if necessary. The 4926th Test Squadron in ~~con~~ conjunction with LASL is doing work associated with rehabilitating, reconditioning, calibrating, etc. various parts of the sampling system for the aircraft.

PP

The next program letter from Teller following the beginning of the moratorium, dated 25 March 59, states "It is yet too early to evaluate accurately the effects of the test moratorium on the Livermore laboratory. Nor is it possible to predict how fast the science of nuclear weapons will progress if the limitations are to continue. New ways are continuing to be explored that will allow weapons technology to advance even without testing, but it is uncertain at what reduced rate new models of weapons can enter production and stockpile once the backlog of current commitments is met. It is certain that if the moratorium continues, weapons will proceed at a much slower pace than that which was achieved in the past two years when testing was at its peak. The plans for future weapons development at Livermore include new techniques and facilities which will, in some small measure, offset the loss of the testing capability." As for test readiness,

PP

"An attempt is being made to establish and maintain a capability of resuming tests on a relative short notice, either in a limited series of shots or in a full-scale operation. This state of preparedness is never an accomplished fact but requires the continual application of technical manpower and facilities for planning, designing, and limited fabrication. The preparedness effort, even though limited, further dilutes the support that would be desirable to put into the advance of new weapon designs. The resolution of any of the uncertainties regarding future testing will eliminate the need to prepare for all of the possibilities, and thus will enable the Livermore Laboratory to concentrate its effort more effectively in advancing the science of nuclear weapons."

The major heading of general weapons research is broken down into a number of experimental and theoretical methods to address some of the physics including: criticality studies by various methods; containment of very low yield nuclear reactions within a steel sphere; {

theoretical and experimental investigations of the possibility of concealing nuclear explosions; and x-ray and argus studies and data reduction.

The section on specific weapon and device R & D and design and weaponization includes much specific discussion of the various classes and kinds of weapons as well as the estimates of which ones could be stockpiled on what time time scales and which tests would be most desirable as of this date and the possibilities of change in requirements for nuclear testing in the future.

The general heading of testing planning and evaluation, which is Gerry Johnson's area, includes the sub-headings; test planning, diagnostic plans for test resumption, diagnostic instrumentation, basic studies of phenomena connected with diagnostics,

PP

Jericho Test Program, and test operation support. Under the test planning section, it is noted that detailed plans are being developed for extended series of underground tests at NTS, and an opensea Pacific series not requiring the use of EPG as either a firing site or a staging area. Livermore "believes that the underground testing technique can be developed to the point where diagnostic information ~~xxxxxx~~ comparable with that from above ground tests can be obtained. Investigations are under way into new instrumentation and methods for obtaining high quality data from underground shots." This had led the laboratory to develop a program of tunnel excavation for shots up to 30 to 40 kt with studies under way for sites to contain up to 200 kt. "LRL has assumed that, if Continental testing is resumed, it will be underground and that even if atmospheric testing is permitted, LRL would plan to test underground for operational flexibility and with the anticipation that at some future date atmospheric testing would be prohibited." Also noted is that studies are under way to develop ways of testing in outerspace since this will be the only practical way to test megaton range devices in the anticipation of an atmospheric test ban. A number of problems in test diagnostics are being addressed and the Jericho program is aiming toward tests possibly in the spring of 1960. Further, in the area of test operations support, a portion of L Division is supporting proposed Plowshare experiments as well as preparations for possible test resumption.

The rest of the program letter addresses Plowshare, Sherwood, and Pluto programs.

25 March 1959, J-6 Report: For overseas testing activities considerable time has been spent laying out the scientific setup on board ~~an~~ an LCU and forwarding these design requirements to H&N, as well as reviewing the LRL design for an opensea LCU and its relationship with ~~k&x~~ an LSD. For NTS test capability the contract for 4 500-foot holes was let and the contractor has moved in to start work; a request was made ~~to~~ to increase the number of holes to 6, which was turned down by DMA. Furthermore design for 4 1100-foot holes for full scale shots up to 10 kT was requested and approved by DMA, but construction will be held in abeyance until someone other than LASL will commit themselves on the question of groundwater contamination. Various other problems and aspects of the NTS underground testing program are being addressed by engineering, designs, feasibility studies, planning etc.

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Here is a 26 Mar. 1959 transmittal letter from Col. Wignall, Commander of the 4950th , forwarding a draft operation plan for the so-called Early Bird operation, on which there was supposed to be a planning conference on 10 Mar. Wignall forwards the draft plan in spite of the fact that the planning conference was postponed.

JA

A document from the Navy entitled, "Operation Willow, Navy Plans, SWET-7," Mar. 1959 has on the distribution the Commander of Task Group 7.3 at the U.S. Naval Gun Factory in Washinton. The report addresses the Navy's proposal for their inclusion in the next overseas weapons effects test series and includes three underwater detonations as well as one surface detonation on the ocean's surface.

JA

A 26 March 59 memo from Quarles (acting Sec. of Defense) to the acting Sec. of State refers to a 26 Feb. meeting of the principals of the Interdepartmental Coordinating Group on Disarmament. This group agreed that the various staffs should develop a fall back position for the US delegation and makes several interesting points about where we have come at Geneva and in the test moratorium since 31 Oct. 58. Due to the Soviets tests after that time, the US was released from their voluntary suspension but the DOD/<sup>feels</sup> should continue to abide by the suspension until 31 Oct. 59 "with the possible exception of some underground tests to gain data for improving the proposed detection and identifications system. After 31 Oct. 1959, the US should reserve the right to test as we deem necessary, until such time as there is an agreement to discontinue specific type of tests under effective control. The US should take no further unilateral action to deny to ourselves the right to test." Other details and suggestions are made and it is felt that the fall out position should be resolved to the delegation before 13 April when the talks will recess "in view of possible termination of the Geneva conference soon thereafter."

PV

Interestingly, the issue of whether the detection system had to really police the test ban or just act as a ~~deterrant~~ <sup>deterrant</sup> was raised openly in the principals' discussions and in letters back and forth as to the Geneva delegation stands and the various agencies providing inputs and in early April, McCone wrote to Herter (then acting Sec. of State) of the commission's concern that the Geneva delegation might look at such a system mainly on the basis of deturance and forget about the fact that the AEC felt that the important matter was that it truly police a test ban.

"3-3.6 UNDERGROUND TESTING, GENERAL" FOLDER

Here is a copy of a Rand report entitled "A Method of Concealing Underground Nuclear Explosions" written by A. Latter, R. LeLevier, E. Martinelli, and W. McMillan and dated 30 March 1959. They acknowledged the work that was undertaken on the suggestion of Edward Teller and state in their summary "It is shown <sup>theoretically</sup> that nuclear explosions can be effectively hidden in large underground cavities. An estimate of the effectiveness of the method indicates <sup>that a</sup> yield of more than 300 KT could be made to look seismically like a yield <sup>of</sup> 1 KT. Experiments with both chemical and nuclear explosions are needed <sup>to test</sup> the theory." Their introduction indicates that this information and the <sup>formulas</sup> formulas and predictions made in this study are of vital importance in connection with the Geneva test Ban Conference and that the information used last summer (summer of 1958) is now known to be fallacious.

LZ