CHRON-12

411666

November 1961:

In the area of NTS construction for testing, drilling of holes for the next five NTS events is essentially complete with about 20 additional drilling jobs in various states of readiness. Three Hi-Vac rigs for post shot drilling should be operational by about 6 Dec. but only one is operational at present.

PT

II. A 1 November 1961 TWX from Reeves to Betts discusses the possible sites for overseas testing and lists the advantages and disadvantages of each as well as those factors surrounding each that can't be determined by ALO. Those sites considered are Eniwetok Atoll, Bikini, Johnston Island, and Christmas Island. Also Reeves makes reference here to the 6 February 1959 memo concerning the alternate methods and locations for weapons testing and the conference that discussed the open seas testing program. He notes that ALO remains of the opinion that an open seas program should be conducted only as a last resort. I will summarize by quoting some of the

FK

FK

last words of this TWX: "On the basis of a permanent long range test facility, it would appear that Christmas Island, from the standpoint of weather conditions, fall=out problems, and international objections to testing activities, would have distinct advantages over Eniwetok. In the long run, any immediate savings that might accrue by use of existing support and scientific facilities on Eniwetok would be far outweighed by operational advantages of Christmas Island.

It also appears that should Christmas Island prove unacceptable for high altitude testing, a separate facility for this activity could be established at Johnston Island, and the increased cost and disadvantage of operating two sites would still be more than off-set by the disadvantages of the combined facilities of Eniwetok-Bikini. This recommendation is based on one premise: That we are given complete operational control of Christmas Island - we doubt that joint operational control of Christmas Island would be acceptable."

A 1 Nov. TWX from Reeves of ALO to Betts goes into a great deal of detail in the assessment of possible overseas sites for the conduct of the long-range test program. Those four areas that are addressed are Eniwetok, Bikini, Johnston Atoll and Christmas Island. The advantages and disadvantages of each area are listed. Summary quoted here.

"In summary, on the basis of a permanent long-range test facility, it would appear that Christmas Island from the standpoint of weather conditions, fallout problems, and international objections to testing activities, would have distinct advantages over Eniwetok. In the long run, any immediate savings that might accrue by use of existing support and scientific facilities on Eniwetok would be far outweighed by operational advantages of Christmas Island. It also appears that should Christmas Island prove unacceptable for high altitude testing, a separate facility for this activity could be established at Johnston Island, and the increased cost and disadvantage of operating two sites would still be more than off-set by the disadvantages of the combined facilities of Eniwetok-Bikini. This recommendation is based on one premise: That we are given complete operational control of Christmas Island."

On the same date, 1 Nov., Gen. Betts sent a similar memo to Chairman Seaborg on the subject of assessment of overseas test sites. He included the details of the various sites that were sent to him by ALO and made essentially the same recommendations about the use of Christmas Island and Christmas in conjunction with Johnston Island as opposed to using Eniwetok and Bikini for a long-range test program which was assumed to be a test series conducted over an indefinite period of time with devices fired when ready and using maximum diagnostics. The great desirability of having such a full-scale test program as opposed to a completely airborne and hence, minimum diagnostics operation is emphasized and an intermediate step between the two programs is discussed as a program which could "be carried out largely by airdrops in the vicinity of an island on which we could establish a higher level of instrumentation for diagnostic measurements than could be provided

in a fully airborne operation. Such a short-term test program with optimum diagnostics could be conducted in connection with ~~Kwajalein~~ either Eniwetok or Johnston Island, but would obviously be easier to support technically and logistically if conducted in connection with the EPG. The considerable acceleration of our developmental test program that could be possible by turning to this intermediate type testing program leads logically to the conclusion that the Commission should strongly support a recommendation that we be released immediately to plan for and execute such an operation. ~~Despite the technical~~ Despite the technical and logistic advantages of conducting such a short-term test program at the EPG, to avoid the problem raised by the trust territory situation, we recommend the operation be based on Johnston Island."

A

A 1 November TWX from Headquarters Air Force to all those involved changed the nickname from EVERREADY TO BLUE STRAW for the Air Force support of nuclear testing.

B2

A 1 November TWX from Headquarters Air Force to all commands involved in plans for atmospheric testing notes that the proposed weapons test plans and operation plans and the proposed SAC operations launch directive are all approved with certain changes to the SAC launch directive. That is that Taongi Atoll is not available as a target and that SAC must select a new target outside of the Trust Territory. The corresponding target and trajectory data after coordination with AEC and AFSWC should be reflected in a corrected launch directive. Apparently the OPs Plan being used is number 6-61 of which Phase I and Phase II cover the Air Drop Operations and were written by AFSWC and Phase III was written by SAC and covers the ATLAS systems Test. Any nuclear safety concerns and required protection measures to be taken at Vandenberg are to be augmented immediately. The end of the message states "Preparations based upon these plans up to and including ALERT of equipment and personnel for overseas movement are authorized. Movement of elements of the Air Task Group (Provisional) to overseas base will be initiated only upon receipt of execution order from Chief of Staff, Air Force."

B2

On 1 Nov. 61, Gen. Booth, Chief of DASA, released a public press release that named the Commander and Deputy Commander of Joint Task Force 8, having been approved by the JCS. CV

Here is reference to a 2 Nov. 61 meeting between SAC and AFSWC and EG&G and OFO among others. The subject was specifically another phase of Ever Ready which included the Air Force Atlas systems tests and the plans were for a detonation after a launch from Vandenberg at 8400 ft. altitude, 262 miles on a heading of 61 degrees from Taongi. There is some thought given to a 15 Nov. date for this test and there are clearly problems with providing any sort of technical diagnostics (samplers and/or bhangmeters) unless authorization is given immediately and some interference worked out. PR

The ALOO reply to the same questions from Betts came from Reeves on 2 Nov. 61 ALOO has a general feeling as to minimizing the number of atmospheric tests as referred to in this statement. "It also appears to us that the public and international opinion must be considered and that it would be desirable to accept some sacrifice in some or perhaps all of these factors in the interest of public opinion in order to reduce the probability of forced termination of atmospheric testing completely or at a unnecessarily early date." The factors referred to include diagnostics, safety, time, and cost. In replying to the specific questions from Betts, certain tests such as Marshmallow and Hard Hat are noted as examples of tests which can be done more advantageously underground; also, if public opinion if given a weight in the definition of advantageously, ALOO believes that most or at least the majority of tests would be underground. As for building up a stockpile of underground sites they state, "We believe that we should prepare sites and maintain them on a lead time of six months on laboratory requirements limited for NQ

yield only by physical and geological considerations and availability of funds. Without detailed study and knowledge of lab requirements, we estimate that this capability should be several times that which we had for low yield tunnel sites 2 months ago and many times that which we had in hole capacity." Reeves emphasizes the need for developing sites for high yield shots either with very deep holes or tunnel and shaft configurations. The final statement reiterates the earlier feelings as follows: "Should it develop that atmospheric as well as underground testing is activated, we would recommend that atmospheric testing be held to a minimum even at the expense of increased costs and acceptable delay in order to decrease to a minimum the probability of public opinion forcing an early termination of atmospheric testing." To this statement the penciled in comment in the LASL files is an emphatic "NO."

NQ

The Livermore answer to the same questions came from Foster to Betts on 2 Nov. As to more advantageous tests underground, those low yield tests which require extensive diagnostics are best conducted underground due to the natural shielding of the rock compared to atmospheric problems. In the event of atmospheric testing never beginning or ending sometime in the future, the critical area would in higher yield devices and Livermore feels that at the present time they are limited to about two detonations per year in the 50 to 100 kiloton range and have no capability above 100 kilotons. The Christmas Tree concept is being developed as one way of meeting this requirement. As for a stockpile of sites for detonations in the zero to 100 kiloton range, Livermore feels it is reasonable to estimate 12 tunnels portals would be required to provide a capability of making approximately 50 detonations per year. Livermore does take a stab at a comparison of costs and times for tunnel configurations vs. vertical holes. The table constructed shows considerable costs advantage and some time advantage for low yield hole denotations over tunnels (less than 5 kilotons) with significantly less cost advantage but some, and a reversal of the time advantage in favor of tunnels for detonations in the 5

to 50 kiloton range. The relative ease and quantity of diagnostic measurement in tunnel configuration with numerous side drifts and wider geometries is noted as compared to the significant problems with a vertical hole being limited by small cross sectional area and difficulties of working in such a geometry. Foster states, "Presently, drill hole diagnostic are limited to alpha measurements, high explosive transit time and hot spot measurements. Prompt and post shot radio chemistry are also available." It is quite significant to me that in this entire message, there is no mention of containment problems and the resultant contamination. As for the use of the outerspace environment, the main advantage here would be that this is the most reasonably area for testing devices with yields in the megaton range. However, except for those particular devices, it is felt that the demonstrated capability underground and the more reasonable cost of such tests make that a more attractive area for non atmospheric testing in the yield ranges below megaton.

On 2 Nov. 61, Froman replys to Betts 27 Oct. list of questions. As to test which can be more advantageous conducted underground, it is conceivable that certain effects experiments which require shielding and/or collimation might be done cheaper and easier underground, and that that environment is also preferable for safety shots to prevent high local contamination. As to developmental type of tests, LASL is not aware of any that would be preferable underground. As to starting and again stopping testing in the atmosphere, Froman states, "We have been badly slowed down at the present time because tangible preparations for the resumption of testing were not permitted during the moratorium. Let us not make this mistake twice. Although it is hard to understand why we should willingly agree to stopping air testing once starting and returning underground, nevertheless we would urge that a stockpile of holes be accumulated just in case." He gives a rough estimate of the number of holes requested (up to 4 for megaton yields) and notes that LASL still prefers holes to tunnels in spite of current casing difficulties.

As to safety type problems underground, LASL feels that potential contamination of underground water is the most problematic and doesn't feel that containment is a significant problem if the 475 W to the 1/3 rule is followed. Also LASL sees no need to conduct underground tests during an atmospheric testing period in order to investigate such safety limitations as containment. LASL also begs off of the question of relative cost and time and instrumentation advantages for holes vs. tunnels until far more experience is gained in the two areas.

NQ

2 November - 61

President Kennedy orders preparations for resumption of atmospheric nuclear tests. "In view of the Soviet action it will be the policy of the United States to proceed in developing nuclear weapons to maintain this superior capability for the defense of the free world against any aggressor."

CR

On 2 Nov. Foster sent a TWX to Betts responding to Betts' 27 Oct. TWX mentioned above. Foster addresses the advantages of underground testing, the possibilities for developing improved capabilities underground for the future and addresses in a great deal of detail the advantages of the tunnel method of underground testing as opposed to vertical holes.

A

A 2 Nov. TWX from Reeves of ALO to Betts replies to Betts' questions about the advantages of atmospheric versus underground testing, etc. contained in a 27 Oct. TWX and in addition to addressing questions about the feasibility and requirements for surveying underground test locations and preparing them, Reeves argues about the advisability of going all out on atmospheric testing in light of the public opinion. He feels that even given the go-ahead to test in the atmosphere, we should realize that there is a certain probability from the public opinion of forced termination of atmospheric testing either completely or at an unnecessarily early date and Reeves recommends that atmospheric testing be held to a minimum even at the expense of increased cost and acceptable delay in order to decrease the probability of public opinion forcing such an early termination.

A

Batzel of LRL in a TWX to Betts on 2 Nov. makes some remarks about the present situation with regard to diagnostic measurements. He feels that with the airborne diagnostics in the C-130 and the X unit signal telemetered from the drop case Hett and time measurements can be made. Also bhangmeter and radiochemistry data will be available but there is considerable question about a reliable fireball yield. It is stated that a ground-based radar-tracked optical system is being prepared for shipment by Nov. 15 and that such a system would insure time measurements and therefore it is requested that operations be planned, if possible, to provide a land base for the time and fireball photography which LRL feels is highly desirable.

A

C V

Here are two reports written for the members of the DASA Test Coordinating Group as minutes for their meetings and they are signed by Col. Thomas Mann, who was formerly the Commander of JTF-7 and is now the Chief of the Test Coordinating Division within DASA. On 2 Nov. 61, the minutes of the group meeting of 31 Oct. contained the following: It is noted that nine of the sixteen personnel scheduled to report in the first increment for JTF-8 have been designated by name. A query has been sent to the Navy requested the status of the equipment and facilities at EPG. As for Christmas Island, it says, "The group was informed that there were no new developments concerning this island except that the British seem to be dragging their feet on our request." The Navy program of atmospheric testing was reported on by Commander Eaton who said that the Asroc test is ready to go right now with some ships having sailed and the rest of the Task Group ready. He stated, "The operational commander determined last night that he would go to sea and standby and wait. Weapons are aboard the ships. Plans are complete as for as the Navy is concerned.' As for the Polaris test, it is just getting under way with no detailed operations order yet written. The submarine chosen is the Ethan Allen with the shot about 350 miles southwest of Ascension Island, and 4 missiles have been designated which will have command destruct systems installed. A Col. Thorne reports on the proposed Air Force program, which is detailed elsewhere in my notes. Of note are these particular excerpts on the three phases now planned. "As for aircraft modifications: the 57's are on schedule; the 52's have little work to be done. All weapons are ready. Plans call for an advance cadre to move to Hickam on D minus 10; D date is 15 Nov." Also, "Phase three, Atlas firing, can take place anytime after 30 Oct. without backup. This will be a category three test. We have been told to try to fire beyond Wake with a short range for the missile. Plan calls for open water firing, 1000 miles away from test grounds. The Atlas will be fired from Vandenberg." As for any Army programs,

a Lt. Col. Conarty reported on planning, and preparations for any ICBM/AICBM tests. Kwajalein seems to be the most attractive location with a time scale of at least 18 to 24 months. Several comments on Johnston Island include the fact that Christmas Island looks better than Johnston, there is a problem with the number of people on Johnston, and after a quick look at Johnston, the Air Force turned it down because they saw no necessity to complicate their problem.

There is a Sandia piece of correspondence, reference #RS 7100/1225, dated 2 Nov 1961 entitled "Test Unit Descriptions." This seems to have some good information on what Sandia had stockpiled and where, with the appropriate and type of case and method of delivery.

NOVEMBER — 61

2 November	Meeting of National Security Council on atmospheric testing and results: public announcement by President that U.S. was preparing for atmospheric testing. Program initially planned would start 1 March and continue for 2 - 3 months. Planning for annual series would also be made. Highest priority - device development and effects tests. DOD systems and proof tests not as high priority. Overseas atmospheric testing would begin before NTS atmospheric testing which might never be approved. Underground testing would continue.
2 November	President Kennedy orders preparations for resumption of atmospheric nuclear tests. "In view of the Soviet action it will be the policy of the United States to proceed in developing nuclear weapons to maintain this superior capability for the defense of the free world against any aggressor."

A 2 November TWX from Foster to Betts notes that present Ever Ready planning does not include the LRL devices - 38 and 45. Foster states that if these events are to be included in the first series, AFSWC must have guidance on it soon and that if they are not to be included LRL requires this guidance immediately so that they can stop the effort that they are currently expending on these two events.

On 2 Nov. Bradbury responds to Betts' TWX of 27 Oct. asking for comments on atmospheric versus underground testing and Bradbury makes a strong case for the lack of real advantages from underground testing as opposed to the attainment of a number of advantages if we could go to atmospheric testing. His TWX stands in stark contrast to that of ALO. Even though he states it would be "hard to understand why we should willingly agree to stopping air testing once started and returning underground" he urges that a stockpile of holes be accumulated.

A

Gen. Betts wrote a memo on 2 Nov. detailing a meeting he attended in the office of a Mr. Howard Furnas of the State Department on Oct. 23 with the Department of the Interior, Department of Defense, Department of State and AEC in attendance. The memo goes into some detail on the various persons' arguments against the advisability of going to either Bikini or Eniwetok for the testing and states that it was the consensus of the group that we should look very carefully at the possibility of using either Johnston or Christmas, and only move to EPG if the factors discussed are out-weighed by other considerations.

A

A most important memo from Deputy Secretary of Defense Gilpatric to the Chairman of the JCS on 3 November 1961 addressed "Weapons Test Plans and Preparations." Gilpatric clarifies the instructions preparing for atmospheric testing which came out of the NSC meeting and the President's announcement and directs certain preparations for the test series to be readied as announced four months hence, as well as parallel planning towards achieving an early capability for developmental tests using an air task force in the area south of Hawaii. He notes that the AEC with DOD and State Department participation are trying to obtain a suitable island site and that negotiations with the UK for the use of Christmas are to begin immediately. While noting that JTF-8 has been activated and will be building up for the long term operation, the task group under the Air Force is already in being and planning and preparations by that group are to continue. The Air Force and Navy efforts to prepare the Asroc, Polaris, and Atlas systems tests are to continue. In the interest of compressing the number of tests that can be done in the short window (probably twelve weeks) he specifically directs that the DOD see what can be done to equip more aircraft for air sampling.

NJ

A 3 Nov. 1961 memorandum from Harold Brown (DDR&E) to the Secretary of Defense discusses the incremental emergency funds required to the Dept. of the Army for the DASA nuclear weapons test in FY-62. Whereas DASA requested $40,500,000 additional to the budget released on 4 Oct., DDR&E recommends certain cuts in these requests and asks for $24,000,000 to be put in the Army RDT&E budget to cover such things as Nougat, Ivanhoe, Sunbeam, and preparation for Fishbowl. It is not clear from this letter whether this covers all of the DASA programs including JTF-8 expenses or is for the Army support only.

CV

Further details of the BLUE STRAW Operation are contained in a 3 November TWX from CINCPACFLT to a number of Naval Units in the Pacific Area in which it is noted what the Task Organization for the Operation will be. The responsibilities of the various naval units to patrol and clear the surface area in the drop zone which is designated as a 200 mile square centered 350 nautical miles southeast of Hilo and the series will go for approximately 30 days beginning on 15 November. The Navy Aircraft required to support as well as base support of Barbers Point are detailed.

BZ

From the same 4 Nov TWX Betts makes the following comments about the underground test situation. He requests the Labs and Sandia to provide him with up-dated details on the revised Nougat series. Furthermore, Betts states that the Eniwetok shot, part of the Plowshare program, will continue as scheduled. Betts then goes on to discuss the atmospheric test program and notes that negotiations are presently going on with the UK, as to the use of Christmas Island as an island base. If Christmas, the first choice, is not available then perhaps Eniwetok and Bikini may be reconsidered. Meanwhile, parallel planning to conduct developmental tests by employment of an air task force based in the Hawaiian Islands with detonations to the south and use of Johnston Island is continuing. Betts asks the Labs and Sandia to reexamine the proposed atmospheric program in light of the current decisions and possible developments for test bases and to meet with him on 13 Nov in Albq. He notes that while he favors no limitations to be placed on the number of shots to be fired or the yield to be released to the atmosphere that the National Security Council tossed around the idea of a 10 megaton release limitation. Betts further notes the military's interest in the availability of hardware for high altitude effects shots and asks Sandia to see what they feel can be done in this area due to their development and study of the Oats system.

L

IV. Planning Directive (NTS-4-11-61) Marshmellow: AZ

This Directive written after testing had been resumed in 1961 is issued to provide guidance and information on the responsibilities and planning for Marshmellow which is being considered as part of Ivanhoe. The test for the DOD has two major purposes. First of all, it is a weapons effects test and includes a series of DOD sponsored measurements which have long been identified under the DOD program 800 and are related to low energy x-ray flux. The source, a is to be detonated in a tunnel constructed in the Oak Springs Tuff formation in Area 16. The second major involvement is in Vela Uniform where, under DOD sponsorship, close, intermediate and long-range seismic measurements will be made.

Marshmellow is a continuation of the DOD diagnostic experiment named Jericho, which was suspended at the start of the moratorium.

4 November

B

TWX from Betts to all -- Asked labs for updated details on revised Nougat series. States negotiations in progress with UK as to use of Christmas Island, first choice for overseas testing. Parallel planning for open seas detonation south of Hawaiian Islands with HAFB and J.A. in use is going on. Set up meeting with labs for 13 Nov. to review most up-to-date lab requirements and desires for atmospheric program and location. Notes military's interests in hardware for H.A. effects shots and asks for Sandia input. f

A 4 Nov. TWX from Betts to ALO and the Labs is included in notes from other folders and it addresses in part the decisions of the National Security Council which met on Nov. 2 on the subject of atmospheric testing. A

635 Christmas Island

The next piece of correspondence is dated 4 November 1961 and doesn't occur until sometime after the discussion of resuming atmospheric testing and the possibility of Christmas Island being one of the locations has begun. BM

5 November

B

Chairman Khrushchev says USSR is prepared to extend present nuclear test program if U.S. resumes tests in air. m

Prime Minister Nehru, visiting U.S. says conclusion of test ban treaty is of "utmost importance." Says, "But as a formal treaty takes time, we insist on some kind of voluntary suspension to bridge the gap."

6 November – 61

cR

General Assembly (XVI) approves resolution asking ban on all tests and urging conclusion of test ban agreement. Vote: 71 Yes, 20 No, 8 Abstaining. *(For full text of resolution and record of vote, see Appendix "E".)*

Note for possible future reference that there is a draft document, 19 page long, containing a concise chronology of the correspondence pertinent to Ever Ready (later called Bluestraw) from the beginning of Oct. thru Nov. contained in this folder, dated 6 Nov. 61. PM

61

A memo from Jim Sugden to Reeves on 6 Nov. notes that he and Ryan of H&N visited J.I. on 2 Nov. to "investigate the feasibility of supporting ground-stationed diagnostic instrumentation for Phase II" of Ever Ready. The island now has a population of 125, building up to support a SAMOS project to begin about 1 Jan. and requiring 175 people to support. Also, they were informed that the base had recently supported 400-500 personnel engaged in some DOD programs. Sugden was specifically investigating the sampler aircraft problem and feels that with the addition of distillation units for fresh water for decontamination, parking of the aircraft and accomodation of the samplers at Johnston Island instead of Barber's Point could be carried out. There is the problem of how to return samples by 135's since they cannot use J.I. F

61

A 6 November trip report from Jim Sugden to Jim Reeves reports on his visit to JI the feasibility of supporting ground-stationed diagnostic instrumentation for part of BLUE STRAW. The trip was arranged by McCorkle and sponsored by PACAF. They viewed the present island status (population 125), were informed that build-up is in progress for SAMOS which will begin about 1 January, and came away with the feeling that the facilities over-all are in better condition than when JI was used during HARDTACK. They were informed that the base had recently supported four to five hundred personnel engaged in DOD programs. A couple of problems mentioned are fresh water for aircraft decontamination and how to arrange for sample returns when 135 aircraft can't use the island. NS

A 6 November TWX from Mr. Shute of SAN to Hertford, Bradbury, Foster and Schwartz notes that the JCS has stated that "any reference at this time to the term JTF-8 is classified secret including its use in titles or any messages or correspondence." CU

BZ A 6 November Memo for Jim Reeves from Jim Sugden has some interesting notes about the status of Johnston Island and BLUE STRAW. Sugden with J. Ryan of H&N visited J. I. to look at the feasibility of possible ground based diagnostics for Phase II of BLUE STRAW on 2 November. The island population was 125 with a buildup to 175 for SAMOS to commence about 1 January. They were informed that the base had recently supported 400 or 500 people engaged in some DOD programs. Sugden believes that the decontamination for sampler aircraft can be accomplished at Johnston Island but the addition of distillation units for fresh water may be required. BI

On 7 November, Bob Miller of ALOO sent a letter to Col. Dishuck of AFSWC which quoted in full Betts message of 4 November where he reported on the National Security Council Meeting of 2 November and in effect relates to AFSWC that the EVER READY Operation is off. BZ

Beginning on 7 November AFSWC began to turn off the effort that had gone into being ready for testing in the Pacific in November. BZ

Here is a memo dated 7 November from Bradbury to members of the weapons section of the LPC on the subject of testing, which includes the list of LASL proposals for overseas testing which Bradbury will present at a meeting with General Betts on 13 November in Albuquerque. The list is divided into two segments: 1) for an off-Hilo operation which will include all measurements except for alpha and includes the 43, 50, 59, and 16 M devices; 2) an operation which will require Alpha measurements or special diagnostics and will be done at some unknown island on balloons and ground stations and will include approximately 10 tests as presently planned. A very tentative list of the parallel plans from Livermore as provided by John Foster is also included. CU

Here is an 8 November TWX from a Mr. G.F. Bing of ARPA to Air Force Systems Command (Col. Nudenberg) with info copies to SSD (Col. Westmoreland), Gen. Betts, Dick Taschek, Gilbert of Livermore, and DASA (Commander Edwards). The message is interesting, I will quote it in its entirety: "Several high altitude weapons effects tests are being planned by DASA. Possible yields are from 165 kt to several megatone. Posssible altitudes from 25 kilometers to 1,000 kilometers. Assumed time spans of 4 to 7 months, 9 to 12 months, and 18 to 24 months with emphasis on 4 to 7 months. CU

Request that you evaluate whether or not these tests can be advantageously used in the Vela Hotel program. If so, request that recommendations be made to ARPA as soon as possible with regard to various actions which could be taken. Would appreciate preliminary views during briefing to ARPA following 13 November meeting of Vela Hotel Joint Technical Group"

61 RH

On 8 Nov., Seaborg replied to Hans Bethe to a letter from Bethe dated 31 Oct. which had discussed the nuclear testing question and Seaborg found it "extremely well thought out and persuasive." I assume it was trying to be convincing in the direction of not resuming atmospheric testing. Indications are that Bethe ~~Beta~~ referred to the eariler stress (during the moratorium probably) placed on the potential of underground testing by Foster and the Livermore people and Seaborg suggested that Bethe ~~Beta~~ discuss this further with Bradberry.

An 8 November TWX from MATS to its subordinate units notes that although nuclear tests will not be implemented in the immediate future certain aircraft (photographic and charting service and Air Weather Service) will be retained in modified configuration for possible reinstatement of the project. BZ

An 8 November TWX from McCorkle to Gen. Schriever, Commander of Systems Command states the following: "Recent deferment with possible planning reorientations points out the need for a permanent organization here at AFSWC which can cope with the many facets of such an operation without the disruption that we all experienced during the last 30 days. Pointed guidance as to type of tests projected, locations, and timing within the framework of the 2 November NSC guidance will be obtained from the AEC in meetings 11 and 13 November. Following this I will complete my organizational plan and request your approval to submit it and suitable recommendations to your Headquarters on 20 November 1961" BZ

8 November — President Kennedy, in news conference, emphasized that, IF it were revealed that Russia had made advances in the understanding of high altitude nuclear effects, commensurate U.S. action must be taken.

8 November — General Assembly (XVI) adopts US-UK resolution proposing renewal of Geneva test ban talks to conclude treaty with controls. Vote: 71 Yes, 11 No, 15 Abstaining.

On 8 Nov. Maj. Rosen of the DMA Test Office wrote an internal memo on the subject of properly diagnosing or best diagnosing the atmospheric tests. (continued)

Major Rosen proposes consideration of barges and surface ships to be used as aiming point and diagnostic base for the air drops and questions whether this method shouldn't be considered as it might possibly be a more desirable and better method of diagnosing the air drop tests than were the airborne diagnostics that were discussed.

1961 (Continued)

8 November — General Assembly (XVI) adopts US-UK resolution proposing renewal of Geneva test ban talks to conclude treaty with controls. Vote: 71 Yes, 11 No, 15 Abstaining. *(For full text of resolution and record of vote, see Appendix "F".)*

A TWX from ARPA to Systems Command on 8 Nov. discusses the planning by DASA for high altitude weapons effects tests and asks Systems Command to evaluate whether or not these tests can be advantageously used in the Vela Hotel. ARPA requests the views following a meeting of the Vela Hotel joint technical group on 13 Nov. The reply written on 15 Nov. by SSD of Systems Command to ARPA states the following as the conclusions of the joint technical group with respect to effects test: "Because of differences in orders of magnitude of distances involved, the Vela Hotel instrumentation will require modification of both detectors and electronics. Such work is already in progress under maintenance of AEC agencies for their own purposes. However, the results of this work will be directly applied to the Vela Hotel diagnostic instrumentation, especially since the same AEC personnel are involved in both programs. Thus, ARPA suggestions are apparently being covered under AEC sponsorship."

On 8 November Betts sent a memo to Leudeke documenting the fact that Sandia feels that air drop of a 30 or 50 megaton weapon from a B52 aircraft at a release altitude of 35,000 feet with a height of burst of 15,000 feet is both feasible and can be safely performed. A

Documentation on 8 November covers the fact that DMA has been requested to outline for a Senator Aiken the reasons for the U. S. resumption of atmospheric testing as well as underground testing and also to prepare a proposed atmospheric test schedule in the event the U.S. resumes atmospheric testing. A

Note that at a 9 November 61 meeting of the Christmas Tree Working Group, Blossom noted that LASL does not intend to make use of the Christmas Tree facility for testing at this time but intend to continue participating in planning since the possibility exists of a future desire to utilize such a facility. PD

On 9 November, 61 H&N submitted their preliminary cost estimates for various sites to be evaluated for Christmas Tree. The estimates for 7 possible locations in Utah, California, Nevada, and New Mexico ranged from about five million to about eight million dollars for site evaluation. PD

A 9 Nov. 61 message from Carothers at Livermore to the AFSWC commander notes the intention of AFSWC to have a rehearsal of the atmospheric testing aircraft on 16 Nov. over Tonopah and says that Livermore cannot participate aboard aircraft No. 299 due to committents at NTS and Gnome. NQ

1961 A 9 November TWX from Reeves to the labs quotes a memo that is detailed in other sets of notes on the Secretary of Defense to the Joint Chiefs of Staff on the subject of planning for overseas operations. Among other things, it is noted here that systems tests to be planned for by the various services include at this time only the ASROC, the ATLAS and the POLARIS. CU

Beginning about 9 November, it is evident that there is now a reorientation of thinking towards the test series to begin in March of 1962 such that all technical desires of the various organizations for different types and different facets of the operation will try to be included in consideration for the future tests. There is now a heavy emphasis of complete coordination and discussion with the Office of Aerospace Research, OAR, and DASA for the operation that is some distance off.

A 10 November TWX from Gen. Gerrity of BSD to the Systems Command Commander stresses the need for more positive thinking and steps in the area of Air Force needs in nuclear testing. Garrity feels that weapon development tests are receiving the predominant consideration whereas AFSWC and BSD have both indicated an urgent need for certain nuclear tests to increase the state of knowledge of nuclear weapons effects, and in particular those that effect ballistic missile systems.

9 November	New York State legislature, under leadership of Governor Nelson D. Rockefeller, authorizes $100 million to be spent on shelter system for schools and colleges in state.
9 November	Secretary of Defense to JCS: JTF-8 has been activated, aimed at 1 March test readiness. Notes there has been preliminary planning between USAF and AEC to set up air drop test capability based in Hawaii. AF and Navy to prepare for OST of Atlas and Asroc and Polaris. More air sampler development being investigated. JCS directed to have completely airborne operation planned and readied by 1 March in event island base can't be found.

A 9 Nov TWX from Reeves to Graves contains extracts from a Secretary of Defense to Joint Chiefs of Staff memorandum of the same date. In addition to reiterating the comments about the NSC meeting on 2 Nov, the Sec. Def. notes that a joint task force, JTF-8, has been activated for the conduct of the developmental and effects tests to be conducted either at Christmas Island or another base to be determined. They are directed to proceed with organization, manning, procurement and other actions necessary to meet the 1 March Readiness date. He notes the existence of a Task Group, presumably Task Group 8.4, under the Executive Agency of the Air Force, as being in-being. I assume this means the nucleus of personnel left over from Task Group 7.4, which have during the moratorium, been contained within and transferred out of AFSWC. He states that

this Task Group has accomplished in coordination with the AEC, the preliminary planning for creation of the capability for air drop testing based in Hawaii and I assume this is in relation to the preparations going on since the end of September or the beginning of October. Air Force and Navy Task Groups are at work on preparations for their operational systems tests for the ASROC, Polaris and Atlas systems. DoD is investigating what can be done to equip more aircraft for air-sampling prior to the Readiness date and the Sec. Def. directs the JCS to prepare for the 1 March Readiness and a 3-month test window and in the event that a suitable island base for testing can't be obtained to prepare for completely airborne operations and substitute such operations on the same schedule. They further direct that the three systems tests noted above be prepared for execution within the 3-month period defined above.

On 10 November a TWX from Reeves of ALO to Betts documents the fact that neither one of the three laboratories can practically utilize a large amount of cable offered by the United Kingdom at a date a month or so previous to this and therefore have after a great deal of correspondence turned down the United Kingdom's offer.

A memorandum for Chairman Seaborg from Betts on 10 November documents the fact that Betts will be briefing the Joint Committee on Atomic Energy on 11 November and contains an outline of the briefing which contains the present AEC guidance for preparing atmospheric testing, the steps that the AEC is taking towards implementing the atmospheric program which include a planned meeting of the laboratories, and ALO and the support contractors on the 13th and 14th of November as well as a good deal of detail on 10 or so devices which are tentatively thought of as candidates for testing in the atmosphere plus a summary briefly covering the five tests already completed underground at NTS

A 10 November letter from Reeves to Hertford discusses the overseas planning as proposed by the NTS Planning Board, including the priorities given to the various locations (with Eniwetok first). They set out a number of details of what should be arranged for in planning and in setting up an operation if Christmas Island is to be used as well as what is needed if none of the island bases can be used but an open sea operation will be required. They re-emphasize the advantages associated with operating from Eniwetok if that can be arranged.

A 10 Nov. 61 letter from Gen. Booth to the Sec. of Defense on the subject of funding of requirements in connection with nuclear weapons tests addresses the current needs for the DASA sponsored weapons effects tests. He notes the former request for funds, the former status of the tests, and the former amount

of approved funds. The four tests mentioned are the one ~~xiei~~ low yield, near surface effects test at the NTS (Sunbeam), for which DASA requested $10,000,000 and is being provided $3,000,000. The other three tests are high altitude tests under the heading of Fish Bowl for which DASA requested $15,000,000 to do preliminary planning and preparation in FY 62 for the operations to be carried out in FY 63. While the DOD authorized $15,000,000, the current schedule requires these shots to be done within FY 62 and thus there is an under run here. In summary, the current requirements for FY 62 funding for these four effects tests requires $7,000,000 additional for Sunbeam and $50,000,000 (for a total of $65,000,000) for the three Fish Bowl tests, for a grand total of $57,000,000 additional required. The money is requested immediately if the tests are to be carried out on the appropriate schedule.

2. A meeting of the NTSO Planning Board was held at ALO on November 11th 61 to consider a revised Nougat schedule in response to a request from Gen. Betts of DMA. Reeves responded by TWX on 12 November 1961. Stressing the tentative nature of the lists Reeves presents an extensive listing for Nougat including the device lab nickname yield hole location and readiness date for detonation. Briefly the shots by lab and number of shots by months are as follows: November 1961 to LASL and one LRL; December 3 LASL and 2 LRL; January 1962 5 LASL, 3 LRL and 1 DOD; February 1962 2 LASL and 7 LRL. FJ

3. Here is a cross reference to a memo from Reeves to Hertford dated 13 November 1961 on the position of the Planning Board for overseas operations and is filed in "635 Blue Straw" Folder. FJ

A 13 November TWX from Betts to the two lab directors requests them to comment on the future planning for and need for their so called reactivity experimentation programs. CU

CR 13 November U.S. proposes to USSR that Geneva Conference on Discontinuance of Nuclear Weapons Tests be resumed 28 November 1961. hn

In an unclassified letter to Senator Aiken on 13 November, Gen. Betts covers some rationale behind the commission feeling the need for resuming atmospheric testing if the President so directs. In assessing the relative positions of the United States and the Soviet Union since testing was resumed on 1 September the letter states in part "The Soviet Union could have been making relatively large gains in nuclear weapons technology through their current intensive tests in the atmosphere. They have demonstrated that the number of tests that can be conducted in the atmosphere in a comparatively short period of time is much A

greater than we have been able to conduct in the same period in the limited facilities presently available to us for underground testing. Thus, by limiting ourselves to underground testing our possible relative gains vs the Soviets in this field are as a consequence also limited. Atmospheric testing would relieve this limitation on the number and types of tests that can be conducted. In addition to the more rapid rate of progress through atmospheric testing, it is important to note that much needed information on effects and operational behavior of weapons systems could be gained only through atmospheric testing. Proof tests of large yield weapons and operational tests of entire weapons systems cannot be conducted underground. Atmospheric tests would permit gathering important effects information relating to anti intercontinental ballistic missiles. In this area we do not believe that conclusive information can be gained through underground tests alone. Important weapons developments necessitating large yield tests cannot be achieved in the present state of technology with underground tests." A

A 14 November TWX from Headquarters TAC, which supplied the C-130 aircraft notes that there is a serious shortage of such airplanes within their command and they request information on the configuration status of the two AFSWC C-130 aircraft as well as the date at which they are to be returned to TAC. Bz

14 November - 61 New York State Governor Rockefeller warns US against test ban; says that agreement now "could place in jeopardy both our national safety and the defense of freedom throughout the world." CR

By a 14 November 61 letter, Bob Newman sent H & N a set of sketches made by his Group a twin balloon launching site and a proposed configuration for a deep hole with rifted bottom. The sketches are for information and consideration only. NT

Here are highlights of 14 Nov. 61 OFO Project Listing:

HP

1. Vela Uniform

Dribble	3 yrs. effort
Shoal	2 yrs. effort
Shade	Support of DOD measurements at NTS; primarily seismic

2. Weapons

Nougat - NTS	27 detonations
Ivanhoe - NTS	24 detonations
Bluestraw - Pacific	41 shots planned; maybe beginning 1 Mar. 62 with probable establishment of new facilities at J.I., Christmas, and Hilo

3. Plowshare

Gnome	
Wagon	Cratering at NTS
Chariot	In 4th year in Alaska

4. AEC Reactor Program

Rover	
Pluto	

5. NASA

Nat'l Nuclear Rocket Development Facility	5-10 yrs. at NTS

6. DOD

Christmas	Feasibility study of possible $27 million underground test facility
Marshmallow	New Tunnel facility involving 800 ft. of vacuum pipe
Hard Hat	Tunnel and hole involving structural

A lengthy TWX dated 14 November from ALO to Gen. Betts with info copies to the labs is a preliminary coverage of the meeting in Albuquerque of 13 November attended by the principals from the various labs as well as Gen. Betts and others on the subject of atmospheric test resumption. The TWX contains a lengthy event list from each lab, LASL listing 15 events plus certain specific statements concerning the conduct of these events, and LRL lists about 26 different events as well as the specifics of their position relating to atmospheric testing. Various other details of the test site requirements, diagnostic requirements, etc., are contained in this TWX as well as a listing of the desired DoD program which includes 3 detonations in the Fishbowl series including Starfish at 400 kilometers, Kingfish, as well as one near surface and Bluegill, shot at the NTS which is titled Small Boy. As to a choice of test sites the sites to be considered in order of desirablity are first Eniwetok/Bikini second Christmas Island and third Johnston Island and or Hilo. It is noted that the concensus shows that politically Eniwetok and Bikini are essentially not feasible and that planning should be directed to Christmas Island with the alternative of Johnston and Hilo.

A

4. A 14 November TWX from Reeves to M. A. Rex, Head of the Field Office of the AEC in Las Vegas goes into detail on the LASL and Livermore requirements for the Ivanhoe operation which at this time I believe was planned to begin on 1 March 1962 and continue through the end of the fiscal year. Roughly speaking LASL had a requirement for 11 vertical holes 36" in diameter ranging in depth from 1,000 to 2500 feet plus 3 200 ft. deep holes presumably for safety tests plus reaming out hole U15d to 36" in diameter and 6000 foot depth by June 1962. Livermore had much grander aspirations requesting more than 30 sites for detonation variously in tunnels and in Area 9 vertical holes. ReeCo and H & N were asked to consider the program as proposed and comment on the construction possibilities and foreseen problems in procuring equipment and constructing sites.

FJ

A 14 Nov. message from Reeves to Rex at the NTS gives the specific construction authorized for various NTS shots to be done in the next few months (Nougat) and notes that the NTS planning board is supporting long lead time construction for Ivanhoe. Therefore, Rex is requested to obtain the best available time and cost estimates as soon as possible for the overall Ivanhoe program since Reeves expects there to be some funding problems due to cost associated with preparations for other testing locations and wants to make DMA aware of these problems as soon as possible.

NQ

61

5. Here is a 14 November TWX from REeves to Betts with info. copies to Foster LRL, LASL, H&N, EG&G, Field Command DASA, AFSWC, Headquarters DASA (Brig. Gen. Polhamus and Maj. Gen. Starbird), and Sandia. The message is addraft summary of the meeting held in ABQ on 13 November 1961 of the principal personnel involved in overseas testing. The meeting had opened with a briefing by Gen. Betts on the necessity to establish a reasonable shot schedule, sufficiently justified to support funding negotiations and political objections. He emphasized that the following should be taken into consideration: (1) a possibility that approval for atmospheric testing might not be forthcoming, (2) provided approval was obtained a readiness date of 1 March was desired and that the testing period might be as short as 60-90 days, (3) provided approval was obtained and a series in 1962 was executed planning should also envision the possibility of a subsequent series in 1963, and (4) location of the series at Christmas Island seems the most feasible under present political conditions. The meeting itself covered a myriad of thoughts and possibilites for an overseas test series and I'll try to hit some of the highlights here. The list of LASL events included 15 different possible tests which could be done variously by airdrop, balloon, barge or ship and LASL mentioned that all events may require a sea vessel of some type including the Christmas Island shots but that especially that would be required for the Johnston Island or off Hilo type series and therefore a joint air-sea operation is required. LRL's shot list included 26 different possible tests and they stated a desire to have only one overseas site rather than two. Support requirements were discussed at length under 3 possibilities: operating complete from Christmas, operating in part from Christmas, and operating from Oahu or Johnston over open water. The requirements for diagnostics such as

FJ

FJ

etc. were covered. Mention was made of the need for launch facilities for 1 or 2 shots at Johnston Island and requirements for 2 ships of the boxer typed as diagnostic platforms was stated. The estimate of personnel to be involved in actual test operation not including the construction phase was 2,410. The consensus was the Eniwetok/Bikini was a politically infeasible choice and that planning should be directed to Christmas Island with the alternative for Johnston-Hilo and therefore it was recommended that early authority to visit Christmas be obtained. The DOD program was summarized as being 3 high altitude shots from Johnston Island (Starfish, Kingfish, and Blue Gill) and 1 near surface shot at NTS (Small Boy).

Here is reference to a 15 Nov.[61] paper, AEC 334/44, which apparently has the RI Commission considering Starbird's appointment as new Task Force Commander.

Test bulletin #5 on 15 November[61] by Goeckermann lists the proposed Livermore atmospheric test schedule as presented at a 13 November DNA meeting. It is NF stated that the method of delivery presupposes a land based diagnostics capability and the present estimate of using Christmas Island is felt to be greater than 50 percent probability. (Goeckermann notes that the fact that any island location is being considered is highly classified.) "Should an island location be unavailable, the next line of retreat would be to put as much diagnostic gear as possible on ships and in aircraft for operations in the open sea. Not all of the events in the schedule could be usefully detonated under these circumstances." The proposed event list shows 26 events ranging up to 9 megatons with dates running 1 March 1962 through the end of May. All events are listed as airdrops with the exception of six, four of which are listed as balloon events and two as barge events shown in the latter half of May).

A 15 Nov. 61 copy of the minutes of the 7 Nov. 61 Test Coordinating Group meeting contains the following: Gen. Polhamus reported that JTF-8 is still classified and that an announcement of the existence of that force would have to wait until after Mr. Nehru had departed from the US. In a discussion of funding, the figure mentioned above of 40.5 million dollars was mentioned again and is apparently the total incremental costs required to do the shots as now planned. In the opinion of a Commander Zawacki, for a 7 month test response, this will be on a crash basis and will cost something on the order of 80 or 90 million dollars, whereas DDR&E has indicated that they will approve 24 million dollars. Capt. Craig of DMA noted that the AEC interpretation of systems tests at this was that they must be justified on a developmental basis or that they would not be included in the test series. Also, they could be justified on the basis of effects measurements. He also noted that in regard to AEC participation as far as safety is concerned, these tests were service tests and were planned initially to be conducted outside of the framework of JTF-8, whereas it now appears they will be conducted by that organization. It was noted that the charter for JTF-8 is being held up until the arrival of Gen. Starbird (who apparently has not yet arrived in his role as Commander). Discussion stated that it looked like the Joint Task Force would be responsible for conducting all tests outside of the US; however, Admiral Gannon pointed out that for the Navy Polaris test this would be different since the Navy would test in the Atlantic. If this effort came under JTF-8, they would have to split their operations between the two oceans. Also, Major Burke, the Air Force representative, stated that the Air Force could run the Atlas test independent from the other service-proposed test. Commander Eaton now said that the Navy is making two different plans for their systems test, one for

the Pacific and one for the Atlantic. Gen. [illegible]

and Dr. Hayward departed for England to confer with the British on Christmas Island. As for aircraft support from the Air Force, Major Burke noted that there was a major problem since the Commands that have furnished the aircraft for test support want them back since there are no firm plans at the moment and there may be a problem in holding on to them for more than a month or so. Major Burke also noted the Air Force Discoverer project and how it and the nuclear test program can not function together in the same place at the same time. Gen. Polhamus asked him to get what information he could on this project's plans for the period Mar. through June of 62. As for the NTS it was stated, "Gen. Polhamus asked Capt. Craig if he could clarify whether the AEC is planning a standdown at NTS during the three month oversea testing period. Capt. Craig said that they were pretty much in agreement that it is not going to be possible to conduct atmospheric shots at the NTS. They are going ahead with underground shots. Lack of sufficient technical personnel may preclude operations at two locations."

The next month's report covering thru 15 Nov. 61 notes about half a dozen NTS events which are being prepared for and adds a few details on the development of capabilities for a Pacific operation, with the arrival of several pieces of gear. No mention is made here of the airborne concept. PH

Here is a 15 Nov. 61 report of a meeting on a estimates of time, manpower, and costs for proposed Pacific operations held at H&N in Los Angeles on 14 Nov. and this report is written by John Pollet. Attending the meeting in addition to a number of H&N personnel were Sugden, Sullivan, and Gibbons of Livermore. The 3 concepts considered were the "quick and dirty" operation, the several J.I. shots and an entirely Christmas Island operation stretching from March PR

thru May and including about 41 air drops. The latter concept it is noted would require extending and widening the Christmas Island air strip to accomodate the B-52's, which of course was not done. One of the items at the meeting noted, in the absence of any LASL attendee, that "as a result of LASL commitments to support the Rover program, it will not be possible for them to man, concurrently, weapon test operations at the NTS and in the Pacific area. During the months now scheduled for tests at Christmas Island, holes for underground detonation will be stockpiled for future LASL use. LRL, however, with its Nevada organization will be able to conduct operations simultaneously at both sites. Consequently, they have been directed to further develop their tunnel capabilities." The 41 event Christmas operation would include 15 balloon shots and 26 airdrops. As for personnel and capabilities to support personnel at Christmas, H&N estimates there are accomodations for 3725, including 3000 enlisted men type accomodations, whereas there is an estimate of about 1500 personnel needed there, exclusive of the H&N requirements. A good summary statement of this meeting is that it was quite preliminary and there were a number of inaccuracies in what might be done and various support capabilities and requirements.

Here is a 15 November TWX from SSD to Mr. Bing of ARPA and the other info addressees of the Vela Hotel message mentioned above. It states "the following are the conclusions of the Joint Technical Group with respect to the effects tests. Because of differences in orders of magnitude of distances involved, the Vela Hotel instrumentation will require modification of both detectors and electronics. Such work is already in progress under maintenance of AEC agencies for their own purposes. However, the results of this work will be directly applied to the Vela Hotel instrumentation especially since the same AEC personnel are involved in both programs. Thus, ARPA's suggestions are apparently being covered by AEC sponsorship."

In relation to the reactivity experimentation, Bradbury replied to Betts on 15 November that, due to operation Nuget, Ivanhoe, and current planning for overseas testing, there are no LASL plans for any one program in the 1 January to 1 July 62 time period.

1961 A 15 November memorandum from Bradbury to certain lab personnel including Graves and Ogle addresses the planned meeting on 20 November with members of Sandia (Schwartz, Henderson, Schuster, et al). Subjects of discussion are CU those of mutual interest if air testing of weapons is resumed and include: neutron output measurements on the 50, yield diagnostics on the high altitude shots, weapons effects of joint interest in the two laboratories, alpha and other measurements if no land is available in the event of air drop testing, and dropable configurations for experimental devices if no land is available.

26 A

On 15 November Chairman Seaborg sent to the AEC General Manager a copy of the "Presidential Instructions to the NSC Committee on Atmospheric Testing Policy" which gives the guidance for this committee to consider the proposed programs submitted by the Atomic Energy Commission. In part the Presidential instructions contain the following guidelines: "tests will be conducted in the atmosphere only if: (a) the test will provide information of substantial importance to the national defense. (b) The information needed can be obtained no other way, with reasonable time and effort. (c) Atmospheric fallout is minimized in all practicable ways. (d) The military need for the tests out weighs the desirability of avoiding all atmospheric fallout.

Preparations for atmospheric testing will be directed toward: (a) Test readiness in 4 months. (b) Concentration of atmospheric tests in the shortest possible time period with a target of about 3 months.

The committee will consider and recommend to the President on the need for providing the capability to conduct follow-on tests.

The study requested by the President (NSC record of action 2440-c) of the availability of sites for atmospheric tests will be directed toward obtaining, on a priority basis, a suitable island test base.

The committee will submit to the President for decision the carrying out of each atmospheric test. (a) For the present, the committee should limit its recommendations to tests which relate to important questions of weapons development and weapons effects. (b) Approval of either proof tests or systems tests can be expected only if there is convincing demonstration of unusual need in each case.

committee, in consultation with the Director of the Bureau of the Budget. The President has decided that : (a) No FY 63 budget proposals for the financing of test preparations will be made public. (b) FY 62 expenditures will be financed by use of the emergency funds, with a supplemental request to be made as necessary."

On 15 November Gen. Betts sent a memorandum to Chairman Seaborg on the subject of the availability of sampling aircraft. In part the letter states that it is felt that there is sufficient B57 aircraft with the low altitude capability to meet those needs. However, the B57D aircraft which are the only available sampler aircraft to meet our high altitude sampling needs are in a marginal status as to the number of aircraft to meet our requirements. There are in fact 4 B57D's available to the AEC but in fact only 3 of these are useable. There are 13 other B57D's in the Air Force inventory and the following is true of these: "4 are assigned to the Air Defense Command for a high priority mission, 6 are in Europe extensively modified for a high priority mission there, and 3 are assigned to the Air Force Systems Command. The 3 assigned to Systéms Command might be available, providing they have not been modified to the extent they are unsuitable for sampling purposes. A determination would have to be made, of course, of the relative priority our mission vs. that to which they are assigned in the event we require more than the 3 B57D's now on hand." It is thus clear that there is some question as of November 15 as to the readiness of the Air Force to meet the AEC's atmospheric test sampling needs.

A

A 16 Nov. 61 message from Newman to Sanders at the NTS gives the specific LASL vertical hole work required through the completion of Ivanhoe. Newman requests that authority be confirmed for design and construction of 21 holes in Area 3 and 1 in Area 4 ranging to a depth of 2500 ft.; as well as 1 6000 ft. hole in Area 15 (U15E). Moreover, 2 1600 ft. vertical holes and 2 1200 vertical holes with drifts at the bottom are to be designed and constructed for Ivanhoe and these are designated U3BB through U3BE. Newman emphasizes how tentative these projections are.

NQ

Here is an interesting document from Bob Petrie of Livermore dated 16 Nov. 61 to Jim Reeves and the title is "Engineering, Construction, and Construction Support Required for the Lawrence Radiation Laboratory xx Christmas Island Participation." This is a somewhat detailed estimate of the initial and more extensive scientific construction to support both a quick type operation at Christmas Island as well as a long term or extended operation there, merely for Livermore's requirements. It includes support for barge shots, balloon launched tests as well as air drops.

PR

CU

A 16 November TWX from Betts to Foster notes that as for the DOD systems tests, Sandia has provided a technical advisor for the ATLAS and ASROC operations and DMA has provided Mr. D. M. Olson to cover the POLARIS and ASROC operations.

A TWX from Graves to Betts on 16 November notes that the possibility of an induced tsunami in Hawaii in case of an accidental surface burst should be added as a safety consideration in connection with off-Hilo operations.

CU

On 16 November, Headquarters Air Force asked for an updated firm requirement from the AEC Users for the various types of B-57 aircraft, since the C and E models at Warner-Robbins have not yet been modified and would cost quite a lot of money.

BZ

The final entry in this folder is a memorandum from Ogle to various Lab personnel, covers a Sandia-LASL meeting held on 16 Nov on atmospheric testing. Under the subject of high-altitude shots, the testing techniques and diagnostic techniques including VELA diagnostics were discussed and several things were decided. It was clear that one shot would not satisfy all needs. The general plan would be to carry a device aboard a Thor missile to about a 150 kilometer altitude and instrumentation rockets would also be used. The meeting went into a great deal of detail on the possible diagnostics for both high altitude and airdrop events and which Laboratory or Sandia would be developing the capability for these measurements. One particular capability Sandia is preparing is a tracking system to track both the drop plane and the device from the ground which could be both ground-mounted and ship-mounted in the event that the devices were to be dropped over the open sea.

L

By a Nov. 16, 1961 memo from Gilpatric (Deputy Secretary of Defense) to the Chairman of the JCS, the JCS requests for 87 spaces for DASA is approved except that 1 civilian space which was requested is not approved, making the incremental authorization 27 officers and 59 enlisted men.

CV

DW TNG-44 (16 Nov-61 on "Atmospheric Testing")

A 16 November memo from a Captain Craig of Test Office to Gen. Betts in DMA covers an attached memo for the commissioners which recommends the conduct of overseas tests in the open sea. The purpose of the memo which is not contained here seems to be to allow the labs and other organizations to do some efficient and firm planning in one direction only and it is felt that the way to force the commissioners to allow this is to recommend that a decision be made to focus only on the open sea area for testing due to the fact that no island base has yet been found. To quote from the conclusion of the cover letter "preparation time is very limited. A decision must be made very soon. Unless the commissioners are sure they can obtain Christmas they should agree to an open sea operation now."

A memo for Chairman Seaborg from General Betts on 16 November while transmitting the list from each laboratory of the proposed devices to be tested in the atmosphere it mentions for the first time that I have seen General Starbird as commander of JTF8.

A 16 November TWX from Graves of Los Alamos to Gen. Betts asks that induced tsunami in Hawaii in the case of an accidental surface burst be added as a safety consideration in connection with off-Hilo operations.

A 16 November memo for Col. Anderson of DMA from a Col. Banks of the R&D Branch addresses

Correspondence on 16 November notes the fact for the record that as of this date negotiations with the United Kingdom for the use of Christmas Island were already underway.

16 November — Ogle memo on atmospheric testing. Proposed HA test using Thor as carrier with small instrumentation rockets. Notes Sandia's preparations of tracking systems for air drop plane and device and all labs' work on diagnostics for HA and air drop events.

Note also that Bill Ogle sent Betts a letter on 17 Nov. 61 entitled "LASL Diagnostic Program Tabulation for Possible Pacific Atmospheric Test Program" which referenced No. 142102Z from Reeves to Betts with info to all other concerned agencies which covered a 13 Nov. meeting of the "principals" in Albuquerque. Betts addressed this meeting with the posibilities for Pacific testing and the TWX tried to lay these out in detail and asked the various info addressees, such as LASL to comment to Betts as Ogle did in this brief letter on 17 Nov.

Here is an interesting internal memo on a conference held in Los Angeles on 17 November 61 with representatives from AEC, Livermore, LASL, Sandia, and EG & G. and H & N. At the direction of General Betts from the 13 November meeting, H & N is preparing overall estimates of the engineering times, procurement time, shipping, construction, and other schedules for a possible overseas atmospheric testing operation. The estimated readiness of two Livermore Alpha stations will be 19 February if authorization is given immediately based on a readiness 13 weeks after go-ahead. Walt Gibbins wrote this memo and stated " it was also determined that the initial Livermore scientific construction required to allow Livermore to proceed with its first shot on March 1 would be complete on February 15 provided there is no delay in authorization. Specifically methods of determining yield from FIREBALL for the earliest shots was addressed and it was felt that it would be impossible to erect steel towers for the early shots and very difficult to erect wooden towers and therefore a non-elevated set-up is being considered. The memo doesn't make clear whether the operation is addressed to a specific area but it does say: "Four timing systems, two for each Lab, were requested. This would allow preparation to take place in two of our three shot areas simultaneously." The words said about the LASL program are quite interesting and are quoted in full: "LASL will fire up to twenty balloon shots, 17 or 18 of which will require Alpha measurements. These shots are essentially replacements for the presently planned needed shots at Nevada if the atmospheric testing program is authorized in the Pacific. LASL will fire four to five relatively high yield air drops and will stage two shots on floating vehicles, one of which will involve a rather extensive neutron experiment. LASL is also planning two or three missle tests, two at a burst height of 100 to 150 kilometers, and one with a 1000 kilometer height at burst. Each of these shots will require companion rockets. The estimated number is 26 companion rockets per missle shots. LASL is planning an Alpha Station which is almost identical in scope to the planned LRL multi-place arch structure, the only difference being that a tunnel liner will be used rather than the Armco arch. EG & G requested one timing and firing building (Butler type) with a wooden and linoleum floor. For planning purposes, it was generally agreed that all shots and floating vehicles could be fired by radio with the provision that LRL would request hard wire to barges

LP

providing the moorings with a reasonable distance off-shore. For the time being both Laboratories are planning on barges or LCU's for the floating surface shots. Exception to this is the LASL device with the neutron experiment which will be implaced in a ship (probably Liberty type). As for more detailon the Livermore program: "copies of preliminary engineering design criteria for the LRL program were distributed to H & N and the AEC. This program was described to the attendees along with our estimates of costs and construction time. Our criteria included detailed drawings of the recording bunker and a descriptive explanation of the requirements for cable installation. Detector stations, rocket launcher, instrument cans, barges and balloons, and administrative and support facilities. The AEC indicated that H & N will be authorized to proceed with the engineering on our criteria to amount of $25,000 internal H & N costs." Further, H & N is now authorized to send two men to Honolulu immediately to begin negotiations for the purchase or rental of construction equipment and to arrange barge tows for this equipment. No DOD program was presented although a Commander Hall was at the meeting. The only mention of Christmas Island is that Livermore made a preliminary request for vehicles to be used in the event Christmas Island was used.

Ogle distributed a shot list within LASL on 17 Nov. to which he attached very little credibility stating that, "I am unaware of anyone who believes there is any serious relation between this listing and what will actually happen." It shows 14 NTS shots scheduled between this time and the end of Feb. with essentially no drilling work done on half of the holes.

A 17 Nov. TWX from Wm. Lawrence of ALO to Bob Krohn of LASL discusses the definitions of various terms that have recently appeared but have not been officially defined. ALO's understanding, which seems to be as good as anybody's, is that Ivanhoe is an unclassified term identifying a continental test series to follow Nougat after Feb. 1962 and would include only underground tests. Blue Straw identifies tests that may be conducted outside of the continental U.S. and it is stated here Blue Straw apparently includes and supersedes off-continent testing identified as Operation Eveready. JTF-8 is the task force which will accomplish the Blue Straw objectives.

A 17 November memo from Ogle to Bradbury and others at LASL details the Sandia/LASL meeting on atmospheric testing held 16 November. From Sandia were Schuster, Jim Scott, Charles Scott, Milligan, Kramm, Mehl, and Claassen. From LASL were J-Division personnel, Jim Koon and Stopinski of H Division. Subjects discussed were: high altitude shots; telemetering of alpha on air drops, barge shots, and high altitude shots; telemetering data on the 8 in. gun; the question of the drop case to be used for various devices, with Sandia preferring to use a 39 case for all air drops independent of the size of the device; Sandia capabilities for monitoring various device functions on air drops; Sandia preparations for either a ground borne or ship borne tracking system for both the drop plane and device; and questions about the balloon site at Christmas Island. A number of details on the first subject (high altitude shots) are worth mentioning. There are four points of view from which such shots are interesting:

1. The possibility of using high altitude shots to measure the neutron flux distribution for the 50,
2. Checking out space testing techniques, in particular yield measurements by observation of x-ray flux
3. Checking out Vela Sierra and Vela Hotel methods of measuring

timing

quantities, in particular, P-Division measurement of

by detectors in a vacuum, and

4. Upper atmospheric physics information which could not all be satisfied in one shot. Included as two main possibilities would be a 50 at 150 kilometers and a Y2 or something larger at roughly 1,000 kilometers. The former shot would be the appropriate one for AEC purposes if only one of the two shots could be performed.

In relation to the method of such high altitude testing it is noted that a device would be launched from Johnston Island in a Thor missile to about 150 kilometers at which altitude it would be turned on its side and fired. Diagnostics would be done from rockets at about 200 kilometers altitude launched from Mid-Way, Kauai, Christmas Island, or Palmira or Jarvis. No observations would be made from other Johnston Island missiles or from pods due to the fact that telemetry would then not have to face the problem of too high gamma and x-ray intensities and secondly, the intensity levels and those distances get closer to those that one might actually expect in space testing, and thirdly, it appears the neutron spectrum and intensity can be measured very nicely with a vaccum pack of something like a 1,000 miles. Obviously, other ground type measurements could be made from Johnston or other adjoining islands. Furthermore, in noting that the DOD proposes two high altitude shots, the AEC feels that neither shot would satisfactorily answer AEC questions but that they should be instrumented and about 15 or 20 instrumentation rockets will be flown against each of the three high altitude shots. Furthermore, Radchem sampling by rockets on the high altitude or space shot seems to be out of the question on this time scale.

A letter from Ogle to Betts dated 17 November addresses the present capabilities and plans for diagnostics in various test situations overseas. As for

devices air-dropped or done by balloons, Fireball, Radchem, Alpha and

CU

time interval measurements as well as Bhangmeter measurements will all be made. For devices fired at Christmas Island on balloons all timing of the above measurements except for would be made. For airdrops if Christmas is not available, only Radchem and Bhangmeter measurements are planned. For the specific case of the XW50X1Y2 on which neutron flux distribution measurements are required, two possibilities are considered: 1) a ground surface shot at Christmas Island with a large vacuum type system and various neutron detectors; 2) the device be fired at about 150 kilometers above Johnston Island with neutron time of flight measurements made by rocket borne instrumentation. As for high altitude shots and development and checking of diagnostic measurements for possible future space testing, x-ray intensity measurements would be made timing by rockets in space, measurements would be made in a similar manner, and optical measurements would be made from the surface and from aircraft.

A 17 November letter to Betts from Bill Ogle of LASL documents the specifics of the LASL diagnostic program for possible Pacific atmospheric tests as presently planned. Details of diagnostics to be performed from groundborne, airborne and/or shipborne stations for the various types of devices and type of carrier are enumerated.

A

on the subject of selection of overseas sites. He enumerates the present possibilities and states the following: "Unless final negotiations for Christmas Island can be accomplished quickly or support for Eniwetok-Bikini operations can be obtained from the highest governmental levels, I strongly but reluctantly recommend that a decision be made to conduct the tests by air drops or barge shots in the open sea. I feel that a decision at this time will provide the guidance needed to place all technical and operational preparations on a systematic basis. With the firm knowledge that the tests will be conducted at sea, all effort can be applied in this direction and it is likely that improved techniques can be worked out that will overcome the inherent disadvantages of such an operation. Continued delay in selection of a test site will greatly increase the cost in terms of funds and manpower, as well as reduce the effectiveness of final operation, since effort must be directed to support several contingencies instead of supporting a specific plan of action. In summary, I recommend that unless there is a good possibility of obtaining Christmas Island or Eniwetok-Bikini Atolls by December 1, the Commission make a decision to proceed with an open sea test operation, making use of Johnston Island and Hawaiian support facilities as feasible. If it appears that agreement for use of Christmas Island might be obtained with extended negotiations, these negotiations should be continued in order to provide a more suitable place of operations for tests in the future."

A

Two letters from Leudeke, the AEC General Manager to the JCAE on November 18 address previous requests from that committee for information concerning Eniwetok in particular and the resumption of atmospheric testing as the AEC is planning for it. The first letter responds specifically to four questions raised by the committee on the present status of the Eniwetok area as to its readiness and response capability for overseas atmospheric testing. The answer in part states that "preparations for a limited air drop series with limited diagnostics could be done so that the first test could be conducted in 12 weeks. Preparations for an extended test series at Eniwetok with optimum diagnostics would require up to 6 months." Further Holmes & Narver as well as EG&G and Sandia and their capabilities to respond with their organizations manned for a test series are addressed. Also the fact that

A

JTF8 is presently being activated by the Department of Defense to conduct the test series is noted.

A November 18 TWX from Betts to the Lab Directors notes that the President has appointed a committee chaired by Seaborg and consisting of Weisner, Bundy, a State Department representative, a DoD representative Gerald Johnson, and the committee will meet about the week of 20 November to address and evaluate a proposed US atmospheric test plan and to jointly meet with a similar committee from the United Kingdom and present the United States's position. Following the joint US/UK review the President and the Prime Minister will be presented with the joint plan for their consideration after which a decision as to the use of Christmas Island will be made. Betts requests the strongest justification for the different labs programs due to the importance of the information being forwarded to the Seaborg committee. He further notes that DMA has obtained authority to dispatch a group to inspect Christmas Island and that additional details of this inspection visit will be forthcoming. On November 20th Bradbury submitted to Gen. Betts the lengthy LASL reply. On November 21st Dr. Foster submitted the LRL reply.

19 November — AFSWC Report -- Preliminary plan for Fishbowl. Plans for high altitude shots between 1 March and 1 June 62. Recommend Thor from J.A. for shots in this order: & 400 km first, km next. Details on carrier selection plus instrumentation rockets, etc.

K

6. An 18 November 61 TWX documented in other notes from Betts to the laboratories notes that the President has appointed a committee chaired by Seaborg and including others such as Jerry Johnson to review the atmospheric test program and come up with a U.S. positon which will then be discussed with a United Kingdom committee and that this effort of Seaborg's committee will begin the week of 20 November. FJ

Here is a 20 November 61 report on a meeting at Holmes and Narver on 17 November "To Establish Estimates of Cost and Time Schedules for Construction and Support of Proposed Pacific Operations." It is written by John Pollet and notes that among the conferees were representatives of ALOO, Los Angeles Office, LASL (Newman), Livermore (including Gibbins), Sandia, EG & G, DASA, and H & N (including Ryan, Spain, and Pollet). Following the direction of the NTS Planning Board on 11 November, this group assumes that Eniwetok will not be available, that there will be no atmospheric testing at NTS for the time being although the balloon areas (7 and 9) are to be maintained, and that Pacific testing will begin on or about 1 March 62. Thus this meeting came up with estimates of the construction costs and schedules for accomplishing any or all of the approaches that would utilize Christmas Island, Johnston Island for high altitude tests, and an open sea operation off Hawaii and Johnston Island. Considered are about twenty-six different shots in the Pacific with some to be using balloons, most air drops, and at least one requiring a Liberty Ship or some sort of surface platform. PM

Note also in this time frame, about 20 Nov. 61, that Sandia and EG&G submitted rather detailed estimates of support in the way of costs and equipment for a Christmas Island type series. PR

A 20 November 1961 message from Foster to Betts replies to a request on 18 November from Betts which is documented in File Notes A. Foster states that the Livermore atmospheric testing program which is being proposed contains three basic objectives: Normalization of design calculations; extension of engineering physics to reduce warhead vulnerability; and experiments on advanced designs. The message then goes into the specific tests intended within each of these three categories and the predicted results and need for information.

LY

Test bulletin #6 on 20 November from Carothers names Gilbert as deputy test director for Pacific Operations and Jack Shearer as responsible for the diagnostics and experiments for these events.

NF

61

Here is a 20 Nov. letter from Gen. McCorkle of AFSWC to Systems Command Headquarters in response to a Systems Command request for the AFSWC concept of an air support group to provide Air Force support for resuming atmospheric nuclear testing. The three documents transmitted are: "Organization for a permanent capability to support nuclear tests, 18 Nov. 1961," No. SWOP-1-2116; "AFSWC Equipment and Personnel Augmentation Requirements, 18 Nov. 1961," No. SWOP-1-2117; "AFSWC Technical Manpower Requirements for Resumed Nuclear Testing, 17 Nov. 1961," No. SWOP-1-2114. The documents and planning is based on the 3 Nov. directives from the Dept. of Defense which note the establishment of a JTF-8 and testing to begin in about 4 months. Thus, the Air Force support will be in the form of a Task Group as part of the JTF-8. In addressing how to establish the appropriate air task group, some history of the Air Force support of testing is given and the Task Group 7.4 and its evolution and status during non-testing periods is noted. It is stated, "To give continuity to preparation for and execution of recurring tests, the 4950th test group (nuclear) was formed in the fall of 1956." During the Hardtack operational

JF

phase, the group headquarters with their subordinate units were comprised of 986 personnel, whereas Task Group 7.4 totaled a peak strength of 2,262 persons at the EPG. "After the fall of 1958 and continuing through the moratorium, the 4950th Test Group (nuclear) was reduced in strength and capability until finally discontinued on 16 Aug. 1961." Since testing has begun at the NTS in Sept., AFWSC has reached into their resources and provided a small air support group at Nevada which has been satisfactory for the minimal requirements there to date. AFSWC proposes as a first step for Air Force support testing, the establishment of a "Nuclear Test

JF

Mission Element" within AFSWC which would contain 11 officers, 8 airmen, and 1 civilian for a total of 20. The next step to follow immediately. would be to augment this element with an Air Force support group at the NTS which is shown to have a total of 22 people. It is further stated that "with some augmentation this mission element could assume control of a force such as contemplated for Blue Straw, and conduct the operation. With some greater augmentation, it could become a provisional air task group under a Joint Task Force." The Blue Straw support task group is shown at a level of 65 personnel, and an air task group as part of a Joint Task Force on an established air base is shown as requiring about 85 personnel. An air task group to support JTF-8 which would not be located on an established Air Force Base would require a much greater number of personnel to provide the base support functions.

The second attached study outlines the requirements for an additional B-52 drop aircraft over the the two that were being prepared for Ever Ready, additional aircraft for support of the NTS requirements, and personnel to support these aircraft as well as the two C-130 aircraft to be used for diagnostics, all to be supported by Kirtland Air Force Base.

The third attachment details the support required from AFSWC as far a technical workload. AFSWC finds itself technically responsible for a major portion of the Air Force nuclear effects programs, developments to Air Force systems having relation to nuclear developments and tests and effects, and technically responsible for supporting the various weapons effects and developmental tests. In order to provide for these support requirements, AFSWC feels they need an augmentation of 64 personnel in their research, development, and test directorates.

Here is a thick document entitled, "Operations Plan for Blue Straw" from AFSWC and it is undated and I believe never actually published although it was written in the time frame of late Oct. It shows the concept of an air drop operation being supported by an Air Task Group under Gen. McCorkle and goes into all the details of communications, personnel and administration, logistics support, nuclear safety, etc. JF

A 20 Nov. message from Bradbury to Betts discusses the LASL proposals for devices and types of tests to be included in the above ground test series and the justification for each one. After going into some detail in the devices to be used in the airdrop program, Bradbury stresses rather strongly 2 high altitude experiments that he feels the AEC should fight hard for. One of these is an experiment to determine the feasibility of testing in space and he says, "We believe the country to have been badly mistaken in its belief as to efficacy of underground testing and that the national policy which followed this opinion might have been quite different had the actual facts been known two year ago. We believe that we should find out by actual experiment what really can be done in space testing before we get trapped into one or another belief regarding it. Specifically, we recommend one shot to be conducted at an altitude as high as can HI

conveniently be reached between about 400 and 1000 kilometers and well out of the sensible atmosphere." Secondly, Bradbury recommends an experiment to study the actual effects of the XW-50X1Y2 utilizing that device at an altitude of 125 to 150 kilometers and making certain detailed output measurements. He notes the DOD proposals for testing in that regime and emphasizes that we must get the AEC purposes fulfilled as well as the DOD purposes even if it means additional tests. Bradbury finally notes that LASL makes no recommendation for tests in a category entitled "Physics Experiments to Determine Future Course of Action," which apparently is a Livermore category. He feels it is more important at this time to determine the actual performance of the untested portion of the stockpile, particularly the designs which have evolved during the moratorium. He states, "With unlimited atmospheric testing, our test proposals would certainly consider the long range significance of physics experiments upon weapons design. Under the present rules, however, of a two to three month test period, we believe that the country's interest are best served by confirmatory, immediately applicable, exploratory experiments. To prepare for meaningful experiments that will push the state of the art to extremes is, in our opinion, essentially impossible to do in three months."

HI

On 20 November, AFSWC sent a message to AFSC with info to all people with interest in the air sampling program and sampler aircraft capabilities. Since it includes numerous pertinent details from this time I will quote it in its entirety: "This message outlines proposals for overseas atmospheric nuclear testing in the spring 1962 time period, and stated requirement to be able to provide ~~aerial~~ aerial sampling of two shots per day on two successive days. Representatives of the LASL met with ECS/00, AFSWC on 16 November to discuss capability to support this requirement. It was agreed that in order to prevent cross-contamination of samples and to preclude unacceptable radiation exposure to air crews and maintenance personnel, aircraft must not be reused within 72 hours to allow for decay of short half-size fission products and for physical decontamination of the aircraft. Therefore, six aircraft per shot, for a total of 24 aircraft will be required. This presupposes a 100% incommission rate. Because of expected yields, ~~hight~~ height of burst, and ~~hight~~ height of cloud in the most likely shot site, the fleet should consist of 14 B57B type samplers and 10 B57D type aircraft. In event this number of B57B aircraft are not available, the total number ~~sbuld~~ should be kept at 24 by increasing the number of B57D type samplers. AEC is proceeding to procure sampling tanks to equip a Pacific test sampling fleet of this size, resulting in an expenditure of approximately $500,000. Request you take action through Air Force channels to augment the B57B/D sampler aircraft capability, including modifications, air crews, maintenance personnel, and AGE in time to make good an overseas ready date of 1 March 1962. To insure crew training and overseas movement, the increased sampling capability should be ready no later than 15 January 62. In formal discussions with the 12-11 Test Squadron indicates that they have a total of 19 B57B type aircraft and 3 serviceable B57D aircraft on hand. Six to eight of the B57B types are committed to crew cut operations. This could require 1 to 3 additional B57B and 7 B57D. In case of resumption of testing by other nations, additional samplers would be required if those detonations were to be monitored."

On 20 November in response to a request from AFSWC, Al Graves sent a letter to Mr. Hertford with info for ALO and AFSWC on sampler aircraft. He stated that both Livermore and LASL had looked at the requirements and agreed that six operational B57 aircraft including a controller are required per shot. With the assumptions that provision should be made for sampling two shots on each of the two successive days and that the possibility exists that operations requiring such samplings may be conducted simultaneously at two geographically distinct locations, the understanding is that all of this is equivalent to a request for 24 aircraft, of which 10 have the high altitude capability of the B57Ds. LASL is procuring sufficient wing tanks to equip 24 aircraft plus one set of spares. Also on 20 November, Ba tzel of Livermore makes the Livermore sampling requirements known as a requirement for B57 aircraft on all shots proposed by Livermore at a 13 November meeting and on the projected Hawaiian open sea operation. The gas sampling equipment should include "squeegee" compressors (not engine compressors) on all aircraft and LRL-designed isokinetic flow wing probes used in Hardtack I on Bs Cs and Es. Ds should have fuselage probes.

CU

Meeting #1802, 21 November 1961:

NG

It was discussed that the pipe fitters and the operating engineers had had a disagreement at the NTS and the former group had established a strike picket line which certain other unions have refused to cross. Luedecke noted that as a result of this strike, the weapons test program will be seriously effected and the Rover Project will be delayed on a day per day basis as long as the strike goes on.

Here, forwarded to the Commissioners and Luedecke and Betts on 21 November 61 is the preliminary draft summary of the 16-17 November 61 considerations of the Bethe panel. I will just quote the most interesting statements in this summary which addressed the accomplishments of the Russians in their series from 1 September to date. "There were a numberof proof tests and a much larger number of development tests.

All of the developments tests showed a highly sophisticated nuclear weapons technology. In some instances the weapons appeared to be of a design to which there is no counterpart in the United States experience. In weight classes down to 1000 lbs. the yield-to-ratio obtained equals the best that the U.S. can do on the basis of designs projected from the 1958 HARDTACK series. . . . .

. . . In summary, we find that the Soviet tests series includes various impressive devices.

This information on future Soviet tests would be of the greatest value." Among the specific areas covered by the summary are the progress made in where substantial development has taken place. Also, a couple of the devices cannot be interpreted on the basis of known U.S. weapons technology.

"Since the device was fired at 12,000 feet elevation, it must have been rather sturdy and in a fairly advanced stage of engineering, although not necessarily a weaponized version."

There are several iterations of the Bethe panel's study of the Russian tests through December 61 which generally concluded very little different from the November meeting, but leaned toward a weight of twenty-five to thirty thousand pounds for the highest yield tested.

Here in the general orders files is the first general order published by JTF-8 on 21 Nov. 61 in which Gen. Starbird assumes command at the direction of the JCS on 2 Nov. 1961. The effective date of the assumption of command is 21 Nov. 61. Later orders show that Admiral Mustin assumed Command as Deputy Commander for the Navy on 30 Nov. and General Samuel assumed Command as Deputy Commander for the Air Force on 29 Nov.

JF

21 November - 61 — USSR notifies US and UK that it agrees to resumption of Geneva negotiations, 28 November.

CR

A TWX from AFSWC to PACAF on 21 November shows that consideration was being made for the Pacific operation to use Gen. Lyman Field in Hilo in lieu of Barbers Point as a staging base for the sampler aircraft. The consideration was due to the distance from Barbers Point to the proposed drop area versus Hilo to the proposed area and AFSWC needed further information on Lyman to consider it.

BZ

A 22 November TWX from Betts to Hertford states the following concerning the Christmas Island trip: "Arrangements for inspection tour of Christmas Island facilities expected to be completed very soon. AEC designees are Bill Ogle, LASL, and Pat Ryan, H & N. Understand Ogle will represent both AEC and DoD."

A

21 November — USSR notifies U.S. and UK that it agrees to resumption of Geneva negotiations, 28 November.

W

22 Nov. 61, J-11 Report: The post shot drilling operation for radchem samples from the Shrew event was completed on 17 Nov. Details of what was found and the process in examining and analizing the samples is contained herein. A very preliminary value of the radchem yield for Shrew is given with ~~tenthy~~ lengthy reservations.

BY

A 21 November letter from the Assistant to the Secretary of Defense Johnson to Chairman Seaborg presents the DoD proposal for the first atmospheric test operations to be conducted beginning in about March and lasting for about 3 months. Johnson notes that these tests were included in the list submitted to the President on October 9th and their preparation was approved on October 11th. Further he notes that the test list submitted previously would require about two years to do and therefore the tests listed in this letter are those that it is felt could be done within the smaller window with the others being delayed to a follow-on series. The tests include(one)a 1 to 2 kiloton land surface or near surface test in Nevada to address the EMP effects. (Two) a 10 kiloton subsurface asroc test probably in the Atlantic ocean (3)At least one and not more than two of the following: (a) a 2 megaton detonation at approximately feet to investigate vulnerability of RV's and blackout effects on radio and radar. (b) a one-quarter megaton detonation at about feet to determine ICBM RV vulnerability and other effects. (c) a two megaton detonation at 1.3 million feet altitude to look at effects on communications and radars. (d) a full-scale ICBM vulverability test to verify the data from the above tests, to investigate kill mechanisms and RV vulnerability and to proof test the ABM capability against an ICBM.(4) the Polaris and Atlas tests earlier proposed are still considered to be desirable. As to the decision on an overseas site Johnson states the following: "In view of the present position of the British Government with the respect to the use of Christmas Island, in the interests of getting on with the operations I recommend that we plan on the time scale that we are working on to conduct all operations out of Johnston Island and over the open sea. In the meantime, let us continue to explore with the British the possibility of obtaining the use of Christmas Island."

A

Here is a memo from Chuck Gilbert to Carothers on 22 November 61 covering his visit to Sandia on 21 November and discussions with Sandia personnel on the high altitude events that were possible and the ways in which Livermore might support these tests. The following shots were listed as proposed by the following agencies: Air Force- a 25 kilometer and a 1000 kilometer event; DOD-a 50 kilometer, 115 kilometer, and 400 kilometer event (the three FISHBOWL events); and LASL-a 150 or 1000 kilometer event. Itw was stated that LASL desires to do one space shot in order to prepare itself for outer space testing and no elaboration of the Air Force shots is given. He discusses Sandia's plans for procuring and installing launchers at Johnston Island (four), Midway (six), Palmyra (six), and Kauai (twelve). The preliminary feelings are that Livermore would want to support the two highest events with the launch of six rockets for each event, two from Johnstone and four from Kauai. Also, Gilbert states that Sandia proposes the Thor booster with a MARK II nose cone.

LP

Note that in this folder (DOMINIC GENERAL-FILE) are memoranda from E. Boyrie of Livermore reporting every so often from 1961 through after DOMINIC in 62 on the preliminary plans and progress to date in the Livermore optical diagnostic measurements. Here is a classified notebook which has his handwriting and contains hand-written notes on each of the events diagnosed by Livermore systems with extensive details of the results. The notebook is #2788 (L) in case I wish to refer to this in the future.

BY

22 Nov. 61, J-8 Report: Under the title of Weapons, the results of Mink and the preparation for Fisher are detailed. EG&G has provided a schematic for a proposed universal zero rack which is being studied and discussed. Further discussion will be held with EG&G before any final decisions are made to change the present design.

61 Here is a 22 Nov. memo for the Chairman of the JCS from Gilpatric, Deputy Secretary of Defense, which refers to the high altitude tests and states "preliminary examination of the detailed objectives . . . indicates that a preparation lead time of 12 to 18 months will be required if a meaningful 3 event high altitude effects program is to be achieved. However, on the basis of a 4 to 5 month lead time, it may be possible to adequately prepare to execute at least 1, but no more than 2, high altitude effects tests with a fair assurance of meaningful results." He requests then that the three events be examined with respect to the feasibility of preparing for 1 or 2 but no more with due regard for "the immediate need for nuclear effect information required for more complete ICBM/AICBM system vulnerable analysis." The balance of the investigation can be treated on a 12 to 18 month lead time basis with such planning taking place so that the DOD will be ready should such tests be authorized in the future.

JF

JF

A 24 November TWX from Systems Command Headquarters to the Air Force Chief of Staff notes that current information and guidance requires a minimum of 24 sampler aircraft to support atmospheric testing and requests that MATS be provided the aircraft, personnel, and equipment for this capability. B1

A 24 November TWX from Systems Command to Headquarters TAC notes that the two ASD C-130 aircraft have been returned to TAC. As for the two C-130B aircraft on loan to AFSWC, their programs have been changed and a firm date of return is not available. B2

24 November -61

General Assembly (XVI) adopts resolution sponsored by 14 African nations asking UN members to "consider and respect Africa as a denuclearized zone." Vote: 55 Yes, None No, 44 Abstaining. *(For full text of resolution and record of vote, see Appendix "G".)* CR

General Assembly (XVI) resolution declares that use of nuclear weapons "is contrary to the spirit, letter and aims of the United Nations and, as such, is a direct violation of the United Nations Charter." Vote: 55 Yes, 20 No, 26 Abstaining.

On 24 November Gen. Betts sent a memorandum cover letter with 3 attachments to Chairman Seaborg in preparation for the meeting of the Seaborg committee which summarized DMA's position on the atmospheric test series proposals. The cover letter addresses the 3 general categories of tests the first of which is verification of designs and a few words on the LASL and LRL proposals are made. The second category is that of effects tests and the overlap between the AEC interests and the DoD interests in particular the two very high altitude recommendations of the DoD are noted. The third category of proposals is called advanced concepts and a good deal of detail of the LASL and LRL proposals is noted in the cover letter. The three attachments are the letter from Johnson of DoD which I just discussed above and second a DMA study entitled "Discussion of Proposed Atmospheric TestProgram" which is a lengthy look at both the LASL and LRL proposed tests in exhaustive detail as to the device and the justification as well as some comments by DMA on the overall need for atmospheric testing and the third enclosure entitled "Proposed Atmospheric Tests" which is an abbreviated listing of those tests selected by DMA as those most desirable for a test series, containing LASL shots and LRL shots and including 2 high altitude tests. A

B2

AFSWC History Office

A 24 November message from AFSWC to Systems Command Headquarters notes that the AEC Laboratories have requested that the two C-130's stay at Kirtland for continued improvement and testing of the installed instrumentation. Further, "to date, AFSWC has flown two test flights which were successful only in that many of the flaws in the system were found. AFSWC is at this time planning a full scale exercise off the West Coast involving all the aircraft in the test already described in the Open Sea Blue Straw operations plan. : AFSWC proposed that it is neither feasible nor timely to return the two C-130B's now at Kirtland to TAC. AFSWC further proposed that these two C-130B aircraft be transferred to AFSC and to AFSWC to be employed as airborn diagnostic laboratories in support of the AEC."

24 Nov. 61, J-16 Report: Personnel in this who have been involved in some local area work, report that work is now being postponed in this area temporarily due to their being assigned to set up an airborne EM recording station. R. Wakefield, Benton, Tatro, and Black are involved in test acitivities at Kirtland as follows: B1 Equipment has been installed in a USAF C-130 aircraft for airborne measurement of the EM signal generated by nuclear weapons. The set up consists of antenna, cathode follower, six Oscilloscope, and associated equipment. The station was set up on an accelerated basis with equipment that was available at the time, and will undoubtedly be modified and additional equipment be added before actual use, if time permits. The equipment is, however, very near a state of readiness at the present time."

A 24 November TWX from Mr. Fowler of Sandia to Betts addresses the DMA questions (from Col. Banks to R.W. Henderson) on the possibility of combining the AEC and DOD high altitude tests. Based on Sandia participation in the AFSWC proposals for various high altitude possibilities and also including informal discussions with field command DASA, Sandia is convinced that for the 400 kilometer shot the AEC and DOD objectives can be combined in one test of the standard warhead They thus recommend action be taken to establish joint sponsorship of the shot. Both DASA and AFSWC have proposed a 115 kilometer shot, however, they show it as a 2 megatone and 1.4 megatone test respectively. The AEC thought in this area is for a 165 kt shot at about 125 to 150 kilometers. Whether the AEC shot can be used to achieve the DOD purposes is not clear whereas the AEC shot is lower than 115 kilometers to produce the desired blackout effects, the neutron assymetry measurements can be made but the prove-in of AEC diagnostic measurements would be seriously compromised. Thus, further discussion is required to determine whether there is some possibility of combining 115 kilometer and the 125 kilometer to 150 kilometer shot proposals.

A 25 November TWX from Headquarters SAC to the Chief of Staff, Air Force details SAC's thinking at this time as to specifically what they would like for their command to get out of nuclear testing. In priority order the general areas are listed as follows: 1. Nuclear Weapons Development Testing; 2. Weapons Effects Testing; 3. Operational Proof Testing. As for the latter category SAC lists seven possible systems test in the desired order as follows: Atlas System; Bomber Device; Livermore Device with the Minuteman System; Atlas/Titan Weapon System; LASL Device with the Minuteman System; another bomb device; Titan II Weapon System. In summary SAC feels that if US testing were extremely restricted, development testing of the 56 and effects testing as presented herein are considered essential to SAC.

Here in the JTF-7 files, is a whole cardboard box full of bound final reports of various early Thor missions in the time frame 1960 and 1961. Here is a TWX dated, I believe, 27 Nov. 61 from Douglas Aircraft Co. (M. W. Hunter) to Major Kenneth R. Chapman of SWRJ in AFSWC at Kirtland. The TWX contains the results of about two dozen Thor shots, all but one of which were listed as successes by Douglas and probably is part of the documentation having to do with the consideration of a high altitude booster going on at this time.

A 27 November TWX from Betts to Hertford, Bradbury, and Schwartz addresses the possibility of doing the Vela Hotel program during weapons testing at 100 to 10000 kilometers. It is noted that the DOD has selected the final stage vehicle contractor and will shortly release funds to implement the program. Betts requests that the labs review their programs and capabilities and advise him concerning their ability to implement the AEC portion, of the Vela Hotel program. Further, because of the past relations with ARPA, efforts should be made to accomodate ARPA's requirements and meet their schedules and Betts asks that this TWX be answered by ALOO.

27 Nov. 61, J_12 Report: Wendall Biggers reports. under the heading of test planning, on possible measurements of an XW-50 test. He says "The problem of neutron flux and spectrum measurements on the XW-50 has been studied from the standpoint of what type of shot ~~xxxxx~~ would be best suited for such experiments. It is our recommendation that a surfact shot, either land or water, would be better than one in, or above, the atmosphere."

A 27 November TWX from Betts to Hertford of ALO discusses the final arrangements for the Christmas Island Tour which will include Ogle and Ryan. In addition to the dates of the tour which is to take place beginning about 5 December, the need for strict security is emphasized and a story for local consumption that Christmas Island and only then if necessary is "the purpose of the party on Christmas is connection with survey work for possible use of the island in extension of satellite tracking facilities." A

Note should be made here of the 3 November letter from a Mr. James Carr, the Acting Secretary of the Interior, to Chairman Seaborg which expresses deep concern over the possibility of use of the trust territory i.e. Eniwetok and Bikini for the testing of atomic devices. It's a strong letter which lists some reasons briefly and states a strong recommendation from the Department of the Interior that they recommend against any further testing in the trust territory.

27 Nov. 61, J-7 Report: In this section on weapons testing, under the groups accomplishments in the area of support hardware for underground testing is listed by hole number the status for various pieces of hardware being completed by J-7. BY For instance, underground support stands, equipment racks, and outside canisters are completed for a number of holes.

27 Nov. 61, J-6 Report: The following progress is reported at the NTS;

Hole U-3 ah was completed.

U-3 ak was completed with 29 in. diameter to a depth of 1199 ft. BY

U-3 ai complete to 1168 ft. with 36 in. diameter.

U-3 ad complete to 201 ft. with 36 in. diameter.

U-3 am abandoned at 550 ft. due to inability to straighten the hole. Problems are being encountered with a new attempt at this hole about 350 ft. to the west.

U-3 aj drilled to 120 ft., then abandoned because of coax and casing problems.

Numerous other shot holes and exploratory holes and instrumentation holes at various stages of completion in Area 3.

Other J-6 activities included the following. The 100-ton crane and the new Hi-Vac machine were both received and put in use. Other support of testing activities at the NTS is detailed. J-6 representatives attended a meeting on Christmas Tree as well as a meeting at H & N in Los Angeles on "Blue Straw." At the latter meeting determination was made of reasonable budget figures for an overseas operation as presently being considered by Livermore and LASL. With the benefit of not knowing where the series would be, the following rough figures were

established; H & N construction and support - $26,000,000; Sandia - $17,000,000; EG&G - $14,500,000; for a total of $57,500,000 estimated. "Of this sum, half is to be committed by 1 Mar. 62 for an operation beginning on that date. Johnston, Midway, Hilo (?) and Christmas Islands were all considered to represent major construction efforts and several weather islands were included. Cost of a Liberty ship for LASL is now entered barge cost are." As for local activity and participation of J-6, this has been reduced to almost nothing.

28 Nov. 61, J-10 Report: Here is an extensive summary of J-10 participation in two Vela Sierra projects: As for projects Southern Light, "The all sky fluorescence detection system continued operation through Nov. 15 and roll up of equipment has been completed.

A small signal was reported on 25 Oct. under daylight conditions. This signal was of the minimum detectable amplitude. It could either originate from a low yield event at a distance of at least 10^5 kilometers or from a shot of unknown yield at an altitude below the horizon of the Southern Light installation."
As for Project Northern Hope, "The objective of this project was A. to obtain timing information from possible Soviet shots exploded at high altitudes above Nova Zemlya by optical means and B. to detect high altitude shots with collimated photo-electric equipment capable of recording X-ray or gamma ray excited upper air fluorescence. Bhangmeters and high frequency EN detectors were also operated part of the time.

The adventure was initiated and the station put into operation on very short notice. It was on the air Sept. 21 through Nov. 6.

As for the optical system, no optical signals have been recorded and there is no other evidence of the occurrence of Russian explosions within the detection capability of this part of the system. The Bhangmeter part of the system has

recorded nothing since all shots have taken place in daylight when the system has no capability. As for the EM monitoring system, it recorded many false, radar-triggered alarms; one strong signal was recorded which corrolated with a Russian test. The two projects were part of Vela Sierra.

Here is a 28 Nov. transmittal letter from the Air Staff to Gen. Samuel who is at this time with JTF-8 on the subject of Air Force support of nuclear testing. The letter transmitts a number of documents that were prepared at the Air Staff level to detail and direct the Air Force Operation Ever Ready and are being transmitted at the request of Col. Wignall.

28 November -61 — Geneva Conference on the Discontinuance of Nuclear Weapons Tests resume. USSR proposes test ban without international control; US calls plan "completely ... unsatisfactory and unacceptable."

On 28 November 61, Curtis LeMay, Chief of Staff of the Air Force sent a letter to Conrad Longmire and others which expresses his concern over the implications of the recent Soviet nuclear tests and states that he is appointing a committee to evaluate from a technical standpoint the military implications of these Russian tests. The membership of the Committee is to be: William Baker; Lt. General Doolittle(retired); John Foster; Trevor Gardner; David Griggs; Conrad Longmire; Simon Ramo; Theodore Taylor; and John Wheeler. Also appointed is the Air Force Chief Scientist and six Air Force Generals. General N.F. Twining is to chair the committee and it will become known as the Twining Committee. The analysis of the Russian tests by the Bethe panel will be provided to the Group as a basis for the study of the military implications and the Group's study is requested to be in LeMay's hands not later than 5 January 62. After discussing the study with General LeMay on the first of December, Twining had the committee meet in mid-December with hopes of preparing the draft of the final by 17 December and one of the subjects on the agenda was to discuss in detail what the proposed U.S. atmospheric series will provide as far as needed information and what specifically will be left out.

RA

A 28 Nov. 61 memo to Seaborg to Betts notes the results of an NTS planning board meeting which are that Nugget would be increased "in response to the desire that the present underground testing program be more vigerously pursued," as directed to the planning board by Betts. Attached to the new proposed test list is a proposed letter to the President for the increased authorization.

PR

Here is a letter I don't think I have seen elsewhere from Goeckermann to Ogle on 29 Nov. 61. In light of recent conversations, Livermore has prepared a list of items that they wish Ogle to gather information on during his upcoming trip to Christmas. The numerous detailed questions are included under the headings: topographic features, hydrological features, existing structures and facilities, engineering details, support capabilities, weather data, industrial and radiological safety, administrative features, signal and communication cable and facilities, device handling and assembly and transportation (etc.), and adaptability of site to our proposed layout.

RA

Here's an interesting letterfrom Luedecke to Hollafield, Chairman of the JCAE on 29 Nov. 61 which begins by pointing out that the Antler test "resulted in loss of entry into the U12 E tunnel complex because of the contamination and spread of debris through the side drift and main tunnel. ... Following the Antler shot a program was comenced to decontaminate and rehabilitate the U12E tunnel complex so as to attempt to salvage 4 shot locations which had been previously constructed. ... U12E tunnel rehabilitation has been accomplished to a point about 1800 feet from the portal. At this point, the tunnel is plugged by a mass of debri from the side drift where the Antler device was placed. It has been determined that rather than attempt to remove the debri plug, it should be by passed and work is proceeding. Until we are able to complete the by pass we will not know wheter the remaining shots sites of the U12e tunnel can be used. ... in addition to the difficult situation in regard to the U12e tunnel complex, we have a troublesome problem with regard to tritium in

U12e tunnel complex. (I believe that should read U12b) This problem arose after the Chena event and was complicated by the tritium residue remaining from the Evans event of Hardtack II." "The combination of the external radiation whole body exposures in the U12e tunnel and the additional internal exposure in the U12b tunnel has resulted in 108 miners and supporting personnel receiving, as of Nov. 24, 1961, a combined whole body exposure in excess of 3 REM in ° one quarter and of these, 38 in excess of 5 REM in one year. No individual was exposed to more than 8.045 REM. ... Because of our inability to continue full-scale tunnel operations within the established normal peace time radiation critiera, the U12b and U12e tunnel operations were curtailed on Nov. 27, 1961. Underground workers who were approacing 3 REM per quarter were removed from the tunnels, as well as any individuals who may have received a dosage of more than three REM per quarter."

A 29 November letter was sent by Dr. Seaborg as Chairman of the NSC Committee on Atmospheric Testing Policy to the President and the contents of this letter are extremely important, of course, so I will have a copy of this made for our use after getting permission since it is Secret RD. The letter begins by noting that a careful study has been made of all of the nuclear test shots proposed by the weapons labs and the DoD for inclusion in the possible shot window which may be authorized for a 3-month period beginning in the spring of '62 and it is noted that the proposals were reviewed in light of the continuing objectives of our nuclear weapons program, our position relative to the USSR and our current state of readiness as adversely affected by the test moratorium. It states that "some 49 possible test shots were reviewed, of which a minimum of are recommended for inclusion in the early program." The letter notes the 3 general categories of testing which are in order of discussion. One, effects of nuclear weapons on such things as hardened missile bases, missiles in flight, radar and communication, and on Naval vessels and their equipment. It is stated also "the area of greatest interest lies in effects at very high altitudes as they apply to AICBM defenses and to the kill capability of our own AICBM warheads. A series of 5 such tests has been projected, varying in yields from a few hundred kilotons to about 1-1/2 megatons, and in altitudes from 20 kilometers to above 400 kilometer. However, practical considerations with respect to development of instrumentation techniques and related preparations make it unrealistic to plan for more than two of these shots in the short time available. Category two is that of advanced concepts for improving weapon effectiveness and decreasing warhead vulnerability, and these cover a wide range of possible design changes, etc. The third category noted includes tests that combine both developmental and weapons verification objectives. As to the designs that might be tested under this category the letter states "it is important that these designs be subject to experimental verification not only to give confidence as to the effectiveness of devices stockpiled as weapons but also, importantly to enable the laboratories to use the information so obtained as a basis for more advanced steps into new weapons technology. In addition to addressing the general categories and justification for the different types of tests which are desired for

atmospheric conduct, the letter gives some specific justifications for the need for atmospheric testing including the problems inherent in solely underground testing, the great advances and the large data base that the Russians are building up in their accelerated atmospheric program, and specific military areas which can best be addressed only by atmospheric testing and are so very important to the nation's military defense strategy. In addition to noting the engineering problems with doing testing underground and the slowness with which such testing goes a strong point is made about the relative capability for diagnostic instrumentation with underground versus atmospheric testing. Further the question of an overseas test site is addressed and Eniwetok with its political difficulties versus the use of Christmas Island with the as yet uncertain availability are noted and it is stated that tests could be done by air drops probably staged from Hawaii with limited instrumentation on some small island such as Johnston which is at present being pursued but which is not as desirable as having a large island test base. Further it is stated that a special requirement exists in connection with the rocket lifted test shot for which Johnston Island is the most logical launch point because of the available facilities. He further addresses the question of outer space testing and states that because of the projected cost of an initial 100 million dollars over a two-year period to develop such a capability that such a capability is not being considered for the planned program. In the area of fallout and political implications of nuclear yield it is stated that a total yield of approximately 21 megaton of which about 8 megaton would be fission yield is projected for the planned series of events as compared to the approximately 120 megatons of yield already totaled during the recent Soviet tests. Part of the summary of the cover letter reads as follows: "In addition to provisions for flexibility, current planning should provide for preparation for a second test series, about a year later, looking to more dramatic advances than are possible in an early time frame. In fact, it is essential to plan for a second series in order to accomplish the very important effects tests that could not be included in the early time scale. In looking at what test devices can be made available in the April to July period, it is apparent that we are suffering to some extent from the three-year test moratorium. During that period while the United States was negotiating in good faith, the bulk of our nuclear weapon design

A

effort was oriented towards devices that could be stockpiled with adequate assurance without tests. Thus, the climate was not conducive to bold, new concepts requiring experimental checks. The possibility of being able to test seemed very remote. In contrast, the available evidence indicates from the very outset of the moratorium, the Soviets have anticipated atmospheric testing and have oriented their efforts toward significant advances requiring such testing. In summary, it is clear that a rate of progress adequate to maintain our relative military posture can be attained only through resort to atmospheric testing; indeed, much vital information on effects and many possible technical advances, would not be realized at all through underground tests alone." The letter also contains 4 lengthy enclosures which detail the types of tests by category, the types of devices with details on the diagnostics and type of device, the amount of yield as well as listing for the President the numbers and types of tests of each of the nuclear powers since the beginning of nuclear testing.

?

diagnostics and the capabilities for diagnostics for the various types of atmospheric tests as LRL sees it. They address them by categories of low yield shots being less than 50 kiloton, high yield shots greater than 50 kiloton, open sea testing and use of aircraft for the atmospheric program diagnostics.

A 30 November memo from the General Manager's office, to Gen. Betts is a reminder that Senator Jackson of the JCAE has requested the AEC be ready when Congress reconvenes in January to present to them the alternative test programs based on the circumstances as they may exist then.

A TWX dated 30 November from Mr. Schwartz of Sandia to DMA notes the change in the title of the outer space program from the Oats program which stood for out of the atmosphere testing and was misconstrued by some to mean that there would be no effects on or in the atmosphere to the new title Wirts which stands for weapon intermediate range testing system.

61

Here is a 29 November message from Baciglupi of Livermore to Reeves which states "Reentry into the E tunnel complex indicates that the U12E01 and U12E04 cannot be used for the Cimarron and Brazos events in the near future. In order to maintain the Nuget schedule it will be necessary to develop new emplacement locations for these events." He sets out the requests for approval of construction of new stations in Area 9.

PD

Correspondence at the end of November indicates that the final draft of the Christmas Tree Report is in review by the concerned people.

A 30 November 1961 letter from Jerry Johnson to Edward Teller at Livermore comments on a request from Teller as to the most important National Defense needs that only above ground testing could satisfy. Johnston lists three general areas: effects, where it is "absolutely essential to get some quantitative measurements on extent and duration of radar blackout effects at altitudes appropriate to acquisition and discrimination radar systems." The second area, of equal priority, is effects and vulnerability measurements made at high altitude on missiles and warheads. The third area addresses gathering quantitative data on the possible vulnerabilities of our hardened missile sites to electromagnetic effects.

4X

The DOD feels a minimum of six tests are needed as follows: 1-2KT on the surface in the spring of 1962; 2-1/4 megaton detonations at 20 kilometers and 60 kilometers, one in 1962 and one in 1963; 1-2 megatons at 110 and 400 kilometers (400 kilometers in 1962 and 110 kilometers in 1963); and a fully instrumented ABM test in 1963. Thus, to do all these tests properly, would require two operations: one in the spring of 1962 and one in 1963.

Event addresses the developmental objectives for devices which are felt to be most important by the DOD. First of all, is to increase the yield to weight figures for low weight warheads. As for aircraft-carried bombs, the aim seems to be more to clean up the devices than to increase the yield to weight ratio. For large missile warheads, the goal is maximum yield consistent with payload capability (like 10 megatons). "In low yield systems characteristic of tactical weapons, it is difficult to make an argument for atmospheric testing because it can all be done underground." As for the duration of the series, the DOD doesn't believe it is wise at this time to limit the operation to less than 3 months in length.

Here is a 30 Nov. 61 message from Batzel and Goeckerman to Betts on the details of LRL involvement in possible atmospheric and high altitude testing as seen at this time. They note the diagnostics and techniques for making the measurements for both low yield and high yield shots as well as the incorporation of instrumentation in an open sea concept using ships and aircraft. As for the C-130 aircraft, they note that recent dry runs at White Sands have convinced them that several improvements need to be made, including X-unit signal telemetry, shock mounting to decrease vibration problems, etc. They also mention the proposed methods of diagnosing space shots, including diagnostic packages blown on probes fired from Kauai and Johnston Island.

Note that through this time period (the end of Nov. 61), Bill Ogle is still attending such meetings as the WWG at LASL and is apparently still heavily involved in the NTS testing activities and the scheduling of the various shots to obtain the best results there. I say this because, in the minutes, he gives that status reports, problems, proposals, etc. for NTS testing. NQ

"Report of the Manager, AEC/NVOO, Operation Dominic," December 1964 Report #NVO-8 by NVOO. BC

This Confidential Document should be obtained for our files. It contains in particular, chronological details of the atmospheric tests capability development following the resumption of testing in September 1961.

In particular, some of the cited discussions and letters are not covered elsewhere and, I would like to note here, a meeting held at Albuquerque on 30 November 1961 called for the purpose of outling a proposed operation in the Pacific. The meeting was conducted by Ogle and attended by representatives of LASL, LRL, Sandia, EG&G and H&N. Organization of a Task Force was in progress at the time with General Starbird as Commander, Ogle as Scientific Deputy, and Colonel Ted Parsons as Operations Officer. Quoting from the NVOO Summary "It was anticipated that each of the scientific groups would act as a Task Unit but there would be no over-all scientific organization at the Task Group level. Support services, including construction, engineering, operations and management were to be handled by Mr. Reeves.

"The Program outlined at the meeting was to consist of: A. Four High-Altitude shots from JI, probably using the Thor Missile as a vehicle. B. Eight Air Drops and one, or possibly two, ground based or ship based shots for LASL. C. Eight to ten Air Drops, two balloon shots and one barge or ground shot for LRL.

"Dr. Ogle expressed the opinion that, with the exception of the High Altitude Events, plans should be based on using both Christmas Island, or some other land area, and an open sea ship based operation.

"Diagnostic requirements for an open sea operation were summarized as consisting of three ships similar to the Curtis, the Albemarle, and a CVE.

"Discussion also included support requirements at Johnston Island, Maui, Midway, Kauai, and French Frigate Shoals."

Another meeting convened at ALO with representatives of ALO, JTF-8, LRL, EG&G and Field Command, DASA discussed an alternate plan for overseas operations in the event Christmas Island would not be available within the next few months. From the NVOO Summary "Plans were based upon executing a program in the open sea in parallel with Christmas Island activities or exclusive of its use, at least in the first series (1962).

"The following plan and general requirements were developed: Organization, proposed shot program, ship and other sea requirements, trailer loading of ships, land use for high altitude shots.

"H&N was then assigned the tasks of preparation of designs for the modification of shot and diagnostic vessels, studies and designs for land based Alpha stations, and study of methods for anchoring or stabilizing barges in deep water."

This relates to the open sea ship reqirement.

The evolution of the JI Thor Missile Facilities is documented by chronological items such as a meeting at Vandenberg with Douglas representatives on 30 November 1961 and an on-site visit to Johnston Island on 12-14 December looking into the locations and construction of the launch pad and support buildings, etc.

Note that in Chapter 7, entitled "Significant Events" there is some discussion of the Thor Launch Pad decontamination as follows: "Following the destruction of Blue Gill Prime missile on 25 July, on launch emplacement #1 at JI, rehabilitation plans for the launch pad and associated facilities were initiated, with clean-up work starting 29 July. The launch pad was completely rehabilitated and ready for user occupancy 8 August.

Foster, in a 30 November TWX, replies to Betts request for planning on the reactivity experimentation type activities of Livermore. As for the 410 area at NTS, Foster says that there has now been a series of experiments to predict device alpha's while giving essentially zero yield. They feel that continuing the program will provide essential design information some of which could not be obtained in any other way and that it would be particularly useful in connection with the full-scale device testing now under way at the NTS. Livermore proposes a yield limit of 20 tons on the experiments which would not have to be included as any part of a test series. As for the areas in which they would like to continue testing, these are:

1. Plutonium optics experiments,
2. Gannet experiments, where there is the possibility of yields up to one ton but which can be carried out more efficiently in area 410 then in the other areas.
3. Reactivity experiments.

Foster anticipates that the 410A enclosed firing facility will become operational during the first half of calendar year '62 and thenLivermore will begin doing optic experiments in the sphere rather than in the underground area; the limit on experiments in the sphere seems to be 150 lbs.

Here's a letter dated 30 Nov. from Ogle to Col. Thomas L. Mann of DSA-Annex, U.S. Army element; Mann apparently is acting as Chief of Staff for the Task Force from the way this is written. Ogle presents here an outline of requirements and arrangements as they now appear to him as Scientific Deputy based on a meeting at ALOO on this particular day. He asks Mann to pass on these details to the Naval and Air Deputies as appropriate members of his staff. First of all named as the Unit Commanders of the Joint Task Units for the AEC are: Goeckerman (UCRL), Hoerlin (LASL), and Schuster (Sandia). EG&G will not appear as a Task Unit but will come under the operational control of Reeves' support task group. The units have been told to submit their operational plans and requirements to Task Force J-3 (Ted Parsons). All other requirements such as communications and construction will be submitted to the support task group (Sam Howell). The overseas series is detailed and broken out into three categories: airdrops; several diagnostic shots for which airdrops are not desirable; and high altitude shots which will be covered in more detail by Don Schuster. Of the first group the air drop, 15 or 20 of the 25 shots now proposed are to be air drops and one site is sufficient with equipment and diagnostic gear which will be required to be packaged in trailers or vans which then may be used on either ships on Christmas island or Johnston Island. Until Christmas is approved, Ogle states that we must be prepared to use the ocean and thus, a first requirement is for instrumentation ships. A small carrier and two sea-plane-tenders such as the Curtis are suggested and the loading of these ships would be as detailed herein (the Curtis, the CVE, and the Curtis prime are listed here with various trailers and measurement capabilities, to be put on board). If Christmas Island is obtained then the

trailers would be put on land in three positions and the diagnostics ships could be turned back in; if Johnston Island were to be used, one or possibly two of the ships could be released. In the event open sea testing is done all ships would be required and since they must be loaded on the West Coast, Ogle suggests that the latest date the ships should be available is 1 February on the West Coast. Furthermore, as backup, the presently instrumented C130's and the instrumentation on the drop plane will also be used. Considering the accuracy and reliability, the technical personnel rate the comparative desirability of the several possiblities as: Christmas-very good; Johnston-moderate; and Open Sea-poor.

The several diagnostics shots for which air drops are not desirable are as follows for the reasons noted:

1. -not 1. safe - alpha required. If Christmas is available this could be done on a balloon with alpha measurements; without Christmas, a shot ship is required.
2. -approximately 1 Megaton-this experimental device is much to large to airdrop.
3. Gun-this requres telemetry and PINEX such that ah airdrop is not feasible and a shot ship is required.
4. An LRL vulnerability shot which requires separate balloon sites for vulnerability experiments.
5. The LASL a nuetron spectrum as a function of angle measurement is desired which would benefit from placement on land so that spectrum, vulnerability, and EM effects could be studied. If an island cannot be obtained for this shot, then the data obtained would be compromised and a shot ship would be needed.
6. Spare shot ships are requested so that if there is trouble with some of the above shots or if others become desirable, perhaps two or three spare ships would be available.

To address such questions as how to implace diagnostics gear on Liberty Ships or whether there are smaller vessels which are seaworthy but could be used for either shot ships or for diagnostic ships, Ogle requests that the Navy Task Group get together immediately with H&N to determine how the aims can be accomplished. It is noted that since some of the construction may be very time consuming, a ship or more may have to be in the shipyard as early as 1 January and thus planning in a coordinated fashion must be done immediately.

In discussing the question of preparing for high altitude testing and noting that Don Schuster will provide details on this later, several points are noted. Two ships are noted as possibly being required as intermediate positions for launching instrumentation rockets and they would have to be more stable than the smaller ships discussed, perhaps destroyers. Ogle does not suggest obtaining

these ships now but merely to thinking of this. A requirement for at least three instrumented aircraft for observations of the high altitude shots is foreseen. Ogle feels that two planes would be close in,with instruments looking almost vertically whereas one would observe the cloud rise from several hundred miles away. Furthermore, KC135's would be ideal, but the C130's might do, and, for some purposes even C154's. He expects that DSA will put in a requirement for a plane or two at the conjugate point. CU

The overall special instrument carrier requirements are as follows:

NAVAL

a. Three diagnostics ships
b. Shot ships perhaps for hedgehog, ~~loot~~ late, gun, and XW-50Y2: plus perhaps three spares.
c. Targets-with radar reflectors on barges for drop plane to sight on; also an LSD or two for placement may be needed.
d. INstrumentation Rocket ships- possibly two.

AIR

a. Drop Planes
b. B-57 Samplers
c. C130's as presently instrumented will serve as backup for all airdrops (these are not configured to satisfy high altitude shot requirements)
d. Instrumentation Aircraft (C3) for high altitude shots

OTHER

a. US Shot Island-Jarvis perhaps
b. Long Distance Time Signal (for Midway, Kuahi, etc)
c. Permission to use Midway, Barking Sands, etc. for launching of instrumentation rocket.

A copy of this particular letter would certainly be useful to have declassified and in our files.

A 30 November TWX from AFSWC notes that a practice air array mission was flown out of Kirtland on 15-16 November and that a similar over water mission using actual drop formation aircraft is required. The B52 will operate out of Kirtland with C-130, B57, and C54 aircraft operating out of BZ

McClellan. Furthermore, an RC-121D aircraft from McClellan is required as the control aircraft. The target area would be about 2 hours west of Sacramento based on planning to be done the week of 4 December with a suggested date of 14 December for the air exercise. B.

61 In late Nov., DASA was providing the ATSD (AE) with background information on Teak, Orange, Argus, Yucca, and Wahoo, apparently to aid in evaluating what new information on high altitude, underwater, etc. effects is needed as compared to what was gathered from these tests in the past. As for the Wahoo test, the proposed Asroc test, which was to performed in Nov. on the quick response time scale is discussed as to what new measurements can be made on the more extended time scale with 4 to 6 months to prepare.

Note that these files indicate that the DASA panels and divisions which address various weapons effects, such as ionization, transient radiation, blast and shock, etc. are addressing these areas in various symposia and meetings and communications with other DOD and outside agencies through 1961, but I do not see any evidence of an all out preparation to address these tests when possible any more than I have in the previous years in the moratorium. That is the planning for such tests as Willow and Jericho have gone on and these meetings have been necessary to address the latest calculations etc. and the same seems to be true in 1961. Perhaps there is a little more activity this year but it is more in terms of discussion than any active pursuing of preparing experiments and scenarios to address the data needed. JB

K

"Preliminary Plan for Operation Fishbowl , Nov 1961" from Air Force Special Weapon Center, Doc. # SWC-TR-61-96

From the abstract to the report: "Operation Fishbowl is a proposed series of high altitude nuclear effects tests to be performed during 1 Mar 62 to 1 June 62. Consideration has been given to burst altitudes of 25, 50, 115, 400 and 1000 kilometers. It is concluded that the three intermediate altitude shots have higher priority. It is concluded that one and possibly two of these intermediate experiments can be accomplished in the present time schedule. If the maximum time allowable for the test series were extended two weeks, the third might also be done. The Thor launched from Johnston Island is suitable as a warhead carrier. Burst phenomenology has been examined and the primary experimental objective determined. These objectives can be satisfied in the execution of the proposed plan." Note that the date of publication of this report is Nov 19,1961.

Reference is made to a previous report (61-95) which planned for executing the series beginning in July 1962. There is some indication that a very brief test period is expected since they speak of a compressed time scale and the curtailment of some of the experiments and only planning for a March through June 62 test period. It is stated that the primary objective of the overall series is to obtain data regarding the interference to radar and COMMsystems produced by a high altitude nuclear burst. Further the present phase is intended to cover a range of burst conditions where specific applications are optimized. Shot altitudes are listed in priority order with the fifty kilometer and four hundred kilometer shot having priority I, the 115 kilometer shot having priority II and the other two shots having priority III.

It states that because of the short time available for development, the Thor vehicle is recommended as a warhead carrier with essentially no vehicle modifications.

The plans for specific experimental shots include by name in order: Bluegill, Kingfish and Starfish. Considerations of nuclear safety, eyeburn and operational suitability dictate selection of J. I. as the most promising operational base for all tests of Operation Fishbowl. Other operational possibilities considered included Enewitok, Kwajalein, Christmas Island and the possible use of Atlas fired from Vandenburg AFB. The specifics of altitudes and yields of these various shots and even the nicknames for them follow very closely what actually took place even though this planning document came out in Nov of 1961 and the series didn't take place until July 62 and following. Another section discusses possible warheads to be used.

There are a number of interesting points made in the section entitled "Vehicle Selection": Because of the short time scale of the operation, while a large number of boosters are available with sufficient performance, only a few of these systems would not require extensive engineering for satisfying all warhead fit and positioning requirements. It's noted that Sandia has previously accomplished detailed study of certain devices in the Thor re-entry vehicle. And it is stated that "since these warheads fit the yield requirements they were logical choices for consideration and the Thor

then became a "first choice for the operation." It notes that if there is a longer time scale for the series, several other desirable features can probably be incorporated in the warhead carrier such as self-propelled pods and rockets mounted on the carrier to improve positioning accuracy of the scientific experiments. "The decision was made to attempt to satisfy the experimental objectives with vehicles available "on the shelf," and to avoid any vehicle modifications which would lead to AEC requirements for proof test to satisfy reliability and safety criteria. The vehicles selected meet these objectives. In addition to the warhead delivery capability it was felt necessary to provide additional capacity for secondary pay loads. All of the large boosters considered: Thor, Redstone and Polaris, have excess capability in the lower altitude. If external ejection of secondary payloads could be accomplished the modifications to a payload carrier section would be held to a minimum. The Thor has this external capability while the Polaris does not without extensive engineering. At low altitudes the Thor is not fully utilized. The consideration of a single system providing operational expediency overcame the objection of wasting vehicle performance. Thor trajectories were exceptionally adaptable to the warhead positioning considerations." Note that the Air Force looked at the Blue Scout first stage with an Aero-jet senior engine, the Thor, and in somewhat less detail the Redstone and the Polaris. The Blue Scout would have required additional stages for anything above 50 kilometers and adapting to the proposed warhead and possible external pods would require additional development. The Redstone it is noted, doesn't have the altitude capability above 400 kilometers and extensive modification would have to be accomplished on the warhead fusing system. The Polaris while it can meet all the altitude requirements will not accept easily all of the warheads and has no provisions for attaching external instrumentation packages. Even in this report, the operational flexibility of the Polaris is noted as being an extremely desirable feature. As for the Thor, it is stated "The Thor booster is available from current inventories, can accomplish all altitude requirements, requires only minor modification for adaptation to the proposed warheads, and has an established high degree of reliability. Twenty-three out of twenty-five Thor space boosters launched since 4 Oct 1960 have been successful. The over-all space booster success is 55 out of 62 launches. The Thor also has provisions for installation of external ejectable scientific instrumentation packages." The engine cut off capability of the Thor and the separability of the booster from the vicinity of the warhead is noted as an advantage.

As for aerospace ground equipment (AGE) it is noted that the Redstone and Thor have similar requirements as well as similar launch pad requirements. The Polaris is designed for tube-type launch which would require entirely different operational planning and presumably the Navy would make the Observation Island available if the Polaris were selected. Blue Scout facilities and AGE are far lesser requirements than those of the other three vehicles. Further, it is noted "Although it may be somewhat cheaper to use Blue Scout vehicles from a cost standpoint it is more desirable to utilize a more expensive vehicle which gives greater assurance of successful mission accomplishment." In the summary of Vehicle Selection it states "The experimental objectives of this proposal can be met through utilization

K

of a basic Thor configuration to serve as both the warhead carrier and instrumentation carrier. Additional instrumentation having less stringent placement requirements would be positioned by sounding rockets. It is proposed to use the basic Thor configuration with minor modifications to the operational re-entry vehicle as a means of a accomplishing Operation Fishbowl. Attached to the exterior of the vehicle, at the base, would be three ejectable scientific instrumentation pods."

Over-all funding for the three shot program is estimated to be around $40 million, $15 million of which would be warhead carriers, $12 million of which would be for small rockets and payloads and the rest between tracking and position stations, communications, data analysis, travel, etc. These costs are exclusive of JTF-8 costs. Lead time is estimated to be five months under the most accelerated high priority conditions and one year under normal conditions. "Limiting items appear to be payload design and fabrication, procurement and installation of ground electronic equipment, Thor ground support equipment installations, and the training of sufficient launch crews to satisfy the small vehicle program."

Later sections discuss the Thor in some detail including carrier costs for four Thors and associated equipment, details of various options for the telemetry and tracking systems, nuclear safety considerations for the launches in Fishbowl, a listing and description of various experiments to be fielded such as Fireball, Blackout, Gamma Scanner, and physical chemistry, chronologies of the three specific planned high altitude launches listing the various sounding rockets as well as the Thor, the order in which they would be launched and the time at which they would be launched relative to one another and the final section on small vehicles which includes the Nike Cajun and the Shot Put, a NASA small rocket.