The DMA apparently did not agree with DASA's suggested personnel to visit Christmas Island, and by October 20 Anderson of DMA was organizing a reconnaissance party which included representatives of LASL, LRL, Sandia, and the ALOO OFO. The field system promptly began to scurry for information on Christmas Island in order to prepare the proper questions for the visiting team.

On October 30 Seaborg, in a letter to Sir Roger Makins, Chairman of the U.K. Atomic Energy Authority, indicated U.S. willingness to cooperate with the British by testing a small British device underground in Nevada during Nougat, and then commented:

> I also recall that during our discussions in London (before October 10), reference was made to Christmas Island. I believe the statement was made that it had been maintained in a standby status. While a decision to conduct atmospheric testing has not been made by my government, the Commission would like to explore with you the possibility of using Christmas Island for staging operations, possibly completely airborne, should circumstance dictate a decision to conduct atmospheric tests. I should appreciate your views on such an arrangement from the standpoint of technical feasibility.

On the same day Seaborg informed the President of his discussion with Makins on this possibility.

The investigation became more urgent on October 29 when Dean Rusk, Secretary of State, informed Seaborg of his view that we should avoid using a site in the Trust Territory for any atmospheric tests and, hence, recommended strongly against the use of Eniwetok and Bikini. On November 1 Reeves told Betts the results of the test organizations' outlook on the use of Christmas, namely,

> 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 offset 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.

Betts concurred in this recommendation in a message to Seaborg, and at the same time requested that a decision be made to conduct Project Everready from Johnston Island rather than Eniwetok.

Technical Developments

Early in October DASA called a mid-October meeting to accomplish advanced planning on high-altitude nuclear weapons effects testing, with the intent of formulating an overall test plan for blast phenomena and missile response and updating the Willow high-altitude balloon experiment plan. AFSWC, as a result of a meeting on September 28-29 with various Air Force agencies, presented the Air Force test requirements and objectives to Systems Command and the Air Staff on October 4 and 5, and to the USAF Scientific Advisory Board on October 6. On October 6 DASA began a study of flight safety and area impact safety problems for the Polaris and Atlas systems tests. On October 18 AFSWC and Sandia were jointly studying nuclear safety in the possible Atlas operation; Sandia determined that they could obviate the surface-burst problem by installing a shorting plug. On October 27 SAC briefed the Air Staff and the

Pentagon on the proposed Atlas system test. On October 30 DASA sent identical letters to the Chief of Naval Operations and the Chiefs of Staff of the Army and the Air Force requesting that by November 15 each Service forward to DASA their proposals for performing full-scale effects tests on the three high-altitude tests already designated (Starfish, Bluegill, and Kingfish), considering both a lead time of 18 to 24 months and an alternate of 9 to 12 months. DASA would use these proposals in making recommendations to the JCS.

By October 26 a preliminary operational plan for Everready was available. The operation would be divided into three phases. [redacted] would be scheduled sometime during the period from about November 15 to early February 1962. These detonations would take place in an area near either Johnston Island or Hilo. For the second phase tests, the weapons diagnostics would be a little more elaborate, as desired by LRL. The measurements would include fireball rate of growth, time interval by both electromagnetic and optical means, radiochemical yield, high-explosive transit time, and bhangmeter yield. Phase 3 was not particularly well defined, but was the imagined longer-range operation, which, in a sense, turned out to be Operation Dominic. Phase 1 would be performed within 7 to 10 days after authorization, whereas Phase 2 would not be ready until approximately December. The control organization would be an "air task group command" which, presumably, would be headed by McCorkle, with a Deputy Commander for AEC matters, presumably Jim Reeves. The air operation would include two B-52 airdrop aircraft, two RC-121 control aircraft, two C-130s and two C-54s for photo and instrumentation coverage, and appropriate B-57-B, -C, and -D aircraft for air sampling. Weather reconnaissance WB-50s would be needed and C-124s were needed for materiel transport.

During October, in parallel with the concept of testing off Johnston or Hawaii over the open sea, provisions were also being made for testing at Eniwetok using the same capability, but having, in addition, ground-based diagnostic equipment.

As a result of the October 9 and 10 letters from Gilpatric and Seaborg, both of which urged returning to atmospheric testing, the President seemed to have given some half-hearted approval to proceed with plans and partial preparation. On October 12 McNamara authorized the JCS to proceed with preparation of plans on an urgent basis. That word, of course, was immediately transmitted through DASA to the Everready organization. By October 15 LRL was building multi-aperture optical systems needed to get time interval data. Sandia was preparing for trial drops of a 39 case containing a dummy [redacted] the first test to be from a B-47 on October 17 and the second test from a B-52 the following week. At the same time Livermore was preparing ground-based optical equipment for fireball measurements, and the Air Force was modifying C-130 and B-52 aircraft.

Initially there was trouble in obtaining sampler aircraft because AFTAC was using them to monitor the Russian tests, and the Laboratories could not agree on their needs. LASL requested at least one sample and said that more would be nice, but eventually their requests required three or four aircraft. Livermore, however, started with a request for five or six samplers and ended with as many as seven. At the same time, the possible desire to test [redacted] led Livermore to request a higher-altitude-capable sampler aircraft because the stablized cloud altitude from the high-yield test might exceed the ceiling of the B-57-B and -C aircraft. AFSWC's sampler aircraft problem was also difficult because several planes that might be available from USAF Systems Command had not been configured for sampling and McCorkle also had

to maintain a sampler capability for Nevada tests. In addition, trained pilots for sampling missions were at a premium. While other parts of the system had been degrading slowly during the moratorium, LASL had stored and maintained all of the sampler tanks obtained some years before and was able to use these on Everready and, for that matter, on Dominic. The aircraft situation improved when Air Force Headquarters directed ADC to transfer four B-57-D aircraft to Kirtland for modification there and directed the Military Air Transport Service (MATS) to transfer seven B-57-C and two B-57-E aircraft to Kirtland, with modification to be accomplished at Warner-Robins AFB prior to transfer. Eventually the LASL request was for four B-57-Bs and two B-57-Ds for high-altitude sampling, and LRL needed two B-57-Bs and five B-57-Ds for shots over a megaton, but if the D models were not available they would accept a force of six B-57-Bs. By October 27 thirteen of the B-57s were being modified for sampling.

This period also saw the beginning of an experiment that was to continue through the Christmas Island operation. On October 16 the medical division of DASA sought HQ DASA approval to do retinal burn-threshold studies on Everready. It was felt that preparations could be completed in three weeks if C-118s or C-130s could be used. The experiment would consist of measurements of light flux using appropriate equipment and, in addition, studies of retinal burns in monkeys and rabbits.

On October 23 Air Force HQ agreed to the experiment and directed Systems Command to furnish eight aircraft to be operated out of Hickam Air Force Base for about eight days in the period from November 13 to November 21, 1961. The designated aircraft, in order of preference, were C-118s, C-113s, C-119s or C-54s.

On October 20 Air Force Headquarters asked the Navy for permission to use Barbers Point for operation of certain aircraft, especially sampler aircraft, because of problems radioactivity would cause at Hickam.

By October 21 Livermore was planning to make an early alpha measurement (along with the other diagnostics) if the airdrops were near Johnston Island. (Note that the drops had to be within aircraft range of their operating island base.)

On October 26 Gerry Johnson and Seaborg discussed the need for qualified, experienced people to serve as safety advisors to the operational commanders during the series, and suggested Graves and Batzel as possibilities, amongst others. On October 26 Livermore named Bob Goeckermann as the LRL Test Group Director for Everready, but by the end of October Bradbury was still uncertain about the Everready organization and was not willing to appoint a LASL member of the Everready staff. On October 27 Headquarters Systems Command notified CNO, CSAF, DASA, the major Air Force Commands, etc., that General McCorkle of AFSWC had been appointed Air Task Group Commander for Project Everready.

The system began to come apart in the last week of October. On October 24 a test unit identical to the one intended for actual airdrop testing was dropped at Tonopah from a B-52 at 45,000 feet. The unit detonated at a position only 3,000 feet below the aircraft instead of 3,000 feet above the ground. The B-52 suffered no damage. On October 26 Henderson of Sandia informed Betts that the suggested nuclear drop date obviously could not be met, and on October 27 AFSWC notified Air Force Systems Command to the same effect.

Growth of the Task Force

DASA could see the handwriting on the wall: on October 3 they established a "test coordinating group" within Headquarters DASA to:

a. Prepare contingency plans for the conduct and support of possible high-altitude open sea and large-scale overseas tests involving nuclear weapons.

b. Develop recommendations for the command and control relationships of nuclear test organizations including consideration of the early activities of a "skeleton" joint task force.

c. Define areas of DASA staff responsibility to ensure complete coordination of staff efforts in this regard.

d. Effect coordination of DASA test planning activities with the military services, AEC, and other governmental agencies, as required.

The group chairman was Brigadier General Douglas C. Polhamus, U.S. Air Force. The initial group had 11 members, including Colonel Thomas L. Mann, U.S. Army Infantry, who had been the Commander of Joint Task Force 7 when it was dissolved in 1958.

In conjunction with this activity, a test coordinating division was established under the Deputy Chief for Operations, Colonel Mann. Among other things, this division would serve as the central staff agency for coordination with other agencies, would prepare plans and programs for nuclear weapons tests as directed by the test coordinating group, and would serve as secretariat to the test coordinating group. On October 9 Polhamus directed that the group prepare a recommendation for activation of a skeleton task force organization.

The October 10 letter from Seaborg to the President on the need for atmospheric testing mentioned that a military task force would be required for logistics support. On October 12 the Chief of DASA, referencing McNamara's memorandum that had transmitted the Presidential acquiescence to some preparation, advised the director of the Joint Staff:

> For the overseas tests, it is considered necessary that a Joint Task Force be established to develop detailed operational logistic plans and conduct the operation. Chief, DASA, would supervise the effects portion through a technical group in the JTF. It is recommended that the JCS direct the establishment of the JTF and designate one of the Services to provide the Commander thereof. I recommend the JTF be initially established, manned, and operated under control of Chief, DASA, with provision for separate operation under the JCS at the appropriate time to conduct the overseas tests.

On October 24, 1961, implementing an instruction from the Joint Chiefs of Staff received earlier on that day, Chief, DASA, announced the activation of Joint Task Force 8.

While awaiting the JTF-8 personnel, Polhamus continued to plan. At his meeting on October 25 he discussed plans to have 69 people on board in 30 days, 183 in 90 days, and 228 in 120 days, and pointed out that $1,000,000 had been obtained as initial funding, with the first year cost estimated to be about $40,000,000. He noted that General Starbird was expected to be the Commander, with General Lampert as the alternate. JTF 8 planning would continue under Colonel Mann until the Task Force was functioning. Office space had been requested either in the Pentagon or at least nearby. His second weekly planning meeting on October 31, designated a JTF-8 meeting by Polhamus, included representatives from the Army, Navy, Air Force, and AEC. The meeting agenda included reviews of all known plans for atmospheric testing, including Everready, the ASROC, Polaris, and Atlas systems tests, and the proposed high-altitude tests. A Navy representative stated that "The ASROC test is ready to go. Some ships are presently at sea. The longer this test is held up, the greater the dangers

of information leaking to the public." The Navy also presented a Polaris system test plan which included use of the Atlantic Missile Range and impact southwest of Ascension Island.

On October 31, 1961, DASA informed the Assistant Secretary of Defense for Public Affairs that the JCS had ordered DASA not to announce the name, role, or existence of the task force organization until specifically authorized to do so. However, DASA suggested that appropriate officials of the DOD and AEC request approval from the President to announce the formation of the organization as soon as possible.

The Pressure to Resume

The pressure on the President to resume atmospheric testing was growing. On October 7 Seaborg urged Rusk and McNamara to be cautious at the upcoming United Nations General Assembly. He suggested that the President not agree to any resolution that would curtail our resolve to resume atmospheric testing and that we not enter into another uncontrolled moratorium under any circumstances. Seaborg also pointed out to the President the difficulties in underground testing and said that atmospheric testing would be a necessary supplement to the current underground program if the program needed to be accelerated. He also stressed that this status report was not intended to be a recommendation for atmospheric testing at this time. On October 9 the President received a Gilpatric letter which outlined a possible atmospheric series, along with appropriate justification, and recommended approval to prepare for atmospheric and high-altitude tests. The Gilpatric letter pointed out that:

> It is fallacious and dangerous to our national security to assume that we have reached a favorable plateau in nuclear weapons development, and that extensive efforts in nuclear testing are no longer required. On the contrary, from past experience, we know that nuclear testing has enabled our scientists to make extraordinary progress, not only in weapon technology, but in the discovery of previously unknown and unsuspected phenomena. We believe that similar gains can be made in the future.

As already mentioned, the President apparently gave a little at this point; at least McNamara authorized DOD planning and some preparation.

But the President still tried to avoid atmospheric test resumption. On October 13 Arthur Dean challenged the U.S.S.R. to sign an immediate test ban treaty, and warned that if the Soviets continued explosions, the U.S. might test in the atmosphere.

At the AEC meeting of October 17, 1961, the Chairman noted the extent of the U.S.S.R. series to date (some 20 shots, Ex.(b)(1) and said there is little doubt that the U.S. must establish a testing program to meet its requirements, and not act only in response to Soviet-inspired pressures. The Commissioners agreed with this viewpoint and noted that Ambassador Dean had expressed a similar view. Bradbury urged that the AEC prepare the Eniwetok site and resume atmospheric testing as soon as the DOD could support an airdrop test program. He added, however, that if Eniwetok was not available, there were many other places in the Pacific that could be considered. At the same meeting:

Ex.(b)(3)

Mr. Foster said that he would have preferred doubling the effort in this area of development, but such a stepped-up pace is not possible in view of the level of effort

required in the current testing program. The Chairman observed that the Commission must keep currently informed on new developments in fusion weapons research because of recent widespread publicity regarding the development of the neutron bomb. . . . Mr. Foster said it is still difficult to convince the personnel at Livermore that the U.S. is once again engaged in full-scale testing. He cited the contrast between General Betts' directives, which stress the urgency of the program, and the President's public announcements, which indicate a strong preference for continued negotiations and moratorium. He said it would be most helpful if the Commission would clearly inform the University of California of the urgent nature of the situation.

The growing awareness of the magnitude of the Russian program was a further pressure on the President, and to add insult to injury, on October 17 the Russians announced their intent to fire a 50-megaton atmospheric detonation. For the next few days there was a continuous exchange between the President and other members of the government on the effects of such a detonation, possible use of such a weapon, etc. At an October 19 meeting of the Commission's General Advisory Committee the evidence became clearer. Scoville summarized the U.S.S.R. test program, pointing out

. . . that [redacted] Soviet devices had been shot, and only this same morning, a report had been received of number[redacted]
. . . shots occurred at Novaya Zemlya, Semipalatinsk, and Kapustin Yar. [redacted]
Ex.(b)(1)
Ex.(b)(3)

Ex.(b)(3)

Ex.(b)(3)

A little later in the meeting Seaborg commented that:

Both Laboratory Directors feel that since progress would be extremely slow in preparing for a sufficient number of underground shots, the U.S. must test in the atmosphere. Since underground testing does not provide good diagnostic data quickly, since the Russians have not worried about fallout, and since the international repercussions over the Russians' tests have been considerably less than anticipated, the AEC has felt it should resume atmospheric testing and has recommended to the President that it be authorized to make preparations for atmospheric testing anywhere.

Ex.(b)(1)
[redacted] On October 24 the Soviet Minister of Defense stated that, "The problem of destroying rockets in flight has been successfully solved." On October 27 another small Russian high-altitude test was noted.

There were other actions that day. The U.N. General Assembly asked the U.S.S.R. "to refrain from carrying out their intention to explode in the atmosphere a 50 megaton bomb." The AEC Chairman sent the President those recommendations from the AEC General Advisory Committee that the Chairman, Mr. Pitzer, had requested be

communicated to the President without delay.

> The Committee advised the Commission that they are of the firm opinion that militarily useful technical information can best be obtained by atmospheric testing. Secondly, it would be technically feasible to conduct a useful atmospheric test before the announced termination of the current Soviet series on October 31, if a decision were made to resume such testing within the next few days. The Committee believes that possible political advantages of such a test should be evaluated promptly. Third, the Committee is convinced that the AEC could, within a few days of a Presidential directive, come up with a single weapon having a yield of about 50 or maybe up to 100 megatons.

In his forwarding letter to the President the AEC Chairman said that the General Advisory Committee was overly optimistic about the short-time availability of a 50-megaton device.

Governor Rockefeller of New York also urged resumption of atmospheric testing: "To assure the sufficiency of our own weapons in the face of the recent tests, we are now clearly compelled to conduct our own nuclear tests." The Governor, who was a potential candidate for the Republican Presidential nomination in 1964, further pointed out that if the United States fell behind the Soviet Union in nuclear weapons it would pave the way for Communist conquest of the democratic world. He commented further, "It is one thing for America to be conscientiously concerned with the views of neutralist nations. It would be quite a different and preposterous thing for America to start behaving like one." Also, on October 27 Communist China broadcast an urgent warning against radioactive fallout in its northern provinces and offered health advice on the subject.

On the 28th Khrushchev announced his intention to go ahead with the 50-megaton shot, and complained, "Bourgeois propaganda, as of late, raised a clamor around the fact that the Soviet Union has been forced to resume nuclear weapons tests," adding that the Soviet motivation in proceeding with the test was not properly understood.

On October 30 Seaborg reviewed for the President the present status of test plans, including the proposed military tests. He specifically mentioned the problem of the EPG and Ex.(b)(1) Ex.(b)(1) gave his own suggestions for restraints on the program, endorsed the position of the Committee of Principals in their October 11 memorandum to the President, and passed on the Commission's opinion that the national security now required the U.S. to test in the atmosphere at the earliest appropriate time, minimizing the U.S. contribution to worldwide fallout. Finally, he stated, "In conclusion, I respectfully reaffirm our earlier recommendation that the U.S. forthwith proceed to full-scale preparation for atmospheric tests, and that those preparations be publicly acknowledged as recommended by the Principals."

On that same day, October 30, the U.S.S.R. exploded its 50-megaton bomb. On the following day Prime Minister Macmillan declared that the United Kingdom would support a U.S. decision to test above ground, saying, "We cannot risk putting the West in a position of permanent military inferiority."

There was widespread reaction to the Russian test. The Vatican Radio termed the blast an "insane decision, morally, politically, socially, economically, and humanely deprecable" that "shows the true face of Communism . . . a face with the light of love and reflecting the tension of hatred." A West German spokesman charged that the Soviet Union "was ruthlessly risking the health of all mankind." The explosion was taken as a new proof of Moscow's "brutal determination" to display its military power. A member of the Storting* in Oslo, displaying anger shared by all parties

*Norwegian Parliament.

there, said, "The explosion showed a cynicism unparalleled in history." The New York Times issue for October 31 showed a map of the damage to New York City from a 50-megaton bomb explosion in the air above Wall Street: there would be fatal burns to exposed persons as far as 35 miles from the detonation. At the U.N. on the 31st, Stevenson said, "If this is what Mr. Tsarapkin calls 'Soviet realism,' God help us all to escape from Russian realism." By this "arrogant act" Stevenson charged the Soviet Union has "added injury to insult" and has "started a new race for deadly weapons . . . and has contemptuously spurned the appeal of the United Nations and of all peace-loving people." Mr. Godber, British Minister of State for Foreign Affairs, told a news conference: "We are still ready, in spite of this latest shocking act by the Soviet Union, to go back to Geneva and try to make a treaty. But if that is not done, then we must reserve our own right to act."

On October 30 Senator Henry M. Jackson, Chairman of the Joint Subcommittee on Atomic Weapons, said that the United States would have to resume nuclear tests in the atmosphere, pointing out that "There could be no question that the Soviets are improving the sophistication of their warheads to the point that the long lead we have may be in jeopardy."

On October 31, 1961, at an MLC meeting, Colonel Anderson of DMA commented:

> that the top-level AEC people were by no means proceeding so enthusiastically with test planning as were the DOD top-level people. In DMA, they do not have the direct guidance which we have in the DOD. The AEC has not faced up to the need for planning for atmospheric testing and operating with JTF 8. The only "joining" between AEC and DOD at present is at the AFSWC-ALOO level. . . . Ex.(b)(3) was dropped and went off at 14 seconds instead of 40 seconds and DMA had their enthusiasm dampened for any hurried preparation for airdrop.

(The author finds this a strange remark since at that point the AEC was ready to drop two stockpile devices within a few days and could within the next month, in principle, airdrop a number of other devices, whereas the DOD could do only systems tests.) At the same MLC meeting, Gerry Johnson summarized recent discussions involving McNamara and Seaborg which had led to the DOD position that selection of a site for atmospheric testing should be a single-agency decision. On October 31 the AEC agreed that it should have primary responsibility for site selection, with the exception of possible early drop tests, and this decision was passed to the Secretary of Defense.

Arthur Schlesinger reported:*

> On the morning of October 30, a call from the White House awakened me to report the largest detonation so far, probably that of Khrushchev's threatened 50-megaton bomb. . . . This final atrocity made it impossible to put off our own preparations for atmospheric testing any longer. Kennedy now directed Ted Sorenson to draft a statement saying that while we should test in the atmosphere only if required to do so by overriding arguments of National Security, contingency preparation should begin at once. Three days after the great Soviet explosion, the paper was laid before the National Security Council. . . . The meeting had begun with the preliminary analysis of the Soviets tests. The new Russian series, according to the CIA report, followed logically from its 1958 series, this suggesting that in spite of the "big hole" thesis, there had been no cheating in the interim. Then McNamara, after an impressive and dispassionate review of our weapons situation, asked that development and effects tests in the atmosphere be authorized at the earliest possible moment. The President inquired about the timing of the projected series and said that if we had to have the tests, they should be run off rapidly; "we want to do as little as possible to prolong the agony."

*A. Schlesinger, *A Thousand Days*, page 487.

On this note, the meeting adjourned.

At the end of the day the President announced publicly that preparations were under way for atmospheric tests "in case it becomes necessary to conduct them." They would not be undertaken, Kennedy emphasized, "for so-called psychological or political reasons." But if the "orderly and essential scientific development of new weapons has reached a point where effective progress is not possible without tests," then they would be undertaken "within limits that restrict the fallout from tests to an absolute minimum."

Thus came the orders from senior authority to prepare for testing. It is interesting to speculate about why testing was not to start immediately. The Task Force was not yet operational, but the ASROC test was ready. The Polaris test was ready, and while there had been trouble with Ex.(b)(3) presumably was droppable. Furthermore, within a few weeks either Livermore or LASL could, in principle, have had other devices ready to drop. Such an operation would have been a high-risk affair since very few of the appropriate safety systems had been set up (such as weather stations and rad-safe organizations). We can only suspect that the Polaris, ASROC, Ex.(b)(3) simply did not meet the ground rules of immediate necessity. Furthermore, the President had satisfied the AEC and DOD by allowing them to prepare, which was really simply the expenditure of a fair amount of effort and money, but he had maintained the option of continued negotiation of a test ban. It is clear that the President's objective was not for the U.S. to test, but to prevent any further Russian testing. The open declaration of our intention to prepare for atmospheric testing could, in a way, be regarded as pressure on the Russians to move toward a test ban treaty.

Be that as it may, the testing system now moved rapidly toward achieving that readiness. While the program would not be defined officially until the Ex.(b)(1) meeting, the elements were clear enough for AEC and DOD action.

The Preparatory Period

November 1961, as related in previous sections, was a period of program and concept definition. While consideration of Eniwetok continued for a while and Christmas Island began to be a gleam in the tester's eye, it quickly became clear that an open sea operation of some sort was the only concept that would be politically acceptable at the moment. But Everready lingered on. On November 1 the Air Force changed the nickname Everready to Bluestraw and defined that project to be Air Force support of nuclear testing. (The name Bluestraw for that Air Force support continued long after the end of Operation Dominic.) The Laboratories quickly realized that the concept of airdrops from a B-52, using diagnostic airplanes such as the C-130s, had to be preserved, at least for a while. Thus, even though the status of Everready was quite uncertain, the AEC Laboratories, with the help of EG&G, continued to increase the diagnostic capability of the C-130s. Livermore, in conjunction with Sandia, was preparing radar tracking and ground-based optical systems for both optical time-interval measurements and fireball photography. On November 3 CINCPAC (Commander-in-Chief, Pacific) informed Navy units of the Bluestraw operational concept, specified their responsibilities to clear and monitor the designated drop zone, which was designated as a 200-mile square centered 350 nautical miles southeast of Hilo, and stated that the series would begin November 15. Naval aircraft support was also specified.

However, on November 4 Betts informed the Laboratories that, among other things, the new readiness date was about March 1. On November 7 Bob Miller of ALOO notified

AFSWC that the Everready operation was cancelled, and AFSWC began to turn off that effort. On November 8 MATS notified its subordinate units that the nuclear tests would not be implemented in the immediate future, but certain aircraft, such as the photographic and air weather aircraft, would be retained in modified configuration for possible reinstatement of the project. On November 8 McCorkle commented to Schriever (Commander, USAF Systems Command) on the disruption that had occurred during the last 30 days, suggesting, therefore, the need for a permanent organization at AFSWC to cope with the many facets of such an operation, and stated his intent to complete an organizational plan which would be submitted for approval later in the month. On November 14 TAC requested that AFTAC advise when the C-130 aircraft could be returned to TAC. On November 24 Systems Command replied to TAC that the two C-130-B aircraft on loan to AFSWC were required for a new program and that a firm return date was not available.

The AEC Laboratories, EG&G, H&N, ALOO, and AFSWC now began to define the operational concept in greater detail. Initial estimates of the safety hazards were quickly made within the Laboratories, especially by Orin Stopinski of LASL and Vay Shelton of LRL.

On November 2 Betts sent to the Laboratories a list of instructions, which included:

> We must plan for an intensive atmospheric program on a relative short time duration to be executed this spring (assuming that the decision to resume testing is made). More specifically, it appears that such a program will start on or about March 1 and will last for 2 to 3 months. There is no assurance that another atmospheric test program will be repeated after the initial series is executed; however, we have been instructed to plan for a similar atmospheric test series on an annual basis. . . . The location for the United States testing will be in the Pacific at a location presently undetermined. The AEC is charged with the determination of a suitable location-- you will be advised of our efforts in this regard by separate communications. . . . We are currently negotiating with the U.K. for the use of Christmas Island as a first choice for an island base. In the event that Christmas is not available, the use of the Eniwetok-Bikini Islands will be reconsidered. Meanwhile, studies will be made of other possible suitable island sites. Parallel planning will continue for early capability to conduct developmental tests by employment of an Air Task Force based in the Hawaiian Islands with detonations to occur southeast to southwest of Hawaii and utilizing Johnston Island, as appropriate, dictated by weather and other considerations.

He then called for a meeting on November 13 with all participants at Albuquerque. The following conclusions and recommendations from the November 11 meeting of the NTS Planning Board were presented to Betts and the testing principals at their November 13 meeting in Albuquerque:

a. Priority of Desired Real Estate Based Upon Maximum Capability

(1) Eniwetok/Bikini
(2) Christmas Island
(3) Johnston Island or Hilo, Hawaii

b. Conditions Associated With the Utilization of Christmas Island

(1) The earliest possible authority should be obtained for an on-site survey of Christmas Island; early authority should also be granted to accomplish support action to attain March 1, 1962, readiness.

(2) Ideally, conditions for use of Christmas Island should provide for:

(a) Sole U.S. operational control.
(b) Permanent removal of native groups.
(c) Acceptance of the principal that under conditions (a) and (b) above and subsequent paragraphs, the test organization may, after several years, still obtain at best only 50 percent of the capability attainable at Eniwetok/Bikini.

(3) Sampler aircraft should be based at Christmas Island.

(4) Capability to measure early alpha must be developed; this includes two alpha stations to support balloon, air, and barge shots, thus providing one alpha station for each laboratory.

(5) Requirement for at least three camera stations for airdrop, balloon, or barge shots, these stations to be used jointly by both LASL and LRL.

(6) Additional camera stations to cover single-stage devices.

(7) Should Eniwetok/Bikini or Christmas be unavailable, necessitating Pacific shots to be fired at Johnston or off the Hawaii coast from Hilo, additional devices must be tested at NTS -- to obtain alpha -- and in the Pacific area -- to obtain yield.

(8) Certain events may be so difficult that barges or ships may be required as diagnostic platforms for detonations off Christmas Island.

(9) Balloon preparations must be initiated immediately if the March 1 readiness date is to be attained.

(10) Logistics, personnel, and other factors must be surveyed to determine the extent of the support problems.

c. Conditions Associated With Johnston Island or Hilo

(1) Provided Eniwetok/Bikini or Christmas Island is not available, it is possible to use either Johnston or Hilo; however, the operation would a mixed air and surface ship operation, and diagnostics programs will be restricted.

(2) Fireball equipment installed in aircraft should be retained, ready to support off-Hilo or Johnston operations.

(3) The Ex.(b)(3) test should be planned for a ground site. This would permit utilization of a vacuum system as part of diagnostics. As an alternative, it may be feasible to utilize a missile system staged from Johnston Island.

(4) Johnston Island is too small and too restricted, and an extended program would require additional locations.

d. Reemphasized Advantages Associated With Operations at Eniwetok/Bikini Atolls

(1) Maximum separation, permitting dual laboratory preparations for detonations.

(2) Weather conditions, subject to further analysis, which may be only slightly less acceptable than those at Christmas Island. (Additional weather studies relating to Christmas Island are being directed.)

(3) Land separation reduces the long-life contamination of ground areas which will be inherent in operations at Christmas Island.

The meeting of the testing principals in Albuquerque on the 13th, which included senior representatives from each of the AEC Laboratories, EG&G, Field Command DASA, AFSWC, ALOO, and others, noted the Planning Board's recommendations on the EPG, but concluded that that site was politically infeasible and recommended that planning should be directed to Christmas Island, with the alternatives of Johnston and Hilo. Most proposed device tests could be built for airdrop, but a few, which could not be airdrops, required a barge, balloon, or ground site. It was also noted that all events might require a sea vessel of some type as a control and observation vehicle, so a joint air-sea operation would be required. It was agreed that support requirements would be developed for three operations concepts, as follows: operate completely from Christmas Island, operate in part from Christmas Island, or operate from Oahu or Johnston over open water. Other conclusions included (1) requirements for three phototrailers for measuring fireball yield, (2) wing tanks and associated equipment to support airplanes assuming two missions per day on two successive days, (3) two trailers, one for electromagnetic and one for Teller-light time-interval measurements, and (4) two alpha measurement stations, each equipped with 40 oscilloscopes and designed to withstand 300 psi blast overpressure. The alpha stations would be located at two balloon-equipped test sites capable of shots as large as 100 kt. Other equipment needed at the balloon sites included either 15 balloon winches which would be destroyed in the tests or three reusable winch trailers capable of withstanding 100 psi blast overpressure. Still other facilities were (1) rocket or missile launch facilities for one or two shots at Johnston Island, (2) two radar tracking trailers, (3) two telemetry-type trailers to observe weapon functioning, (4) a shop trailer, (5) decontamination fresh water facilities for aircraft, (6) two Boxer-type ships for diagnostic platforms, (7) 40 to 50 aircraft of several types, (8) anchoring and barge facilities for fuel handling, and (9) five weather islands. The total personnel, including the Laboratories, the air support, and DASA and their support, but not including construction people, was estimated to be 2,410 people. It was assumed that some of these people would be aboard ships and the others would be in tents or other quarters ashore. It was concluded that early permission was needed to visit Christmas Island and to initiate support action there. The DOD listed Starfish, Kingfish, and Bluegill as their test requirements. It was noted that the fireball optical equipment already installed in the C-130s should be maintained, that there was an increased requirement for high-altitude sampler aircraft and crews, and that additional study should be made of sampling techniques utilizing rockets. It was also recognized that the possible effects of air blast and flash blindness might lead to the airdrops near the Hawaiian islands being farther away than previously anticipated, complicating the airborne sampling problem even more.

Changes to the detailed concepts of the November 13 meeting came rapidly. On

November 16 DMA staff personnel suggested to Betts that the Commission be asked to authorize an open sea operation immediately. However, Al Graves pointed out the additional hazard of tsunamis in Hawaii in case of an accidental surface burst. LASL and Sandia representatives met on the 16th to refine the plans for the atmospheric program. A possible high-altitude method of measuring neutron distribution from the Ex.(b)(3) was proposed. This would involve lifting the device to 150 kilometers, turning it on its side, and detonating. Observations would then be made by detectors lifted to about 200 kilometers using small sounding rockets which might be fired from Johnston, Midway, Kauai, Christmas, Palmyra, or Jarvis islands. The device might have a thin lead shield on one side to check out the "lead balloon" evasion theory. In other discussions Sandia agreed with the LASL request to take responsibility for early alpha measurements using telemetry, as they had done on all LASL shots of Hardtack Phase II. Pending further investigation, LASL agreed to Sandia's preference of the TX-39 drop case for all airdrops, regardless of the size of the device. Sandia also agreed to monitor the various device functions on airdrops, including squib firing, X-unit firing, supercharging, etc.; to furnish the radio signals; and to start the timing signals for such airdrops. Sandia was already preparing to furnish a ground-based system for tracking the "drop plane and device," thus preventing the kind of data loss that happened on Cherokee. The gear could be put on ships if necessary. Sandia had already ordered 25 balloons in two sizes, one that could lift 1,800 pounds and the other perhaps 15,000 pounds.

On November 17 Ogle informed Betts that LASL had changed some diagnostics requirements since the November 13 meeting. Fireball camera stations would be required on the surface and in the air independent of test location and would be operated by EG&G under LASL direction on LASL shots. Time interval would be measured similarly, from ground stations, by both LASL and LRL, and might also be attempted from the C-130s. On any single-stage device to be fired at Christmas using a balloon, fireball yield would be obtained from ground stations only. On LASL shots bhangmeters would be operated by EG&G and the data would be interpreted by LASL. Both a ground surface shot on Christmas and a high-altitude shot would be considered for the measurement of neutron distribution from the Ex.(b)(3) and no choice had been made. On the deep space shot intended to develop diagnostic measurements for possible future space testing, x-ray intensity measurements in space would be made jointly by Sandia and LASL (and possibly LRL). Ground-based and airborne optical measurements of x-ray intensity, time interval, and atmospheric characteristics by observation of air fluorescence on all high-altitude shots would be made by LASL from stations on Johnston Island and from high-flying C-135 aircraft.

Later discussions led to the conclusion that neither steel nor wooden shot towers could be erected in the time allowed. Consequently, Livermore would have to consider some other means of firing. Livermore alpha stations could be ready 13 weeks after go-ahead, which would be 10 days before the required readiness date if go-ahead were immediate. LASL was planning two shots on floating platforms and two or three missile tests, each of which would require about 25 companion rockets. The LASL and LRL alpha stations would be very similar. It was agreed that all shots on floating platforms would be fired by radio, except that LRL would request hard wire to barges, provided the moorings were not too far from shore. H&N was authorized by the AEC to proceed with engineering on the Livermore criteria, to begin negotiations immediately for the purchase or rental of construction equipment, and to arrange for barge tows. Estimates of the funds required were as follows: H&N construction support, $26,000,000; Sandia, $17,000,000; EG&G, $14,500,000; total, $57,500,000. Half would be committed by March 1, 1962, for an operation beginning on that date.

At the November 17 Commission meeting Betts suggested that:

> 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 decision be made to conduct the test by airdrop 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 first knowledge that the tests will be conducted at sea, all efforts 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 Hawaii support facilities as feasible. If it appears that agreement for use of Christmas Island might be obtained with extended negotiations, the negotiations should be continued in order to provide a more suitable place of operation for testing in the future.

On the 18th Luedecke briefed the JCAE on present atmospheric test planning, including the President's designation of the Seaborg-chaired NSC subcommittee as the organization to review and recommend U.S. atmospheric test plans. On November 20 both Sandia and EG&G submitted to Reeves their detailed estimates of equipment and costs needed for a test series based on Christmas Island. Jim Carothers of Livermore named Chuck Gilbert as his Deputy Test Director for Pacific Operations and made Jack Shearer responsible for the diagnostics and experiments on those events. On that same day McCorkle of AFSWC discussed with Systems Command Headquarters the AFSWC concept of an Air Task Group to support the upcoming atmospheric nuclear testing as part of the Joint Task Force. After recalling previous experience and noting that the 4950th had been discontinued on August 16, 1961, he proposed to establish a "nuclear test mission element" within AFSWC with an initial manning of 20 people. He noted that with augmentation this could become a provisional Air Task Group under a Joint Task Force. He estimated that 85 people would be required for the Air Task Group if it were based at an established air force base and suggested a much greater number would be required if it were located elsewhere.

In his letter to the President after the November 21 National Security Council subcommittee meeting Seaborg noted:

> The choice of test site will dictate how the tests can actually be conducted. Technically, the Eniwetok Proving Ground is the most desirable, extending as it does over a substantial area, with a lagoon suitable for barge shots. However, the contemplated tests could probably also be conducted, but not so well, at Christmas Island. Since Eniwetok has political difficulties and the availability of Christmas is at best uncertain, prudence dictates that we be prepared to test elsewhere if necessary. Fortunately, many of the proposed tests could be conducted without a highly developed island site, although they would benefit from such a site. Some could be done by airdrops probably straight from Hawaii with limited instrumentation on some small island, such as Johnston, not suitable for more extensive development; with some degradation of diagnostic information, others could be carried out by airdrop over the open ocean using such instrumentation as could be carried in accompanying aircraft or on ships. However, some of the most complex instruments are of questionable feasibility except over an extended land base such as Christmas Island; in the absence of such a base, serious consideration should be given to conducting some of these above ground in Nevada.

He also noted that as directed by the President, the new planning target date was April 1, 1962.

On November 30 Batzel and Goeckermann of Livermore sent Betts a summary of their intended diagnostic program. It was essentially a mirror image of the LASL program with the word LRL replacing LASL. Balloon and barge shots were assumed along with airdrops. However, they noted in particular that some measurements on large weapons

fired on barges would be complicated because of line-of-sight difficulties, and they were, therefore, relying on airborne disgnostics. They noted that recent dry runs using the C-130 aircraft had convinced them that several improvements were needed. The X-unit signal from the drop case was not large enough; no method existed for dry running the RF pickup and optical gear while the aircraft was in flight; and excessive vibration had caused a number of instrument failures during full power checks on the ground. They therefore requested that the C-130 assigned to LRL be made continuously available from that moment throughout the test series for development and testing use. On the space shots, LRL proposed to make x-ray intensity, primary alpha, time interval, and neutron time-of-flight measurements themselves, with Sandia being responsible for rocket firing and telemetry. The diagnostic packages would be flown on sounding rockets launched from Kauai and Johnston. If an LRL device were used in any of the high-altitude shots, they might attempt radiochemical sampling.

By mid-November much of the planning responsibility had been assumed by the Joint Task Force. General Booth, Chief, DASA, had moved quickly after the October 24 authorization to establish Joint Task Force 8. To be Task Force Commander, Gerry Johnson had specifically suggested Starbird, whose previous experience and long tour as head of DMA made him an obvious candidate. On November 15 the charter of JTF-8 was still being held up pending arrival of General Starbird, presumably so that he could help in its formulation.

At the November 16 Commission meeting Luedecke introduced for Commission consideration the appointment of Starbird as Commander of JTF-8 and his designation as the senior AEC representative at the overseas testing site. The minutes of the meeting note that Mr. Graham discussed the point:

> First, he said, it is important to establish a firm delegation of responsibility to the Commander in matters affecting the health and safety of the public which may arise in the course of the testing operation. He said the second important aspect is keeping the AEC fully informed so that the Commission, in turn, may notify the President and the JCAE of the developments which may arise in the course of the testing operation. General Betts stressed that as AEC senior representative, General Starbird will be directly responsible to the Commission and he will be required to abide by AEC standards for assuring the health and safety of the public. General Starbird will also be required to keep the Commission fully and promptly informed.

The Commission concurred in the appointment of Major General Alfred D. Starbird, U.S.A., as Commander, Joint Task Force 8, and noted that the Chairman of the MLC (Gerry Johnson) would be advised of this action by letter, which would also indicate the Commission's intention to appoint General Starbird as the senior AEC representative at the overseas test site for the operational phase of the test operations. It was decided that no public announcement of the appointment would be made and that the JCAE would be advised by appropriate letter later.

The first Task Force General Order, on November 21, 1961, shows that General Starbird assumed command on that day in compliance with the November 2 direction of the JCS. When called to the new assignment, he had been on the west coast serving as Chief of a Corps of Engineers field office, and he had to take some time to settle affairs there and move his family. He apparently had flown east early in November to discuss the appointment with the JCS and others, stayed there a few days, and then returned to move his family. In mid-November, after checking with Bradbury and others, Starbird asked Ogle if he would be willing to act as the Scientific Deputy Commander of JTF-8. After checking with Graves and Bradbury, Ogle quickly agreed.

On November 20 Starbird and Ogle met in Denver for a few hours as Starbird was driving back across the country with his family. At that meeting they agreed on a manner of operating and their appropriate separation of duties. It was very simple: Starbird would concentrate on the Washington problems, the military problems, site

agreements, etc., and Ogle would put together the technical program and run it. Both would concern themselves with safety; each would keep the other continuously informed; and, of course, each could have input on any part of the problem. In essence it was to be a partnership with one (Starbird) being a little bigger partner than the other. By the end of November Rear Admiral Lloyd Mustin assumed command as Navy Deputy Commander and Brig. General John Samuel became the Air Force Deputy Commander.

The attempts continued to arrange a visit to Christmas Island to see if it was really satisfactory as a test site. At the November 2 DASA test coordination meeting, "The group was informed that there were no new developments concerning this island except that the British seemed to be dragging their feet on our request." Later there were several discussions of the subject in Washington between U.S. and U.K. government representatives, as well as a visit to England in mid-November. On November 16 the U.K. invited U.S. participation in a survey of Christmas Island, to be followed by briefings of senior U.K. officials before any further discussions between Macmillan and Kennedy. This invitation led to some confusion about U.S. members of the survey group which was settled with the appointment of Ogle as Task Force Scientific Deputy Commander. On November 22 Betts noted, "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 that Ogle will represent both AEC and DOD." On November 27 Betts told Hertford:

> Arrangements for inspection tour for Christmas Island follow: Ogle and Ryan (Pat Ryan of H&N) should arrange for commercial air transportation to Hickam Air Force Base, Hawaii, reporting there at the Royal Air Force Liaison Office during the afternoon of December 4, 1961. Notification of DOD representatives selected expected on November 28. Current passports required. Headquarters, AEC, will notify British Embassy of security clearances for Ryan and Ogle. Clearance of U.K. representatives will be verified. Air Commander Whelan, RAF, and U.K. representatives Beards and Jones will join at Hickam. Travel beyond Hickam is via RAF air shuttle service, departing morning of December 5. Strict security required. For local consumption at Christmas and then only if necessary, the purpose of party on Christmas is in connection with survey work for possible use of the island in extension of satellite tracking facilities.

On November 29 Goeckermann sent to Ogle a list of items on which they wished information gathered during his upcoming trip to Christmas. These included topography 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 transport and adaptability of site to the Livermore layout.

Samplers

The debate about the required samplers continued. As a result of the November 13 meeting in Albuquerque, AFSWC asked the Laboratories on November 17 about their requirements for collection of gaseous samples. Batzel answered on the 20th that LRL required gaseous samples on all LRL shots, that the gas sampling equipment should include "squeegee" compressors (not engine compressors) on all aircraft and should be the LRL-designed isokinetic flow wing probes used in Hardtack I on B-57-Bs, -Cs, and -Es. The B-57-Ds should have fuselage probes. On the 21st Graves commented that all the experience on diagnostic gas sampling was at Livermore, but that since Hardtack Phase I data had provided valuable diagnostic information, LASL concurred with any requirement for probes and gas sampling capability established by LRL. On November 20 AFSWC informed Systems Command: "This message outlines proposals for overseas

atmospheric nuclear testing in spring of 1962 time period, and states requirement to be able to provide sampling of two shots per day on two successive days." In a meeting of LASL and AFSWC representatives on November 16 it had been 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-life fission products and for physical decontamination of the aircraft. Therefore, six aircraft per shot, or a total of 24 aircraft, would be required, assuming 100 percent in-commission rate. The AFSWC message continued: "Because of expected yields, height of burst, and height of cloud in the most likely shot site, the fleet should consist of 14 B-57-B-type sampler and 10 B-57-D-type aircraft. In the event this number of B-57-D aircraft are not available, the total number should be kept at 24 by increasing the number of B-57 B-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 B-57-B/D sampler aircraft capability, including modifications, air crews, maintenance personnel, and AGE in time to make good an overseas ready date of March 1, 1962. To ensure crew training and overseas movement, the increased sampling capability should be ready no later than January 15, 1962. Informal discussion with the 1211th Test Squadron indicates that they have a total of 19 B-57-B-type aircraft and 3 serviceable B-57-C aircraft on hand. Six to eight of the B-57-B types are committed to "crew cut" operations. This could require one to three additional B-57-Bs and seven B-57-Ds. In case of resumption of testing by other nations, additional samplers would be required if those detonations were to be monitored."

DOD Experimental Plans

DOD preparations for systems tests continued through November. In late October investigation of possible trajectories for the Atlas test had led to the conclusion that the Johnston Island area was not suitable as a target area, and Taongi Atoll had been suggested as an alternative. However, the political complications of involving a Trust Territory area precluded use of Taongi, and a new site was sought. On November 2 at the DASA Test Coordination Group meeting, the status of systems tests concepts was summarized as follows:

> Phase III, Atlas firing, can take place any time after October 30, without backup. This will be a Category III test. We have been told to try to fire beyond Wake with a short range for the missile. The plan calls for open water firing, 1,000 miles away from the test grounds. The Atlas will be fired from Vandenberg."

As for the ASROC test,

> The Operational Commander determined last night that he would go to sea and stand by and wait. Weapons are aboard the ships. Plans are complete as far as the Navy is concerned.

Planning for the Polaris test was just starting with no detailed operations order yet written. The submarine chosen was the Ethan Allen, and the shot area was to be about 350 miles southwest of Ascension Island. Four missiles had been designated and would have command destruct systems installed.

On November 3 Gilpatric notified the JCS that the Air Force and Navy efforts to prepare the ASROC, Polaris, and Atlas systems were to continue, but that the overall operational date was now no sooner than April 1, 1962. McNamara again confirmed to the JCS on November 9 that planning should continue for the three systems tests with

planned execution dates within the three months after April 1. (As has been noted elsewhere, the Polaris and Atlas systems tests were deleted in the November 29 National Security Council meeting, but ASROC was left in as an effects test.) On November 10 General Gerrity of Ballistics Systems Division stressed to Systems Command the need for more positive thinking about Air Force needs for nuclear testing, expressing his feeling that weapon development tests were receiving the predominant consideration, whereas there was an urgent need for improved understanding of nuclear weapons effects, especially those involved in ballistic missile systems. By mid-November Sandia had designated a technical advisor for the ASROC and Atlas tests. On November 16 Gilpatric approved an additional 86 personnel billets for DASA, and on November 20 AFSWC noted their requirement for another 64 personnel in the Research, Development, and Test directorates since they seemed to be technically responsible for a major portion of the Air Force nuclear effects programs.

On November 16 and 17 the Bethe Panel met to review Russian progress. It was impressive. [redacted] Ex.(b)(3) [redacted] These conclusions led Curtis LeMay, then Chief of Staff of the Air Force, to establish a committee to study the military implications of the Russian series of tests as interpreted by the Bethe Panel. He hoped to have the results in hand by January 5, 1962.

More Political Considerations

New pressures to renew atmospheric testing, as noted earlier, had appeared during November. The Russians had declared that their series would end on October 31, but, apparently as a result of our announcement, Chairman Khrushchev, on November 5, commented that the U.S.S.R. was prepared to extend their nuclear test program if the United States resumed tests in the atmosphere. Nehru, at that time in the United States, stated that a test ban treaty was of the utmost importance, but, "As a formal treaty takes time, we insist on some kind of voluntary suspension to bridge the gap." On November 6 the U.N. General Assembly approved a resolution asking for a ban on all tests and urging the conclusion of a test ban agreement. In a sense as a reply to Khrushchev, Kennedy, in a news conference on November 8, emphasized that if the U.S. learned that Russia had made advances in understanding high-altitude nuclear effects, commensurate U.S. action must be taken. On November 8 the General Assembly adopted a U.S.-U.K. resolution proposing renewal of the Geneva test ban talks. On November 13 the United States proposed to the U.S.S.R. that the Geneva Conference be resumed on November 28, and on November 21 the Russians agreed.

Task Force Plans

The first steps along the path of technical consolidation of plans came in a meeting in Albuquerque on November 30, 1961. At that meeting Ogle explained the organization he and Starbird planned, pointing out in particular that while there would be military task groups , there would be no technical task group, only task units. Support services including construction, engineering, operations, and management were to be handled by Reeves, probably as Task Group 8.5. There was a review of

the test program as it was then defined. (It had, of course, changed the day before, but the word had not gotten around yet.) The program discussed included four high-altitude shots from Johnston Island, probably using the Thor; eight airdrops and one, or possibly two, ground-based or ship-based shots for LASL; and eight to ten air-drops, two balloon shots, and one barge or ground shot for LRL. Both the Christmas Island and open sea operations were to be considered, and support requirements for Johnston, Maui, Midway, Kauai, and French Frigate Shoals were to be discussed. The report of the meeting sent to JTF-8 by Ogle is as follows:

The following is intended to be an outline of requirements and arrangements as they now appear to me. A great proportion of these represent agreements reached at a meeting today in ALOO attended by representatives of LRL, LASL, Sandia, EG&G, H&N, ALOO, and DASA (Albuquerque). I would appreciate your passing these on to the Naval and Air Deputies and appropriate members of the staff, in particular J-3 and J-4 and the Task unit commanders.

1. As a manner of operating, the above organization will be considered task units with the following task unit commanders:

   LRL--Bob Goeckermann
   LASL--H. Hoerlin (temporary appointment)
   Sandia--D. Shuster (temporary)

   EG&G will not appear as a task unit at this time, but will instead satisfy the technical requirements of LRL and LASL, under the operational control of the support task group (Reeves). These units have now been told (by me) to submit operational plans and requirements to the task force J-3 (Ted Parsons) for coordination. All other requirements (construction, communication, etc.) will be submitted to the support task group (Sam Howell). After the consolidation of requirements, that task group will then take the appropriate action, i.e., pass on to the headquarters for action, or procure itself.

2. After due consideration, it becomes clear that the programs of the laboratories may now be broken down into several categories which may be treated separately, as follows:
   a. Airdrops: Of the 25 shots now proposed, some 15 to 20 will be airdrops. Some of the instrumentation of these shots serves both LASL and LRL, and one drop site is sufficient. It also appears that the equipment required is such that it can be packaged in trailers or vans which then may be used either on ships, on Christmas, or on Johnston. Until the use of Christmas is approved, we must prepare to use the ocean. Thus, a first requirement is for these instrumentation ships. A small carrier and two sea-plane tenders, such as the Curtis are suggested. The loading of these ships would be as follows:

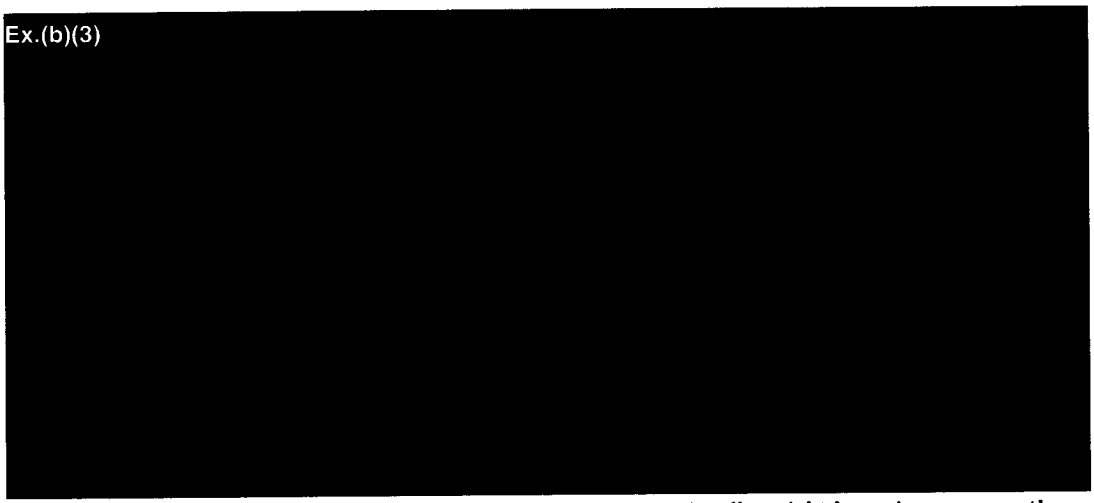
CURTIS	CVE	CURTIS PRIME
Photo trailer (EG&G)	8 LRL diagnostic trailers	584 Radar (Sandia)
Timing trailer (EG&G)	584 Radar (Sandia)	Alpha (Sandia)
Two LASL trailers (time interval)	Alpha (Sandia)	Tracking (Sandia)
	Tracking (Sandia)	Photo (EG&G)
	Timing (EG&G)	Timing (EG&G)
	Photo (EG&G)	
4 trailers	13 trailers	5 trailers

If Christmas is obtained, these trailers will then be used on land in three positions, and the diagnostic ships can be turned back. If Johnston is used, one, and possibly two, of the ships can be released. If we go to open sea, all are required. Since these ships should be loaded on the West Coast, I suggest that the latest date the ships should be available is February 1 on the West Coast. As a matter of backup, we should plan to use the presently instrumented C-130s and the instrumentation in the drop planes on all of these shots also. I should make it clear that the alternatives allowed above are not all equally desirable. In particular, because of accuracy and reliability, the technical fraternity would rate the comparative desirability of the several possibilities about as follows:

Christmas--very good Johnston--moderate Open sea--poor

b. There are several diagnostic shots for which air dropping is not desirable for various reasons, as follows:

Ex.(b)(3)



This shot could probably be done on land at Christmas, but operationally, might be easier on some other island. Since we are presently uncertain about Christmas, a United States owned island should be considered. Thus, I request that you immediately begin negotiations to obtain a position for this shot. Howland, Baker, Jarvis are possibilities. Jarvis is preferred because of its closeness to Christmas, which would allow the use of the airstrip for samplers. If we cannot obtain an island for this shot, we then will need a "shot ship," the use of which will allow a poorer measure of neutron flux and spectrum, but will not allow vulnerability experiments, etc.

(6) Spare "shot ships." We may need some extra floating shot points if there is trouble with some of the above shots, or if others appear. Perhaps 2 or 3 spares will do. A few comments on these shot ships may be in order. If we have Christmas, these shots would be fired at the same point as the airdrop target position. If we do not have Christmas, they will be done in the open sea using the three "diagnostic ships" for observation. Some of the diagnostics require space available only on ships the size of "Liberty Ships." Others could be done on smaller vessels, but in any case, they must be seaworthy. Anchoring systems for Christmas or sea anchors for open sea must be designed. Methods of getting people on and off in the open sea must be determined. I suggest that the Navy task group immediately get together with H&N (Sam Howell) to determine how these aims shall be accomplished. Some of the "shot ships" require considerable construction--collimators, vacuum pipes, assembly facilities, etc. The support task group is collecting the construction requirements for these, but that construction will probably have to be done in a shipyard somewhere, and time must be allowed to then get the ships to the shot point. They may have to be towed. Since some of the construction may be very time-consuming, a ship or so may have to be in the yard as early as January 1. Again, the Navy and support task groups should get together immediately on how to accomplish this construction.

c. Don Shuster is collecting, and will get to you very quickly, a set of statements similar to the above on the high-altitude atmospheric shots. However, some comments can be made now as follows:

(1) Assuming we use Johnston or that vicinity for firing the main missile, Sandia will fire instrument rockets from Midway, Kauai, and any island in the region of Christmas to which we have access for other purposes. These instrument rockets will be carriers for detectors furnished by LRL, LASL, and Sandia (and possibly DASA). Thus, any arrangements necessary for us to use Midway or Kauai for this purpose should begin soon. Some small construction may be necessary, but certainly trips by laboratory personnel to Midway and Kauai will be necessary very soon.

(2) Two ships which may be placed at intermediate positions as launching platforms for instrument rockets may be necessary. They would have to be more stable than, for instance, destroyers. I do not

suggest obtaining these ships now, because further thought on the experimental program may remove this requirement. However, it might be wise to keep this possible requirement in mind.

(3) Local timing signals on Johnston will be furnished in the normal fashion by EG&G. However, we must have an indication at Midway, Kauai, on the ships, and probably on Maui, that lift off has been achieved. This indicator should be accurate to a second or so. I suggest that J-3 get the armed forces communications people to satisfy this requirement. Obviously, if it turns out to be possible to fire the weapon missile at a prefixed time, then the time accuracy requirement of such a signal is reduced.

(4) Even without having the DOD requirements in our hands, it is clear that at least three instrumented aircraft for observation of the high-altitude shots are required. This instrumentation would observe photographically the expanding mass, take spectral measurements, observe cloud rise, etc. The instrumentation will be installed by LRL, LASL, Sandia--and I am sure the DOD will add some. Two planes would be close in, with the instruments looking almost vertically. One to observe cloud rise would be several hundred miles away. The main aim of these planes is to get above possible cloud layers. So it seems that KC-135s would be ideal, but if these cannot be obtained, C-130s might do, and for some purposes, even C-54s. I am sure the DASA will also put in a requirement for a plane or two to be at the conjugate point.

3. In summary, the requirements on us for special instrument carriers, etc., are in part as follows:

Naval

a. Three diagnostic ships. Requirement may be reduced depending on method of operation.

b. Shot Ships

Ex.(b)(3)

(5), (6), (7). Spares probably needed.

c. Targets--Radar reflector-carrying barges for drop plane to sight on. Discuss with Sam Howell and Air Task Group. May need an LSD or two for placement.

d. Instrument rocket ships. Possible requirement for two.

Air

a. Drop planes--it is to be noted that the requirement to be able to take off some devices from a remote field because of safety seems to have disappeared.

b. B-57 samplers.

c. Presently instrumented C-130s as backup for all airdrops. (Note that these planes are not configured to satisfy requirement on high-altitude shots.)

d. Instrumented planes (three) for high-altitude shots.

Other

a. U.S. shot island (Jarvis)

b. Long-distance time signal (Midway, etc.)

c. Permission to use Midway, Barking Sands (Kauai) for launching of instrument rockets.

4. Obviously, I have not attempted here to put together the more normal movements such as sample return, communications, transportation, etc. These will come to us through the normal channels.

Ogle, Shuster, Goeckermann, Strabala, Lieutenant Colonel C. R. Peterson of Field Command, DASA, Bill Adair of ALOO, and Bob Miller of ALOO discussed other aspects of the problem in a smaller meeting during the afternoon of November 30. (Don Shuster had by now agreed, after appreciable arm twisting by Ogle, to be the Assistant to the Scientific Deputy.) At that meeting, Ogle presented requirements that had been worked out between himself and Starbird, many of which are given in Tables XXXII through XXXVI).

TABLE XXXII
PROPOSED OVERSEAS SHOT PROGRAM
(Alternate Plan)

Assumptions: (1) Detonations begin April 1, 1962; complete June 30, 1962
(2) Limitations: 23 shots total
(3) Locations:
(a) High altitude-Johnston Island
(b) Off Johnston Island
(c) One or two shots off small island not yet identified

General Events and Sponsors

Ex.(b)(3)

Ex.(b)(3)

Further assignments were made. The AEC (Reeves), through EG&G, would be responsible for close-in, ground-to-ground, and timing signals. If feasible, the AEC would retain a ship-to-shore and long-range signal system, but would concede if necessary to the DOD. The AEC would assume responsibility for radiological safety, utilizing REECo. Holmes & Narver would collect the requirements. Bill Sanders would be responsible for support and any other duty agreed upon. ALOO would be responsible for construction and Bob Miller would have responsibility for planning and coordination and liaison with JTF, particularly with Ogle and Shuster. Pending the formal announcement of JTF-8 establishment, criteria would be furnished to H&N directly from the task units, and operational requirements would be forwarded directly to Colonel Parsons, JTF-8 Deputy for Operations.

On the same day, November 30, at Vandenberg Air Force Base, representatives of AEC, Douglas Aircraft, Sandia Corporation, and H&N discussed ground facilities required for the Thor missiles at Johnston Island. Determinations were made concerning a similar launch facility already at Johnston Island, and initial criteria were presented for shop facilities and other support of the launch facility. H&N was authorized to provide a survey crew and to make "as-built" surveys of critical areas.

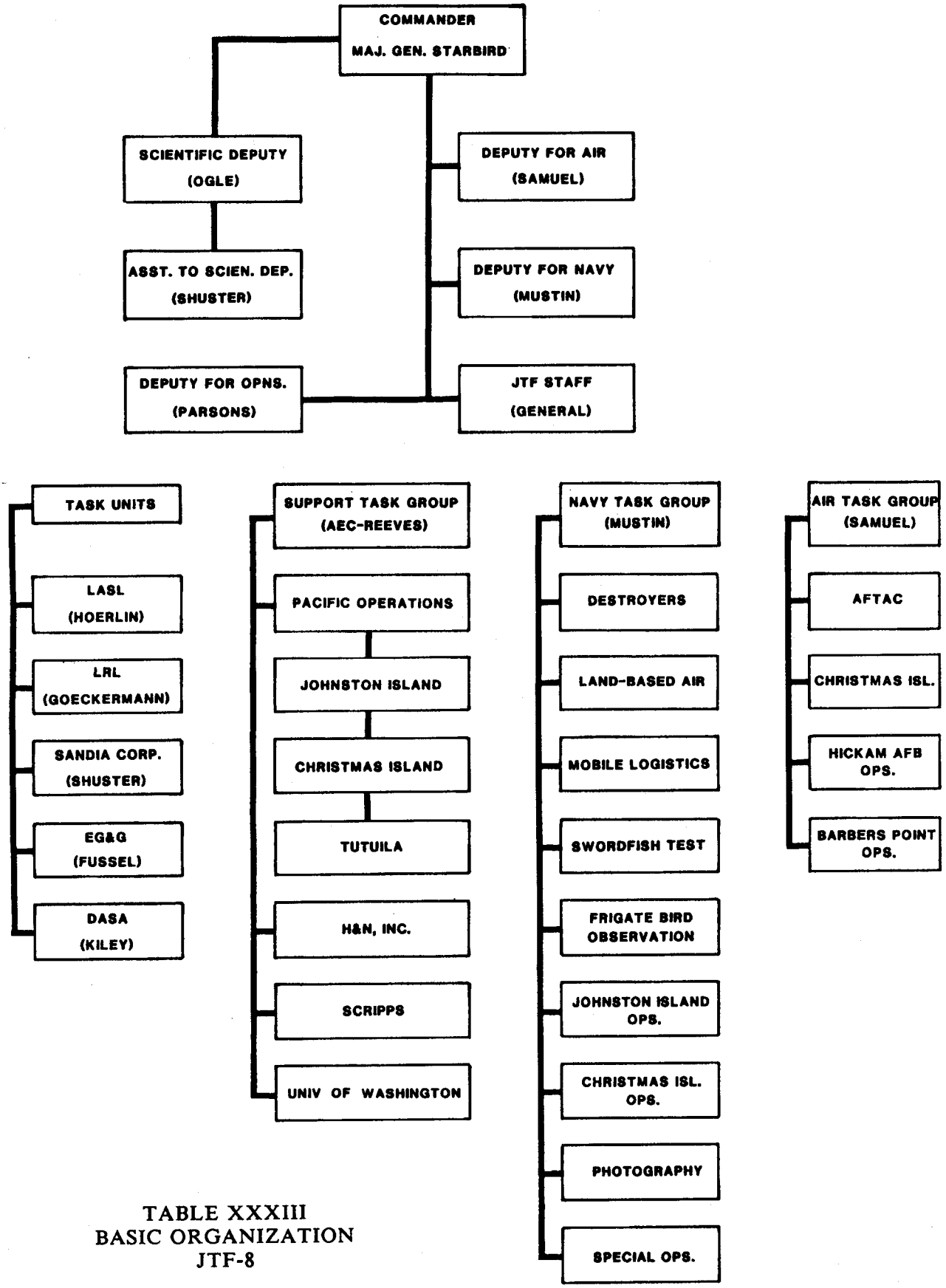


TABLE XXXIII
BASIC ORGANIZATION
JTF-8

TABLE XXXIV
SHIP AND OTHER SEA REQUIREMENTS

Three Diagnostic Ships
- U.S.S. Curtis
- CVE
- U.S.S. Albemarle

Five Target Ships (Liberty Type)

Ex.(b)(3) [redacted] Propose to find small island; however, could detonate on ship.

Range Stations:	2 Ships for Intermediate Range Stations
Rocket Ships:	2 Rocket Ships CCVE or Equivalent
Target Barges:	30
Air-Sea:	Nose Cone Recovery Capability for High-Altitude Shots

TABLE XXXV
TRAILER LOADING OF SHIPS

U.S.S. Curtis	CVE	U.S.S. Albemarle
1 Trailer Photo (EG&G)	8 Trailers (LRL)	1 Trailer Radar 584 (SC)
1 Trailer Timing (EG&G)	1 Trailer Radar 584 (SC)	1 Trailer Alpha (EG&G)
1 Trailer (LASL)	1 Trailer Alpha (EG&G)	1 Trailer Tracking (SC)
1 Trailer (EM) (LASL)	1 Trailer Tracking Mount (SC)	1 Trailer Photo (EG&G)
	1 Trailer Photo (EG&G)	1 Trailer Timing (EG&G)
	1 Trailer Timing (EG&G)	

Note: H&N to be responsible for furnishing power supply of technical programs aboard ships.

TABLE XXXVI
LAND USE REQUIREMENTS FOR HIGH-ALTITUDE SHOTS

Maui:	Camera shelter--12 cameras; 3 spectrographs; weather.
Kauai:	20 cameras; documentary photo, rocket firings (50 people).
Midway:	4 cameras; documentary photo (10 people).
Johnston:	Rebuild Hardtack II facilities; photostations, launch pad, 4 rocket launchers (75-100 technical people and support).
French Frigate:	Photo (5 people).
Palmyra:	Additional rocket sites probable.
Christmas:	Additional rocket sites probable.

AIR REQUIREMENTS

Drop aircraft plus 2 C-130s required for all shots. (Drop aircraft cameras may be used as backup on high-altitude shots.)
B-57 Samplers: Now estimated at 6 operational including controller; based upon sampling 2 shots on 2 successive days at 2 geographically separated locations.
2 high-altitude (above cloud) aircraft. (Mission not defined.)