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16 January 1957

SUBJECT: UCRL's Proposal on TAONGI (U)

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TO: Distribution

1. A conference was held on 3 January 1957 relative to the employment of Taongi Atoll as a shot site in the EPG.

2. The following persons attended:

G. L. Felt, CTG 7.1
W. D. Gibbins, UCRL
J. B. Sanders, ALOO
D. Curry, Jr., LASL
A. W. Kelly, LASL
R. H. Campbell, LASL
R. J. Van Gemert, LASL
E. A. Lucke, LASL
R. H. Gattis, LASL

3. Following is an edited transcription of the conference.

FELT: Walter, would you expand somewhat on the UCRL conception of the scope of operation HARDTACK. I have given my impression of that, gathered from conversations with you, Jerry Johnson, Harry Keller and Vay Shelton. We had a short session yesterday morning in which I elaborated on that paper you just read (Felt's Memorandum). We concluded that the first thing we should do this morning is ask you to go into some detail on two things. First, what you have done to date and second, what is your concept of how Taongi should be integrated to meet the requirements of UCRL, so far as the utilization is concerned.

GIBBINS: The best place to start is with what has been done. Originally, we took it upon ourselves to study the feasibility of using Taongi as a firing site. The information concerning the place geographically and weather wise is quite meager. Weather information, from the mean daily hodograph,

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~~MILITARY RESEARCH & APPL.~~ Hardtack

is available. We had decided to carry on this feasibility study in the following order: first, how do you gain access to the atoll in the beginning to stage an operation; secondly, what sort of firing do you do there and with what sort of instrumentation, and third, the question of airstrip and semi-permanent camp facilities versus no airstrip and no camp.

We accepted from the beginning that the best concept would be one of remote diagnostics and remote firing of devices from a ship. Barge firing sites would be selected in the northern end of the lagoon in the most strategic locations to produce a better anchorage. The first shot would be fired to give a break-through in the reef and later shots would be stepped in to improve the anchorage. The Task Force and the Navy supplied us with Hydrographic Office survey work-sheets and pictures. Scripps has looked into the permanence of the sand islands, if the reef is breeched, and the exchange of water in the lagoon to determine the feasibility of setting off one shot and then going back in five days to set another one just off the edge of that crater. Nothing is known about the currents and we felt that this was pertinent information and wanted to start a marine survey. Thayer's program of deep-water shots in HARDTACK involves sending two vessels out to the Forward Area to make some soundings, so we talked to the Task Force about including five Scripps people in the second one of these two trips, but the necessary money was not made available. Gaelen and I put the question to the AEC and apparently the feeling was that we should have been working with the AEC all the time. So the way the thing stands now, I think we can go ahead and write this feasibility study leaving out two of the most important answers; first, how soon can you get back in there after the first shot and secondly, the fe

sibility of opening up the channel and gaining access to the lagoon.

We contacted Admiral Pride at San Diego for advise on type of ship available for diagnostics work. While we were there we also raised the question of bombing a channel into the lagoon and he threw his hands up at this. We called on CDR Fane, who is commanding officer of the Underwater Demolition Teams, and he was quite optimistic about being able to open the channel for LCU access. At the suggestion of Fane and Isaacs, we requested of JTF that one officer and two enlisted men go along with the Thayer expedition to Taongi for the purpose of inspecting landing beaches that the Navy would be willing to use for firing some test shots in the coral in the narrow passage. No funds have been made available for this survey.

FELT: Did Jerry talk to Starbird?

GIBBINS: I think he did not.

FELT: After we came back, I called and told him that I got an answer from Musick.

GIBBINS: I think he talked only to Musick.

FELT: You don't know what happened there?

GIBBINS: No I don't, except that he had apoligized for not having kept us informed.

FELT: Jerry said when I talked to him, that he thought that he had kept Starbird informed of what we were doing here, and pointed out to him that he had not since seen a copy of that letter.

GIBBINS: That's right, and that was a mistake.

FELT: But Jim Reeves had sent one, he made a photostat of the copy he got and sent it on to him. I gave him my impression that Starbird was a little bit piqued at being left out. I suggested that he get ahold of Starbird and argue the case with him. You say that you think he talked to Musick, but just not to Starbird.

GIBBINS: Johnson will be in Washington this week.

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FELT: Is he going to see Starbird?

GIBBINS: Yes. Well as far as the concept of operation is concerned, we feel that the shots that we would put up there, which would be four or five barge shots, could be diagnosed remotely from a ship, by using fireball cameras, high speed cameras for Teller-time interval and no hot spot. These measurements would be backed up by electromagnetic time interval and radio chemical yield. A preferred method of operation would be to build stations ashore at this time, however, we feel that for the shots we have planned the diagnostics could be done from aboard ship. If semi-permanent facilities are to be built, an APL type living barge could be moved into the lagoon. H&N estimate for outfitting and putting it ashore would be $250,000. This would give accomodations for 175 men which is adequate to start any job. H&N feels that this could be accomplished using LCU's. Admiral Wellings, however, does not feel very confident of being able to move a shot barge or the APL barge into position unless he could use ATF's in the lagoon. Sam says he can do it with M Boats, and I believe he can. We realize, that even though you widen the channel, you are not going to effect the current in there, and you would have to move this thing in wise like, and in the absence of the strong westerly swells which they do get very often.

No firm design work has been done on mounting the diagnostics on a ship. People are just getting started on that now. So I am not prepared to say that this is a reasonable way to do it, and we might end up with stations ashore. My feeling is that we probably will not be able to build any major stations ashore and have Taongi approved as far as the Commission is concerned, just because of the financial outlook.

CURRY: Even if the ship couldn't be ready or wouldn't work, you would still want to use Taongi for HARDTACK, is that right?

GIBBINS: Yes.

FELT: Now let me ask you a question. Is your feeling about an instrumented ship based on the idea that this is a appreciably less expensive way to do it although it is probably not quite so satisfactory as putting in a shore installation of some kind? Is that the reason for associating a ship with this thing? My impression would be that it would be better (and we don't know how much more expensive), as far as HARDTACK is concerned to put in the shore installation. That way you know you can do the instrumentation. There is a question about whether you can get a ship released for this purpose.

GIBBINS: Well, there are two things, first we feel that the installation on the ship would be less expensive than the building of a major alpha station and a fast photo station.

FELT: Yes, but suppose you leave the alpha measurement out since you intend to leave that out anyway.

GIBBINS: Excuse me, I left out Wouters important optical experiment. He is using this optical system for reaction history.

FELT: Using which optical system?

GIBBINS: The thing that they are using in Nevada.

FELT: Is he going to do that from a ship?

GIBBINS: Yes. They are thinking about it. We think that this is difficult, it may not be, but if we went ashore to build a fast photo station I know that they would want to.

FELT: Well, the thing is, its quite possible and its one of the things that perhaps we can develop some firm opinions on, that if you develop the atoll at all, the investment will be pretty heavy to begin with and the addition of one or two major instrument stations, lets call them, would not change it by a factor of two or three or something like that at all. We would

only increase the cost five or ten percent. Now I don't know, but I think that this is one of the things that perhaps in the next week or two we can pinpoint somewhat more exactly, and I think that this is one of the reasons that Joe wanted to come up today.

GIBBINS: It seems to me that the most important thing to determine is that what we are looking for really, is to try and shorten the operation, and we believe it can be done by using Taongi.

LUCKE: Is that based on not using Bikini?

GIBBINS: No. We use Bikini for small shots. There may be some intermediate yields that could go at Bikini nicely to be fired at Bikini at almost any time. The combined disadvantage of protecting Eniwetok and worrying about the repatriated natives and trying to fire the major portion of the barge shots at Bikini points out a real advantage of going to Taongi. The concept of operation of not building major stations ashore is based on this flat pattern concept that we talked to you about when we started off expecting fallout. To take advantage of Taongi's meteorological advantage you need to fire in this flat pattern because it is the stable one there, and it is the one which comes most often as we know. So this is why I say, I think the first point to determine for sure is that there is a real advantage as far as firing frequency is concerned.

FELT: Yes, weather wise. This aspect is something that must come out of the Weather Office.

GIBBINS: So we need Rex's report.

FELT: You see for our purpose, we simply assume that there is an advantage.

GIBBINS: We are too, but also in this assumption, you consider that you use the flat pattern and this gives you a lot of trouble on recovery, particularly at that atoll. Access back into it is not, nor ever be, as free as Bikini.

FELT: Well, that isn't terribly obvious. That is if you visualize an installation like Fox, you can't work out doors but if you have big buildings they are not too difficult to operate out of.

GIBBINS: I agree, if you develop Taongi like Bikini is developed, then there is no problem on recovery.

RHC: Being a little optimistic, lets say that if your diagnostics from the ship proves feasible, and at the moment I don't see how this can happen on a couple of experiments, what can you visualize ashore on Taongi except the barge.

GIBBINS: The only thing I know of would be some telemetering repeater stations.

RHC: No airstrip?

GIBBINS: I don't see why. Some people have better ideas about that than I do as far as safety is concerned, which would be the main reason for going in there with it. If you use this afloat operation principle then certainly the airstrip falls into that category because the concept of firing the shot would be to leave Eniwetok or Bikini with the barge in an LSD and take it in there with M-boats or LCUs required, to get the thing in position and wait for the word to fire.

RHC: Your repeater station, or stations might be combined to end up like Station 70 on Nan.

GIBBINS: Well I wouldn't visualize such a major structure as that.

RHC: You would almost certainly have to be in there during the shot, and shielding and reinforcement would have to be fairly heavy.

FELT: It would not be so much floor area.

GIBBINS: That is just what I am thinking of, you would need the same shielding.

RHC: It might house the communication link as Station 70 does and would probably require the tower. Sandia has had trouble in the past getting line of sight from the barges in the vicinity of Yurochi. You are talking about

a small structure to start your firing link, your telemetering links and your communications, plus probably some sort of elevated platform or platforms on which to put your repeating antenna.

UNK: Have you ever thought just how much quicker we could have gotten rid of REDWING had we had Taongi and your plan for using it. It seems to me it would be a good justification.

GIBBINS: That's right. That would be a part of this report.

UNK: You visualize HARDTACK to be the size of REDWING.

GIBBINS: There again the major consideration would be weather. In spite of the fact that the statement is made that we always fire just as if the natives were on Rongerik and Rongelap because we didn't want to lay any stuff down over there knowing that they would come back some day, I don't buy that arguement, I don't think thats true. I think that whenever the weather people make the statement in answer to the question will there be any fallout on Rongerik and Rongelap, at least on REDWING they said there should be none and to go ahead and fire. If there were natives there, they would say are you sure? There is a difference.

CURRY: Do you feel you will still save time even though this operation were completely based afloat, with no airstrip, no helicopters nothing but boats?

GIBBINS: Right. Because I think that we should be able to maintain a five day firing frequency at Taongi.

LUCKE: Do you think your personnel could live with say a forty hour trip from Eniwetok?

GIBBINS: Yessir, yessir, on the right ship.

LUCKE: Well, as I see it, you would have to have an APL up there to eliminate this necessity of ship to shore movement daily of personnel. And your instrumented ship, whatever it might be, say the CURTISS or something else, of course could not be moored but would have to be steaming all the time

FELT: That's right.

LUCKE: And it would have to refuel, so your APL would be your method by which you would eliminate this tremendous ship to shore movement.

GIBBINS: The way we see this operation, Al, there wouldn't be any tremendous ship to shore movement except those people directly connected with the barge and directly connected with whatever might be housed in this firing station.

CURRY: You would have to get the APL out of there before the first shot.

GIBBINS: That's right.

LUCKE: When you bring up the shot barge on an LSD you would have to leave it there to mother the APL.

GIBBINS: Maybe I should have let this APL thing go. If we are not going to go to major stations ashore, I see no reason why the APL has to come back in after the first shot is fired. You take it out before the first shot, and it stays out.

RHC: That is just like loosing your camp on George.

GIBBINS: That's right. And I am still making the statement that we preserve this five day firing capability.

FELT: Most of the personnel would live on the ship.

SANDERS: Didn't we have a floating camp in this deal somewhere?

GIBBINS: That is the APL and I am not convinced we need it, if we are not going to build major stations ashore.

FELT: It is not clear to me that we would need it, even if we did build major stations ashore.

RHC: That's hard to do, Joe.

SANDERS: Well, it could be.

RHC: You have got to start from your warehouse, your maintenance of heavy equipment, there are a few things besides tents and mess halls, and a PX and things like that which are kind of hard to put on an APL.

SANDERS: Well, we would still have tents and that sort of thing, but maybe we could cut down on the size of them.

RHC: You mean the tents.

SANDERS: Yes.

GIBBINS: Yes, I agree with you, Bob, we are not going to cut down on the size of the work ashore unless we cut down on the number of stations that go ashore.

RHC: Do you have any feelings on the time scale on this investigation of diagnostics by ship?

GIBBINS: Woodward, Wouters, Keller and Norm Hansen are looking at it, now. I have not talked to Grier. And Rex is working up this weather. We had hoped to have the results at the morning survey. Then we want to put the whole thing in a package. We hope to get this done by the first of February.

CURRY: When does Rex expect to have the weather done, Gibby?

GIBBINS: He is supposed to have it in by the 15th of January.

SANDERS: Is everything you need available?

GIBBINS: What do you mean by that question?

SANDERS: I mean the information we need, that Rex needs. Is he compiling it or is he trying to?

GIBBINS: Well, he has got all the data that exists.

SANDERS: That's what I'm asking. Does enough exist?

GIBBINS: They had worked this thing up before REDWING when they were considering Taongi as a weather station before, but the study got misplaced. He is repeating this business in a different light, as a firing site, giving the average mean hodograph from what data they have available.

FELT: I don't think that we know the answer to your question.

SANDERS: Well, I don't know.

FELT: I think if you ask the weather guy they would say that the information they had in existence is not adequate to make a really good estimate, but they're analysing the available data to try and determine what the flow at various levels is at Taongi. This is an interpolation business. They don't have any observations there. So there are several sources of error. First, there would be error, in the observations they do have, but more important than that is the error in analysis, the uncertainty in analysis when they make up the weather map. They will get something out of it, but I think they would say that it isn't very good. On the other hand, it may be adequate, I don't know what their intentions would be on that and I don't think anyone else does. I know that if they could, they would like to get on-site data as another observation point. During this coming year, set up a weather station there and probably reactivate many of the other weather station during the test operations in order to make the analysis. I don't expect they will have that out there, but it may be enough to evaluate the firing frequency. I think it is quite unlikely that they will discover that the firing frequency up there is appreciably lower than it is at Bikini. I think they will end up with a conclusion that it is about the same. If it is, then that is probably good enough. That's just speculation.

GIBBINS: It should be better.

FELT: Maybe, maybe not. It will be hard to demonstrate that it is better, it will be easy to demonstrate that it is just as good, but it would not be of any great advantage if it's a lot better, because the firing frequency at Bikini isn't bad. Even under the restrictions that we imposed on REDWING. Better probably than you could make on an operational basis. Of course, having it better than that is to your advantage which means you don't hit the valleys.

GIBBINS: You think the firing frequency at Bikini is the same with the natives back in?

FELT: I think so.

SANDERS: Do you have a figure for that?

FELT: I don't know what it is exactly, but it is probably something like five.

SANDERS: Let me ask this question, Walt. If you can prove, or back up, a five day firing interval at Taongi, can you prove the thing to be economical.

GIBBINS: Yes.

SANDERS: Development and everything -- do you think we can?

GIBBINS: Yes. Because if you fire large shots at Eniwetok and don't fire any large shots at Bikini because of the restriction which was mentioned her in assumption two. Under assumption three, Bikini is completely inactive because of Commission restrictions.

FELT: The way these things are graded, the advantage of Taongi increases as you go from one to three in here.

GIBBINS: Yes, that's right.

FELT: Under condition three, I think the advantage is quite obvious. Under condition three, what that amounts to is simply shutting down Bikini entirely and then its clear that firing the whole series at Eniwetok is almost impossible. Under condition two, where you use Bikini for small shots, here again the advantage of using Taongi is pretty easy to demonstrate. Suppose you take eight megaton range shots or something like that, you can split them in part between Eniwetok and Taongi, so there is a distinctive advantage there. If you were still using Bikini for some large shots, then the advantage is really quite preferable on the basis of time versus the cost of development. Then it was on the basis of this kind of argument that I suggested that the approach be divided into these categories, so we could just see what each one of them looked like individually to see what the costs are along side the advantages. In savings of time and

what not, and bearing in mind as much as we can imagine of the operational aspect of this thing, too. I think that the five day frequency under some circumstances is probably a little tight, operationally, not weather-wise perhaps, but we will just assume that the weather is all right, and not worry about that, someone else is doing that. But now there is a forty hour haul for an LSD from the assembly building on Eniwetok. We can cut that down if we want to spend the money to put in an assembly installation at Bikini. But I think we cut the time perhaps from forty hours down to thirty hours. Alright, that's something, but against that is, what, $200,000 to put in an assembly installation at Bikini? Is that worth it? I don't know. Forty hours is a good time under normal circumstances. There are times when the trades are pretty brisk, and this might be worth the forty hours haul up there, you would be going up wind all the way, what do we know about that? Well, we don't know much about it, but maybe Dan, in their weather study will be able to make some estimates on the state of the sea. The unknown subject is probably feeding a barge through the channel. If it has to be timed with high slack water, then there must be some average delay resulting from that. I don't know what it is. Maybe there is, maybe there isn't, but it's probably under Simpson's consideration. The mooring of the barge is something we understand fairly well for the areas we have used. We can make pretty good estimates. What the situation will be at Taongi, we are just going to have to guess. Under the conditions proposed for testing, it's pretty clear that you do not require high precision in the moorings. This saves you something, I don't know how much it is. If you are trying to moor in a crater which is breached through to the open sea, the state of the water in there is probably not quite so pleasant as it is in the sheltered Fox-George region. Despite the fact that you don't need precision, it may be a little bit harder to put down successful moorings that will hold the barge moderately well. On the

other hand, if you go inside Taongi Atoll, it may be as Walter suggests, that the exchange rate of the water is such that you have to let the place sit for a while before you can get in. That's from a radiological viewpoint. There may be a day or two lost in there. How much time we will need for dry running, I don't know. By changing the firing systems, you can probably dry run the systems successfully at Eniwetok or Bikini, wherever you do the assembly and don't have to dry run your equipment on the site. I would guess that the experimental people, and the weapons people would probably not give up all dry running, but they would probably not insist on three or four days dry running or something like that.

GIBBINS: Well, they have to aboard ship.

FELT: Yes, I think they could. I don't know what devices you are talking about, and I would guess that some of them at least are going to have to have pressure runs on pressurized boosters and primaries and things like that. Maybe not, but the chances are good they will. So, five days is pretty tight operationally, I would think.

CURRY: There's another out about which we don't know much and maybe their study will show something, and maybe it won't. That is, how soon can you unload the LSD, do you have to wait on the average of a couple of days to get the sea calm enough to unload?

GIBBINS: You're speaking now of the northwest swell?

CURRY: Yes.

GIBBINS: Through the months of April, May and June, the average days each month when the northwest swell is running -- I've forgotten -- well, the swell would be considered more than just the small swell for five days, but it increases through the other months to something like 17 or 18 days a month, later on in November. Now, how much trouble this would cause is dependent on

where you go with the first shot and how much of the reef is breached.

CURRY: And whether you could get inside with the LSD.

GIBBINS: Yes.

CURRY: Is Isaacs prepared to hazard any guess about the exchange rate, if he is not able to make the survey? Does he have any feelings about that?

GIBBINS: Well, all I can say about that is that -- oh, one more thing. I had better go into this part of it, too. In connection with this business of what happens when you breach the reef, in view of the fact that you want to stay out to the edge of that crater before you step over it and block the edge of it inside with a second shot. We explored, in a very preliminary way with the Richmond University Field Station, the feasibility of a model study. We asked them these questions: Do they feel that any information could be obtained from model study? Could you make a model accurate enough to give you any facts or information? Off hand, they wouldn't answer the questions. They said that they would not guarantee anything. They recognize that this vertical mixing thing is a hard thing to dig up without knowing anything about the conch. But when we told them that there was a marine survey being contemplated, they asked us to be able to put one man at work on making a feasibility study of the feasibility of a model. Which is the right way to approach it, believe me, and we agreed that this was all right. The Laboratory is willing to pay for this one guy. Isaacs had requested that after the marine survey, they get a photo survey of Taongi up to date and when we started talking to the people at the Richmond Field Station, they said they would like to have this survey made before Isaacs goes out so that if there are any points of information that Isaacs could pick up for them, that they could discover from the photo survey, they could do it at that time. So, we asked the Task Force to get such a survey, and they have started that. Whether they can get it to us in color or not

we don't know. Now, from those pictures, in which we asked for second hand timing to appear in the shots as they are taken with 60% overlap along the run and 30% on the sides, they can tell something about current movements from the foam patches, but that's all the current information they will have across the reef. So, it's a sketchy thing to go on without actually measuring it, and you won't know anything about the vertical measurement.

RHC: Is this a stereo lapping?

GIBBINS: Yes.

SANDERS: I have a hard time visualising a test without an airstrip somewhere. It seems to me that you are going to tie up a lot of people for a long time.

FELT: Well, we talked yesterday and I told those present what I understood of your needs. We discussed the whole thing from a somewhat more general point of view, trying to consider what needs would arise from the requirements placed on other task groups by 7.1 to support test operations in the area. One of the major subjects that we discussed was the question of an airstrip. We felt that the chances were quite good that there will be very strong pressure arising out of 7.4 to put in an airstrip there. Their justification would be an emergency landing strip. This we intend to explore with 7.4 and find out just how strongly they feel about it. They have felt quite strongly about it before and they even went to the extent of asking to have a barricade put on Engebi, for example, and we put out pots on the Eninman airstrip, and we put a barricade up over there at Enyu, and so forth. Our hunch is that 7.4 would push pretty hard to put in some kind of emergency airstrip up there. That was the first thing. The second thing we talked about was Holmes & Narver's methods of operation. While they could successfully get along up there without an airstrip, I nevertheless felt that if you got down into the H&N working level and asked them how they felt about it, they would develop fairly strong arguments

why they should have one in order to provide the support that they would be obliged to provide to you. An awful lot of material and equipment gets shuttled back and forth, and I think that if they were asked how they would go about supporting a test operation up there, they would arrive at the conclusion that an airstrip is extremely valuable. I feel that they would be able to cut down their investment in new materials and still be able to guarantee the support capability by being able to shuttle parts and people back and forth.

GIBBINS: I disagree. It depends upon the number of stations you build ashore.

RHC: Well, let's leave materials out of it. I can remember a number of occasions on CASTLE and REDWING when it got pretty important to make a medical evacuation from Bikini to Eniwetok.

GIBBINS: I already made the statement that if you decide to base the airstrip on the factor of safety alone, I would agree.

FELT: We weren't trying to say that you couldn't conduct an operation without an airstrip up there. What we were saying, or doing, was looking at the way operations have been conducted, and trying to decide from our own point of view whether it was reasonable to assume that if the place was developed, if pressure would be sufficient that an airstrip would be put in anyway, whether it was asked for by you, or us or anybody else.

GIBBINS: Well, that might be, but we are not asking for it.

FELT: Yes, but despite the fact that you didn't ask for it for UCRL operations, there would be enough pressure for it anyway. So, it would be a fair assumption for planning purposes, at least in one category of the planning, that an airstrip would be put in, and we were exploring the implications of what the general idea for developing the place would be, on the basis that there was an airstrip. We also felt that if you put an airstrip in, you also hope that you can use the thing after you begin to shoot up there and that perhaps

you should arrange to pick a firing location to improve that likelihood. This is just a question of following up implications in a more or less general manner. We also explored the implications of putting in one or more stations and I think that my feeling on this was based on the feeling that we should do this, that we had to do this, and that the value of Taongi as an operations site should not be based on your being able to get a remote instrumentation ship. Either Taongi is useful or it isn't useful. And if it is useful, how do we use it without the whole thing depending on some other questions or assumptions. You can develop a method of operating up there which is based on your getting the ship and your proving out the instrumentation, but while you can do this, I don't think you should base the usefulness of the place on those two things. So we decided that we should consider what would be necessary if you did not have the ship and we had to put the necessary instrumentation ashore. Having tossed it around, we decided in any event there would have to be something ashore up there to house communications. Now you would say that this was not necessary because you have the ship. The argument against this was that you're going to have H&N support people working up there quite a ways in advance of the time you'll have operational communication facilities up there. So, the feeling was that having to have high frequency radio circuits, you'll probably have to put in teletype. Chances are, you'd better put this in in such a way that you can use it after the first shot, although this is not absolutely necessary. This leads you to believe that you're going to have something, not like Station 70, not quite so elaborate, but something that is a communications center. The thing is that this is not something required by 7.1, but H&N is going to need it. So, we've got something there already. Then I mentioned the likelihood of having a telemetering relay station. Now, there's a little more building required. So you've got an airstrip and one

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building. Then, if you don't get the ship, you will probably have to have one more building, possibly two. Now you are beginning to get something that looks like the Fox-George complex.

GIBBINS: That is right.

FELT: Alright, there you are.

GIBBINS: You have to protect the data, you have to have blast doors for the cameras.

FELT: That is right. You have the airstrip and you hope that you may be able to keep the airstrip, but you do not count on it. You have to plan the operation so that you are not using it for shuttle aircraft or something like that. But if you are going to use it for an emergency strip and it is justified on that basis, then it should be possible to get the thing in condition to meet that requirement, which is basic to all operations in the area. Then, you have got to have at least one piece of grading machinery. You have got to have fuel service for it, probably, so that you can get in there and scrape the thing off again after you have used the site. If the airstrip is basic to air operations in the area, and we have already assumed that the Air Force has pushed the thing, then this leads you to say that you had better put the shot in such a place so that you can probably at least get in there and patch up the strip.

GIBBINS: That leads you to put it up at the north end someplace.

FELT: Still you haven't said anything about whether it is on the reef or whether it is inside.

LUCKE: I don't think you could ever fix that lagoon, say, to get in an LST, which draws 14 or 15 feet.

KELLY: It would be expensive, but it could be done.

GIBBINS: You mean without a nuclear shot.

LUCKE: Another thing that bothers me, you mentioned in your study and I realize that

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you have got to have this survey to determine this water exchange and things like that. But looking back on some of the barge shots at Bikini, shot over at Tare and the APACHE shot over at Mike, as to what it did to the water, where you did have exchange of water in the lagoon. It seems to me that it is going to be days before you can take in an M-Boat or a shot barge where your readings even on the barge are permissible for personnel.

GIBBINS: Why do you say that?

LUCKE: Well, take up in the Mike crater where you'd have quite a good exchange. That water was hot to a point where you couldn't take anything up there for about three or four days. In fact, when we went up there with the copter still taking our readings after four days, we went around it because we were getting readings of something like 1500 mr.

GIBBINS: Then in making this statement you have taken into account the shallowness of the lagoon at Taongi.

LUCKE: As a layman, I don't know whether that would increase it or decrease it.

GIBBINS: We don't either.

KELLY: It looks sort of like a bathtub because there are no outlets or inlets, and the exchange may be pretty slow.

GIBBINS: You have to breach the lagoon on the far side, or you're not going to do anything else in there for three months.

FELT: Yes, you can, if you are not doing it inside the lagoon.

LUCKE: If you do that, you have to go to a shore establishment.

REC: That's the thing that I'm trying to establish, that there has to be something ashore. Herb didn't have any more room than he needed for his firing circuits. I think we are talking about something like Station 70, and this is a sizeable job, so you would have to move something in there and before long, you find that you've got quite a bit of equipment tied up just to build one building. Even if you leave out the airstrip and just have the repeater station, you've

still got quite a bit of a problem with construction. We told Holmes & Narver on REDWING, and I think you were aware of this, that in the Fox region we did not require a camp. We would ask all our people with their instrumentation, early calibration, and all the pre-shot stuff to live off-shore on these houseboats. We asked Holmes & Narver to make a small addition to the back of the alpha station in addition to the power shelter to replace the one we blew away on CASTLE. We asked them to build one telemeter in front of the station. This was the major heavy construction on that chain of islands, and they found it justified, for the people going back and forth from Kan, in order to save time, to construct a 125 man camp on Fox. That camp for 125 men was put in for H&N on their justification alone.

FELT: Well, I think you're being a little unfair. It wasn't just the work on the alpha station, it was the man-made islands.

GIBBINS: Okay, but what's the point?

RIC: What I'm saying is that to build something like Station 70, ashore there, I suspect H&N would follow the same argument again.

GIBBINS: Sam has not made that statement.

RIC: No, I know he hasn't.

GIBBINS: He has said, that with LCU access, he would build anything in there we wanted. Now I realize he's hitching on a little hidden addendum there - given enough time. But he can bring in a batch plant without an LST, for instance.

RIC: Sure, but at the moment he doesn't have a batch plant. We're shuttling one between Eniwetok and Bikini, at the moment. If we'd had a big construction program at Bikini that would have taken a lot of time, we'd have been in a fix. This would mean to Joe, I think, that rather than try and stretch his batch plant over two atolls, which was a little bit difficult, although he did a good job of it, but to do this over three atolls, with Taongi as far away as it is, it would mean we'd either

have to get an awful early start on this, or actually duplicate some of the equipment [redacted] now has.

SANDERS: During that management meeting, it came out that Sam thinks he's spread pretty thin even without Taongi.

RHC: Well, what I'm saying is, that if you build one facility up there, and try to do it over the usual time scales, you're probably have to build some facilities ashore. You can leave a lot of things out, like the mess halls, the PX, etc., but you're still probably going to have to have the basic shops and maintenance support. So even without an air-strip, you've got quite a bit of construction in there.

GIBBINS: Did you talk to Sam about this APL?

RHC: No, I didn't.

GIBBINS: You'd better do that, because he's included shops in that.

SANDERS: That's right, there are shops in that thing.

GIBBINS: You can put the power generators and the distillation equipment ashore.

RHC: The people around here haven't looked at this thing in any great detail, until the last few weeks, and yesterday, of course, we all got together. I think the next step is for me to ask the question of whether 7.5 can do it, more or less legally.

GIBBINS: Well, I think we should.

SANDERS: If we are going to go in there and prove the thing to be feasible, we have got to recognize what we have to have, and I don't know if this sounds a little bit too simplified, if we go up there with a boat and a barge.

FELT: Look, I think from Walter's point of view, so far as weapons and experimentation, there is a way in which it can be done without doing very much ashore. The thing that I'm afraid of is that there, are hidden in this scheme, services which will develop that will be put on other people which will lead to a somewhat more elaborate installation than that which

is required for weapons testing purposes alone. If you say that this is true, that there will be a somewhat more elaborate installation, then you would try to guess what it would look like, then its very much to our advantage to go one step further and say, well, how do we make more effective use of the area up there considering what other people are going to need anyway even the support with a less elaborate thing than you have been talking about. I am not suggesting here that that means you guys, your diagnostic people of Livermore, should go all out with high collimated experiments and what not. I'll take your experimental plans as you propose it and consider how it gets done up there, in the light of what other people are likely to put in there anyhow. The other thing is this. In the breakdown here, try to put some sort of quantitative estimate of the relative importance of the three catagories, and I think that you would find the following. If Taongi is an extention of the existing facilities and there are no required changes in the operating procedures at Eniwetok or Bikini, then there are perhaps desirable features, but it probably is not economically justifiable to develop the facilities at Taongi; now maybe it is and maybe it isn't, but we ought to take a little closer look at that thing. In the second circumstance where you are restricted at Bikini, then Taongi becomes really quite desirable in that it is an alternate firing site for large shots and it is approaching a necessary installation. In the third situation where you do not have Bikini at all, then Taongi becomes absolutely necessary under the initial assumption that we made and if the program looks as it appears to look. If you do not get Taongi and you loose Bikini too, then you have only two alternatives; one, is that you cut the program, and the other is; well, you say that the program is going to last six or eight months, and that's it.

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GIBBINS: What we are really trying to do is answer those questions?

FELT: No, some of them we do not have to answer. We don't have to answer the question, we just have to make the basic assumption. In the third category where you do not have Bikini at all, then you say this, you say well, Taongi is very necessary to us under this circumstance the same way that Bikini was several times. It is just exactly the same situation. Then, how do we conduct and operate under these circumstances, and what do we need in order to have something like the kind of facility we had before. We don't want to make the whole thing hinge on getting a ship. Now maybe that works out and if so, you're lucky, but you shouldn't depend on it, because if you don't get it, then you're stuck with just Eniwetok, unless you have some pretty well developed plans and know just what it's goin to cost, etc. This is why I'd like to toss out some considerations based on not getting an instrumented ship because I don't think that makes any major difference. The reason I feel this way is that I think there's going to have to be some sort of installation up there anyway, with or without an airstrip, and I suspect that there will have to be an airstrip too, not for your purposes but for others.

RHC: There's another interesting thing, too, Gaelen. The Nan installation, with an airstrip and that big camp, cost something in the neighborhood of a million dollars. Now you take something like the AINSWORTH and the amount they pay for that, something like $10,000 a day. In three months of operating and paying for a ship, you might pay for a sizeable shore installation.

FELT: I'm not trying to argue you out of your position. I'm just trying to capitalize on what I suspect is going to happen in the future.

GIBBINS: It's not my position, Gaelen. I will say this. I think that if you request that Taongi be opened up to the point of a Fox-George camp with a Station 70, the money will not be available.

FELT: I'm not sure. That again stems from which one of these three situations we're talking about.

RHC: Well, will the money be available for this ship?

GIBBINS: Yes, because I think that's a lot less money. But it's only less if you don't have major installations ashore.

SANDERS: It seems to me, Walt, if you can prove that you can shorten the operation by a third, you can justify the expenditure.

RHC: We had an awful lot of questions on CASTLE, from the visiting dignitaries, as to what the operation cost per day. The only figure I remember, and I was surprised that it was as low as it was, was one for the H&N pay roll during the interim period, something like $55,000 a day.

SANDERS: I think one good point, as I understand it, that the possibility of contaminating the islands from Taongi is very slight, and you might save a lot of expenditure there. I think someday if we keep using Bikini, we're going to have to wash that place off or something.

GIBBINS: Well, we have to look at all three of those situations, because it's going to be quite a long time before we know just which one of these three we're going to have to operate under.

FELT: Let me say one more thing here. I think we've been getting slightly off the track here. We've been talking about justifications and I really don't think that that's quite our business. I think what we want to do is establish what various needs are under these various conditions and that we are going to have to get some help. What we really want are facts or best expert opinions, or something of that sort, rather than arguments. In the arguments, we can help but I would imagine that this would be left up to York and Bradbury to argue with Hertford, Starbird, etc. What we want to do here, I think, is to see why we would need to include

Taongi in a test operation under these various circumstances. Now this is not only the real estate, which I would like to have Bob investigate with 7.5, but the other types of support, (Air and Navy support) which I think Lucke and Gattis can work with. For our purposes, I think we can assume that these are our problems and the problems of weather and firing frequency should be left up to people like Rex and Vay Shelton. Now you and I disagree somewhat on the preliminary feasibility, getting the channel open, etc. I don't think we actually disagree. We simply assume that one can get into the lagoon. It costs some money, I don't know just how much, but here again, maybe the justification problem looms very large. For our purposes, I would like to assume that we can get into the place to operate. It's difficult, but we make some estimates as to how difficult in order to feed this into our estimates of the operational problems that we've got. These problems are important but they're not important at this level. They're important for purposes of justification at a higher level. And, of course, there is one point that I propose to leave out entirely and that is the question of whether or not the AEC and the United Nations will agree to our using the place. For our purposes, we just assume that that's been taken care of.

SANDERS: As I see it, you say do we need it, why do we need it and what are the advantages? Now I think that if you can prove you need it, if we can sell that point, you can take care of the rest of it.

GIBBINS: Okay, we got to the point where we wanted some facts about the atoll and we got stopped on an $18,000 tab. That's exactly where we are. I haven't been doing anything different than what you just said, and we do need this survey. You're talking to me about what kind of a feasibility report can be written without the marine survey. You can write one -- you can write down all kinds of things. As Gaelen says, we have

different opinions about opening the channel.

FELT: All right, I want to write down the opinions; get them down in some orderly fashion. I realize there are things we don't know, but the thing is this, there are things that we don't have to know at this point. We should not worry at this level about questions of using it or not using it. We simply start with this point of view; we say, we don't know what the weather situation is up there, we'll assume it's all right. We don't know what the difficulties are of getting a channel blasted in there, but in order for us to use the place, clearly, it's going to have to be opened up. So we start there, with the thing opened up. If they can't open it up, then the whole thing is out and it doesn't make any difference whether we want the place or not.

GIBBINS: Well, isn't that the first thing to be determined, whether or not it can be opened up?

FELT: No, not from our point of view. We say it is opened up. We have to make some assumptions as to the extent that it's opened. We know it's not going to be a big channel like the Enyu channel. We know it's going to be difficult to get in and out, but we will assume that we can get in and out. If it isn't open that much, we might as well quit now. But for this thing to be of any advantage to us, we shouldn't sit around and wait for that answer. We should go ahead and assume that it can be opened and modify the plans when we find out what the details are. Now, I started to say that I don't believe that it's the $18,000 that's the road block. I think it's the political question. I tried to get an answer in talking to Musick on the 18,000 without including the political question but I'm dead sure that the real hold-up is not where does the money comes from. I think the real problem is that Starbird is worried, he suspects that the Commission is worried about the general question of what would appear

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in the public eye to be an expansion of AEC facilities at a time when there's a lot of talk about cutting back. This is why I suggested to Johnson that he'd better work on Starbird, that he too should try and get Starbird to set aside the political question and see if they couldn't manage to carry out the survey.

GIBBINS: Well, of course this is the way the question was asked. Is there a legal reason why we can't use it? And, from what he indicated, he kept getting telephone calls back about dollars.

LUCKE: Well, the $18,000 is just for Scripps and you could probably get the Navy to carry out the survey and get the same data that Scripps would get. So there again, is perhaps further evidence that the $18,000 is not the main reason.

FELT: That's right. The main question in the Task Force and the Commission is the uncertainty about the whole general problem.

SANDERS: Well, the truth of the matter is that we just haven't sold anybody on the thing.

CURRY: Suppose Taongi was turned down by the AEC, Gibby, would you still be interested in your instrumented ship?

GIBBINS: I think we would say not for HARDTACK. We still would be interested in it. I think the day will come when you'll see shots fired without any land at all.

CURRY: Do you want to say anything about your progress in getting a ship, or haven't you made any progress?

GIBBINS: We haven't requested a ship. All we did was explore the availability; asked people's opinions. The opinions were these; Pride said you'll never get a Navy ship, you might as well forget it. If we get one, it will come out of the Reserve Fleet and then he asked me a few questions about clear deck space, complement to be housed aboard, etc. Fleming,

for instance, from the Maritime Authority, said that it sounds like what you're after is the RESCUE, a hospital ship. I think this is true, you don't need a ship like the CURTISS, with heavy shops.

LUCKE: How about another LSD?

GIBBINS: Al, I believe, personally, that if we go to Taongi, and we're going to operate like this, we should have a second LSD.

LUCKE: I think so too, but I was wondering if, outside of a mother ship for your M-boats, etc., could you also use an LSD as your instrumented ship?

GIBBINS: No, I don't think you could. I'm sure you couldn't house the number of 7.1 people that would have to be housed and still use it to support the small boats and move the barge, etc.

LUCKE: Well, as I see it, if you use Taongi, you're going to have one LSD devoted full time to that atoll, to move the barges and support the small craft.

GIBBINS: Well, it would not have to be there full-time, if you moved in an APL; a M&N APL, not a Navy APL.

LUCKE: But there's a problem of boat maintenance, repairing M-boats and T-boats, etc.

GIBBINS: Well, supporting your APL camp ashore would be similar to the boating for a weather station, except you have to make more trips.

LUCKE: Well, I remember the time small boats had maneuvered in the open sea on trips from up-atoll sites to Nan at Bikini. You'd have the same problem at Taongi; the distances would not be so great and you would be in the lee of the atoll, but you would still be operating in the open sea.

RHC: I think an M-boat would be sort of useless to you outside the atoll.

CURRY: The only circumstance I can think of under which you wouldn't need

another LSD is if Bikini were out altogether.

LUCKE: Right.

FELT: Would you need an extra one if Bikini were operated on a limited basis? There'd be no shot barges or evacuation of boats.

LUCKE: If you operate Bikini as at Eniwetok, that's true.

CURRY: An alternative would be a small floating dry-dock. Even with small shots at Bikini, you'd still need a fairly good-sized boat pool and you'd have to support them somehow.

SANDERS: Also, in order to maintain the firing schedule you're talking about, that one LSD is going to have to be free to go back and forth. It can't stay at Taongi until just before the shot or it won't get back.

RHC: It would take it easily four days to make a round trip.

GIBBINS: Do you suppose H&N will ever beat 48 hours in setting down the moorings?

RHC: I think they have gone through the process of mooring and fired in 72 hours, that's from the time they dropped anchor until they fired.

GIBBINS: In connection with the LSD, it would be bringing in the barge, flooding down, and releasing the barge, then just standing by with the small boats until you fired, unloading them and leaving for the next barge. So it would be used just in support of Taongi during the time of firing.

RHC: That's operating on a pretty tight schedule. That figures out to about an eleven day cycle between shots.

GIBBINS: Eleven days. How do you figure that?

LUCKE: It would be about eight days. Two days down to Eniwetok, one day to load, two days back and about 72 hours to moor.

GIBBINS: Seventy-two hours to moor?

RHC: About that, from mooring to firing.

VAN: Another LSD would cut that down.

GIBBINS: Well, I thought you were adding up what you could do with two LSDs.

LUCKE: No, this is with one LSD.

GIBBINS: What you're saying is that you have a conception of three LSDs for the whole operation.

LUCKE: Right.

FELT: That's if you're using Bikini.

RHC: If you have just one for Bikini and one for Taongi, one more than we've had in the past, that means probably a four day round-trip, at least, and probably another three or four day stand-by.

LUCKE: You might run into the same problem we had at Bikini, having to lay off the LSD for four days to reline it's boilers.

RHC: Well, you almost have to have one hauling and one standing by if you're going to make this five day firing schedule you're talking about.

VAN: Well, if you need these two LSDs to operate, that almost justifies the expenditure for a nice camp ashore.

FELT: No, I don't think that's right.

VAN: Well, it makes that much more money available, rather than pour it into ships. That LSD will cost you, what?

RHC: Well, the point you're missing, Van, is that whether you have a camp or not, just to move barges and support the small boats, you have to accept this LSD timing.

FELT: Well, it's possible you could have a camp and stay in there.

RHC: Yes, in the same fashion you stayed on Enyu this time. But you have to have a capability of doing something else, too. You can't pick up your boat pool on the night of minus one and get back to Eniwetok to pick up another bomb. Now you might sneak in a trip back to get another bomb while you're mooring the barge you have.

FELT: But then when you have a bomb on board, you can't pick up the boats.

RHC: I think maybe you could. If you changed that barge design, those things

do not have to be so high.

GIBBINS: I don't think there is any advantage to it, Bob.

RHC: Rather than have the LSD just steaming around after it has unloaded, the barge waiting to pick up the boats, it could be making a trip to Eniwetok to pick up the next barge.

FELT: I will make you a bet that it isn't the night of minus one. Not up there.

RHC: Perhaps not in that place.

CURRY: Maybe you just use T-boats, and use tugs or something like that to escort the T-boats to sea. I think you are going to have quite a time getting two LSDs, let alone three.

RHC: I think one of the questions here is just what does the addition of Taongi buy you, timewise, in shortening the operation. We are just trying to get an estimate of how often you could fire over there with one Dog boat.

GIBBINS: We would like to preserve a five day capability.

FELT: You have come down two days since I last talked to you. It was seven.

GIBBINS: With a seven day capability, I think you can do it, with one LSD.

FELT: Just barely.

GIBBINS: Two days down, two days back and three days up there.

RHC: Yes, but this three days up there is with everything running very smoothly.

VAN: Yes, and down there, he has got to load too, you have to allow time for that.

LUCKE: You know how we got the LSD up in the lee of Bikini Island, because of the smoothness of the water in the lagoon. Here you would be discharging the barge again in the open sea.

GIBBINS: Not after the first shot.

RHC: Oh, yes, you would never bring that LSD into the lagoon.

GIBBINS: You couldn't?

FELT: How much does that ship draw?

RHC: About 14, 15 feet, doesn't it.

FELT: The Dog boat?

LUCKE: More than that.

RHC: If you shoot something like Mike on the reef, and get a crater about a mile in diameter, which is about what we got, this is hardly maneuvering room for the Dog boat. I don't think they would come into a hole and try and turn around and come back out.

FELT: We are not going to settle this until we talk to the Captain. I think we should assume that it is probably going to be a little more difficult to off-load a barge in the Taongi area than it was in the Bikini area.

GIBBINS: Whether he goes into the crater or not?

FELT: I am not sure that that would make all the difference. If you fire a shot and breech the reef, so that it is open to the sea but still does not afford a lot of protection, this is still an improvement.

RHC: There is one thing that is bothering me about this firing a shot and breeching the reef or placing it in the north end of the atoll; if you get permission to use Taongi, eventually you will go to shore-based facilities.

FELT: We will fire it at Eniwetok.

RHC: Wall, maybe so, but I have got a hunch that if you put that alpha station as far up on the northern land mass as you can, and operate with the range we have used in the past for these things, you don't come close, to the reef, anyway.

GIBBINS: I agree.

RHC: I am wondering if it is really sensible to talk about firing up in that

north corner and blowing a hole, because the hole doesn't do you a bit of good unless you can clear a path down through the lagoon.

GIBBINS: I agree with you, Bob, but you are going along with the concept that we are going to build major shore installations up there.

RHC: Maybe not for HARDTACK, but eventually. I think that if you get permission to use Taongi, you should keep some sort of planning in your head and not build a photo station where you will want an airstrip later. Try to make eventual use of the land as much as possible.

GIBBINS: Maybe with a remote diagnostic system, you will want to breech the reef in two places.

KELLY: Have you settled where you want to put the first one, yet?

GIBBINS: No, north of the Pokaakku Island Passage somewhere. We don't know anything about the currents. We would like to get back in that same crater. I think it is not clear that the edge of that crater would be cleaned out to the point where you could set another barge in there and have the gang work on it. I do not think you would want to go along on the basis of firing every shot in the same crater. Even with the remote diagnostics, it is advisable to keep stepping in on each shot.

FELT: I don't see how you can help but clean out the old crater enough. There isn't any land there, you get shine off islands, you do not have any islands, you are not going to have any shine. You are going to have contaminated water. It is going to be right at the edge of the ocean. It obviously is going to get diluted and mixed on the edge of the reef.

GIBBINS: I think we are saying that we just do not know enough about the place. Don't know enough about the whole operation.

RHC: And you are not really sure enough about just what you want to do.

FELT: No, you don't know exactly what you want to do, but you can make a couple of assumptions.

RHC: I think you have to make two assumptions, one, that you can do it from a ship and two, that you can not and follow both of them up and see what you get.

FELT: Now, in some cases, they will not be markedly different. About the only thing I can think of that really depends on the ship is the question of whether or not you do put in one major instrument station to diagnostic purposes. This is a part from what ever else one thinks has to be put in there, on the beach. You would probably want to put one in anyway.

RHC: Whether you have a ship or not you have to put in something like Station 70.

FELT: Alright, but I am talking now about an Instrument Station.

RHC: In addition to that. In my method of operation you have to have something like Station 70.

FELT: I think it is not correct to call it a Station 70. It is something, but it is not clear to me that it has to have a firing system in it. I think the only thing that you really want to put ashore is communications.

RHC: You can put the firing system aboard the barge.

FELT: That is right. It would seem to me, though, that if you put in a diagnostic system, you should also put the firing system in this building. You do not put it on the barge, in that case.

RHC: This is going to be a pretty healthy structure, just for the relaying of gas pressures, alpha measurements, etc.

FELT: If that is what you do, but you may not have to do that. It could be quite simple. The gas system, for example, it may not be necessary to relay that.

RHC: Well, the systems that Sandia uses are quite involved. They are a "line of sight" proposition and this involves some height above the water if the ship is 20, 30 miles away.

GIBBINS: No, I think you have to have a station ashore. I did not picture it as a Station 70.

RHC: If you picture it as the room in Station 70 that Sandia used last time.

GIBBINS: As a matter of fact, I did not picture it at all.

RHC: Well, I don't know of any way to lick this curvature business.

GIBBINS: It depends on whether we get our ship or not.

RHC: We had difficulty getting Sandia's antenna some 60 feet above the water this year to get a path to the tower on Enyu.

GIBBINS: Yes, on that score, you may have to build a tower.

RHC: And to put this 60 feet above the water, you didn't have to build a tower, but it was still a little tricky.

CURRY: Have you made any guess as to how far away your ship would be from the shot barge at shot time?

GIBBINS: You are talking about the diagnostic ship? Fifteen to twenty miles.

LUCKE: We were 26 miles on [redacted] DOE

RHC: What yields are you talking about, Gibby? Roughly?

GIBBINS: One megaton and greater.

RHC: How much greater? This is a basic question in designing any structure ashore.

GIBBINS: We are thinking about firing a [redacted] device, a clean device [redacted] Dirty, this thing would be something like [redacted] Now, I think that we are going to hit an AEC restriction anyway, on the top yield. What they would like to do is fire one [redacted] clean. DOE

RHC: I was worrying more about a [redacted]

GIBBINS: Any [redacted] device that is fired, I am sure will have to be cut down. It seems to me that they will put the restriction, I am not sure about this, [redacted]

RHC: My question is not necessarily for HARDTACK, but what, ultimately, are [redacted]

we liable to get over there. It is a lot easier to add another foot of concrete than to start over again, if you can foresee a use for it on, say, WILLOW. Your statement about not testing a full-strength [redacted] is rather interesting. The eventual firing of a [redacted] device, DOE whether it is full yield or not, will be the governing thing in any shore installation you might have. That is what I was trying to get at.

GIBBINS: I think if a [redacted] device is ever tested, even though you could whittle DOE the yield down [redacted] that they would fire it at sea.

KELLY: Or air drop it, maybe.

GIBBINS: No, I think it is too big for that. This is a device.

RHC: When we went into CASTLE, with Mike fresh in our minds, we did the construction on Enyu based on the idea of firing in the Namu region, for the powerhouse and permanent structures, we used a yield of 20 MT. It would be a little hard to design a structure, and therefore hard to estimate the cost for a structure at Taongi, depending on where you were going to shoot. I think you could make the worst assumption and proceed from there.

FELT: Are you talking about design pressures?

GIBBINS: Yes, supposing we went ahead developing Taongi, where you think you might go with the yield ceiling, later on. I don't think you would ever see it over 15 MT clean, probably not over 5 MT dirty.

FELT: You are talking now about a permanent communications building of some sort?

GIBBINS: Design criteria for any building.

RHC: Just as a general guide, what type of building are we talking about? You can probably save money on an individual shot by building light construction, but this is not a reasonable way of doing things. You are re-building each time you increase the yield of a bomb.

FELT: I think there is any easy out for all this. You build for shielding as

[redacted]

well as blast-pressure and between the two of them, you end up with something fairly rugged. Let me change the subject a little. What do you need for radiological survey purposes? Are we going to have a light carrier with helicopters? Are we going to have to have the helicopter attached to some other ship with a suitable landing platform? How do we do that? Or does one simply steam in with boats and find out where you are?

GIBBINS: If we put major structures ashore, it's no different from what we've used in the past.

FELT: In the absence of major structures which you have to get into, let's say, suppose you have just your firing area there on the side of the reef. Do you still have to have helicopters?

GIBBINS: No.

FELT: Are you sure?

REC: Don't you want a water survey before you steam in there?

GIBBINS: I don't see why you would need it.

FELT: Well, I'm just asking you.

REC: If you get in a hot spot in a boat, don't you sort of louse up the boat before you get anything?

GIBBINS: Sure. Once having fired in there and knowing the clean-out of the lagoon, I don't see why you need helicopters. This is assuming you have no installations or data ashore.

KELLY: You just wouldn't approach it until you knew from knowledge of the currents that the place was fairly clean.

REC: But you do have to approach it the first time, to find out what the currents are doing.

GIBBINS: That's right.

REC: And probably for that pass, you'd like to have a helicopter rather than a T-Boat or something like that. It's a little slow getting out of a hot spot.

GIBBINS: That might be, but I think it can be done with a boat.

LOCKE: Well, it would be very uneconomical to have copters up there unless you did have something like a carrier, just because of your maintenance problem.

REC: Maybe you could sneak a carrier away from the operation down below, just to make that one pass and get the data. Do it once, and from there for the rest of the operation you might be able to guess what your situation was after each shot.

SANDERS: How long after, would you say, you'd want to make that first survey?

REC: Well, I think you'd want to start in about a couple of hours.

FELT: I think, depending on what you've got up there, you do different things. If you take the airstrip as being put in there, someone's going to want to go and see what the airstrip looks like. After all, sampling is going to take place an hour or so later, after a shot, and it would be nice to know what the airstrip looks like. You can do that with a P2V, they did it every time on REDWING. They also can take radiation readings at the same time. They would probably be adequate for aircraft safety.

GIBBINS: I think they'd also be adequate from the standpoint of keeping a guy out of trouble in a boat.

FELT: That might well be. I think the general answer to the question is, yes, we do want some sort of a survey. It's not clear just how much detail you'd need. Ultimately, you're going to have to go in by boat anyway, in order to put in the next barge. If you have an airstrip, you'd want to have some estimate of two things, physical damage and radiation levels. If you have a telemeter relay station, you may or may not want to get into that.

GIBBINS: It's not as urgent.

FELT: No, it isn't. Presumably, even if you have an alpha station, it's not as urgent. Here again, if you do not have helicopters, you're counting on getting in by boat. I suppose you could have a couple of helicopters if you had a suitable landing platform someplace.

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LUCKE: Oh, yes, on something like the CURTISS, but you'd have a maintenance problem.

FELT: What about helicopter transportation? Well, I suppose if you pursue the helicopters and have them for some other reason, then you probably wind up putting a helicopter platform on your shot barge.

REC: We've gone through this helicopter platform on the shot barge several times before, but for safety reasons, it's always been killed.

FELT: I daresay, if you had the helicopters around for some other reason, you'd very shortly wind up with a helicopter barge parked in there someplace.

CURRY: What you'd probably like to have if you're going to have a special ship, is one with a boom large enough to hoist an LCM, and a platform large enough to hold a couple of copters

GIBBINS: I'm convinced in my own mind that the way UCRL would like to operate in there is from an afloat set-up, and hold the cost of installations ashore to an absolute minimum, even to the point of making the people a little uncomfortable.

FELT: I think we should begin to think about listing some of our assumptions, hoping to discover what the major areas are that we ought to investigate more thoroughly. We've tossed around a lot of assumptions and ideas, and they're all perfectly valid assumptions. They fit someplace into this picture; some of them are pertinent when considering them in one light, but they are not pertinent in another.

LUCKE: Well, this one on the airstrip. I think that, certainly, the requirement for an airstrip, other than UCRL is one field we have to examine.

FELT: Yes, I think that's true.

GATTIS: Yesterday, I talked with Colonel Eynes at 7.4, and he had heard the rumor of Taongi, but this was in an informal stage and they had not done any serious thinking on the problem I told them that Walt would be here today and we would appreciate their feelings on the subject. They couldn't come to the conference, but I got a call from him a short time ago and he said that on sampling, it would have to be done with B-57's, which we had already concluded

Secondly, on positioning of the aircraft, if the aircraft had its own positioning system. then reflectors or something like that on the island would be satisfactory I then asked him about their requirement for an airstrip, for safety reasons. He said that with the smaller aircraft ruled out because of their range, he could see no requirement at this time, as far as they were concerned They would not support an airstrip simply from the safety factor.

LUCKE: While it's not in his field, exactly, I talked to Parsons about it this morning, and that was his answer on the thing, too.

GATTIS: Safety, of course, as a factor, can be built up whichever way you choose. If we need it to support a requirement for an airstrip, I'm sure it could be included as a factor in requesting an airstrip.

SANDERS: Could we bring a C-47 over there?

GATTIS: It's within range.

GIBBINS: Well, we should get back to seeing if we can arrive at some logical sequence of events.

FELT: Yes, but I don't know quite where to start on it.

GIBBINS: Suppose you start with the idea of having to consider each one of the three categories you've listed, by answering the question of what happens with major stations ashore and without major stations ashore.

FELT: Alright, there are a lot of things that one can write down regarding stations ashore. Is there anything that has to be ashore? We can start writing thing down and then discuss whether they are necessary or not.

It was decided that three general situations could be listed and that the remainder of the session should be devoted to a discussion of the implications of each of these situations. The situations are:

(a) Three sites available in the EPG.

(b) Two and one half sites (Bikini used on a limited basis).

(c) Two sites (Bikini eliminated entirely).

The general requirements discussed under each of the situations are as follows:

NAVIGATION AIDS

AIR

Homing Beacons
Reflectors

NAVAL

Beacons

COMMUNICATIONS

7.3

H&N requirements. Take up with AEC & H&N.

TELEMETERING REPEATER STATION

Within 7.1

AIRSTRIP

7.4
7.5 (H&N)

PHOTO STATION

ALPHA STATION

POWER PLANT

WORK CAMP

H&N

ACCESS

7.3

CHANNEL CLEARANCE

7.3

SEA DROME

7.3 (Emergency evacuation)

At the close of the meeting, the following discussion took place:

CURRY: It looks as though this study will require that J-1, J-3, J-4 and J-6 work pretty closely together, but they each have a pretty good idea of what part of the answers they're supposed to come up with. Do you want to try and attempt any consolidation before the deadline, or do you just want to get those four reports written and then attempt a consolidation?

FELT: It would be nice to consolidate ahead of time but if it can't be done, we will just have to take what we can get. There is a purpose behind this and that is to present some kind of results for consideration to somebody, as yet unknown, apparently the Planning Board, I don't know. The thing that would worry me a little bit is that if we don't make some effort to consolidate ourselves, its purpose won't be very well served, because the consolidation will have to take place in the Planning Board and they are liable to consolidate the way they think it should be.

REC: Why don't we scurry around for a couple of weeks? I would like to talk to 7.5 and Al will probably want to gather information from 7.4 and 7.3. Maybe in a couple of weeks we could report back and see what, if anything, we have learned.

CURRY: Yes, perhaps I didn't make myself clear. I didn't mean that we should never attempt to consolidate; I meant, do we try to consolidate before that deadline, or do we take the four separate reports at that deadline and try to consolidate then?

FELT: Why don't we try to get together the week of the 20th or 21st of January and see where we stand? Possibly the 18th, when Gibby will try to be here again.

GIBBINS: I think we're going to be a little pushed to get anything by that time. We've just been talking about whether or not we could get the consolidation done by that time. But right now, you're aiming at the 18th of January?

FELT: Yes, not to have the thing completed by that time but to see what we have at that point.

GIBBINS: That's when you were planning on having me come down again.

FELT: Yes.

SANDERS: Let me ask this question. It is something we might bring up when we talk to Sam Howell. If we assume an operation of the same size as REDWING, how many shots would we be transferring to Taongi?

GIBBINS: The best number we can use right now is five. I think what you need to say is that it is very likely to be more than three and very likely to be less than six.

LUCKE: They would be all over 1 MT?

GIBBINS: Yes.

SANDERS: And all would be barge shots?

GIBBINS: More or less.

KELLY: I'd like to ask one more question about these people up there. Gibby, did you say 175 total personnel if you were ship-based?

GIBBINS: Yes.

KELLY: And this includes everybody, H&N, etc.?

GIBBINS: This is a real off-the-cuff opinion. without talking to any EG&G people, Sandia people or anybody.

REC: If you can guess the number of UCRL people, you can probably infer the number of total people up there

GIBBINS: Yes, I think if you talk about 50 to 60 UCRL people, it seems like 175 billets would handle it.

The meeting was adjourned at approximately 1430 hours.

E. A. LUCKE
J-3
Plans & Operations

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J3-H-29

16 January 1957

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