



(Order # 139-6)

BEFORE THE OIL AND GAS CONSERVATION COMMISSION
OF THE STATE OF COLORADO

IN THE MATTER OF THE PROMULGATION
AND ESTABLISHMENT OF FIELD RULES TO
GOVERN OPERATIONS IN THE RULISON FIELD,
GARFIELD AND MESA COUNTIES, COLORADO.

CAUSE NO. 139

PURSUANT TO NOTICE to all parties in interest,
the above-entitled matter came duly on for hearing in the
Conference Room 260, Columbine Building, Denver, Colorado,
at the hour of 10:00 o'clock a.m., January 16, 1968.

BEFORE:

Commissioner H. C. Bretschneider
Commissioner Howard Schmidt
Commissioner M. C. Hoffman
Commissioner J. E. Dunn
Commissioner D. M. Rounds

APPEARANCES:

J. D. Voorhees, Esq., Denver, Colorado, for
Austral Oil Company, Incorporated.

F. J. Piro, Secretary, Denver, Colorado,
D. V. Rogers, Director, Denver, Colorado, and
John Moore, Esq., Denver, Colorado, for the
Oil and Gas Conservation Commission.

CHAIRMAN BRETSCHNEIDER: The next cause on the agenda is Cause No. 139. On December 27, 1967, Austral Oil Company, Incorporated, filed with the Commission an application for an order approving a certain Unit Agreement and Unit Operating Agreement attached to said application and marked as Exhibit No. 1 and Exhibit No. 2, respectively, for the development and operation of the Rulison Unit Area in any and all formations underlying the following described lands in Garfield and Mesa Counties, Colorado. I don't think it's necessary to read all the description of the lands involved in this case unless someone wants it read. The notice goes on further to say, "And approving the use of nuclear completion methods in said unit operating to the extent they are approved by the Atomic Energy Commission."

The hearing is called to order. Is the applicant present?

MR. VOORHEES: Yes.

CHAIRMAN BRETSCHNEIDER: Will you appear then?

MR. VOORHEES: Yes. My name is J. D. Voorhees, appearing for Austral Oil Company, Incorporated, the applicant. We have two witnesses.

CHAIRMAN BRETSCHNEIDER: All right, you may proceed.

MR. VOORHEES: If the Commission please, this is an application, as Mr. Bretschneider stated, for an order approving the Rulison Unit Agreement and Unit Operating

Agreement, and also approving the use of nuclear completion techniques in the wells which will be drilled in the unit.

As a bit of preliminary, the Rulison unit area lies south and a little bit west of Rifle, Colorado. This is an outline map of the unit. The dark slotted line is the unit boundary. This is the Colorado River. I think Rifle would be about there (indicating). Grand Valley is somewhere about in here (indicating). The unit covers a little more than 50,000 acres, of which approximately one-half is federal land and about one-half is fee land, with most of the fee land lying up next to the river and some patented mining claims lying in the center of the unit. There is no State of Colorado land in this unit. The federal land, some of it is national forest. About half of it, I guess, or maybe a little less than half of the federal land, is national forest. The unit lies entirely in Garfield County except for a little bit of it down in here which is in Mesa County.

The objective formation in this unit is the Mesaverde, and Mr. Frank and Mr. Aronson will discuss in as much detail as you gentlemen wish the techniques and objectives of the unit. The Unit Agreement is a standard federal form of Unit Agreement as prescribed by the Department of the Interior with modifications to it which take into consideration the particular problems and rights and results which arise or

are believed to arise because of the use of nuclear completion techniques in this formation, in this unitized formation.

Basically the main and most important difference perhaps is that there is a 2-phase procedure for establishing participation under this unit. There is conventional participation which is defined in the unit as participation resulting from wells which are not completed with the use of nuclear stimulation, and then there is nuclear participation which is participation resulting from the use of nuclear devices.

The Department of the Interior in negotiations on the form of this unit which occurred starting about this time last year and resulted in the approval of this unit by the Department of the Interior on October 4th required, and it was a good idea, that some provisions be written in here to take into account the possibilities that were inherent in the use of these devices.

Now, they were concerned really with two matters: In the first place, this is a big unit and they were unwilling to permit the proponent to tie up all of this acreage forever if he could not get nuclear devices to use in there. Also they were concerned that all of this land not be tied up forever even if the operator got to shoot off one or maybe two devices in there, they did not want to

tie up the entire 50,000 acres. So the Unit Agreement, in addition to the conventional federal language, does provide that it will terminate unless within three years of the date of its approval, which will be three years from October 4, 1967, a well has been stimulated or there has been a nuclear device set off in the unit area. That is precaution No. 1.

It also will terminate as to any lands which are not in a nuclear participating area five years after the effective date of the first nuclear participating area unless at the end of that 5-year period there is actively under way operations to use nuclear devices in there, and there are provisions in here which, in effect, say that if the AEC, the Atomic Energy Commission, certifies that there is in effect an active program that will be adequate in order to determine whether these termination dates occur or not.

The final date is that the unit will terminate 10 years after the establishment of the first nuclear participating area as to any lands not within a nuclear participating area.

Now because there was some uncertainty as to what would happen and how fast these devices were available, the Department of the Interior required a separate participating area determination with respect to wells which are completed by nuclear devices, and you will see as an exhibit just underneath the map that you have there, there is another map which

divides this entire unit area into, I think, 20 blocks. Now those blocks are designed to establish nuclear participating areas more or less arbitrarily, and the way it works is if a well in one of those blocks has been stimulated and is producing gas as the result of a nuclear completion then all the land within that particular block is in that participating area and shares in production from that well. So that these are the main differences which this unit bears to an ordinary unit.

Now the unit operating agreement which we are also asking for your approval today is a standard form of unit operating agreement on what is known as the Rocky Mountain Form with again the same minimum changes which are required to adapt its use to this use of these devices.

I am about through, but there is now being drilled, and Mr. Frank will go into that, a test well which is aimed at the Mesaverde Formation in Lot 11 of Section 25 right here. This will be the instrumentation well for the nuclear completion which will occur in another well still to be drilled, a very big well, we'll talk about in a minute. It will be quite close to that, within two or three hundred feet, I believe, in this same area, so that is where the activity is at this point.

With that introduction, I could explain also that Exhibit 3 to the application, which is before the

Commission, it's marked by a tab at the end of the sheet, is a map which shows the wells that have been drilled up to date on the Rulison unit. There has been considerable exploratory drilling in the Mesaverde and other formations in this unit area. However, none of that is considered by the United States Geological Survey as commercial, so even though there are three or four -- I think there are four or maybe five wells which are producing gas, under the Unit Agreement none of those wells are classed as unit wells because none of them are considered as producing enough gas to be commercial for the purposes of the United States Geological Survey, so this Unit Agreement is in effect a wildcat unit agreement which has been put together to test these devices.

This is a part of the Atomic Energy Commission's project Plowshare. This is the Rulison project. It is in the same chain of projects as Gasbuggy, which was recently fired and which Mr. Aronson may tell you something about. It is in the same program as Bronco, which is the oil shale shot which will go off somewhere north of this area, and Dragon Trail, which is another oil and gas shot which Continental Oil Company will set off at sometime either before or after the Rulison shot up northwest of this area and south of Rangely.

One other statistic: the unit has 51 or so

thousand acres in it. There are 222 separate ownership tracts. The north end, as you can see from the little tract number, is extremely cut up. That is farming land down on the river. There is committed to the unit 94% of the working interest and 88.2% of all mineral royalty and non-paying interests. Other commitments are anticipated, they are being received all the time. There are lots of people involved in this unit and most of them have committed.

With that introduction I would like to call Austral's first witness, Mr. Frank.

G. W. FRANK

called as a witness on behalf of the Applicant, being first duly sworn, upon his oath testified as follows:

DIRECT EXAMINATION

BY MR. VOORHEES:

Q. Will you state your name please?

A. G. W. Frank.

Q. Where do you live, Mr. Frank?

A. Houston, Texas.

Q. What is your business position?

A. I am Senior Vice President of Austral Oil Company, Incorporated, in charge of their drilling, production, and engineering.

Q. Where did you go to school?

A. University of Kansas.

Q. What degree did you receive there?

A. I received a B.S. in Petroleum Engineering.

Q. Do you have any postgraduate degrees?

A. No degrees. I have done additional work in geology.

Q. And would you just briefly state your employment history and where you have worked and the areas in which you have worked please?

A. Yes. I graduated from the University of Kansas in 1946, then went to work with Phillips Petroleum Company; thereafter worked until 1950 with Phillips, and went to work for a small independent petroleum company until 1956. In January, 1956, I went to work for Austral Oil Company as General Superintendent. I have been with Austral since that date.

Q. Would you describe briefly the activities that Austral has been in there? It's rather a new name up here, could you tell the Commission something about it?

A. Yes. We have had considerable activity in the Rocky Mountain area. However, the major portion of our activity has been in the Gulf Coast and we have concentrated on deep high-pressure gas reserves. I believe in the last 10 years -- I checked these statistics this morning -- and we have drilled 111 wells that have been deeper than 13,000 feet, and 54 of those have been below 15,000 feet.

CHAIRMAN BRETSCHNEIDER: Many of them in this area?

THE WITNESS: Of those deep ones?

CHAIRMAN BRETSCHNEIDER: I mean in Colorado.

THE WITNESS: No, none below that depth, but I am only giving these to point out that our concentration has been on deep high-pressure drilling so that we have had considerable experience in complicated drilling problems.

Q. Where is Austral's headquarters?

A. Houston, Texas.

CHAIRMAN BRETSCHNEIDER: I think that is up to the point where we can approve you as an expert witness.

MR. VOORHEES: Thank you.

Q. Mr. Frank, would you briefly describe the Rulison Field that has been identified behind you, and tell something about its geology and why Austral was attracted to Rulison as a place to try out this technique.

A. Yes. Probably most of you recognize the area as being an area where Southern Union developed or made a discovery well in 1957 in the Mesaverde in Section 26, and over the next several years, I believe through 1962, there were 13 or 14 additional wells drilled across this area, the furthest west one being in Section 30 right here (indicating), so that it developed this area as a slight northeast plunging anticline. It's not significant as a structure, however, this area is all known to have gas bearing sands. Most of the Mesaverde in this area is lenticular sand with shale

streaks and all the sands seem to have gas in them at one location or the other.

Our location, as Mr. Voorhees pointed out of our drilling well presently, is in Section 25, Lot 11, and we are right at this point at the top of the Mesaverde preparing to drill out below our protection casing and I think it's -- we at least think it's reasonable to believe there will be gas bearing sands at this point similar to what there are in 28, 29, and 30 and all across this area here. There are now, I believe, 16 wells and ours is the 17th Mesaverde well drilled in what is known as the Rulison Field by the Colorado Commission rules.

Q. What kind of a formation do you find in the Mesaverde, is it solid or is it made up of little liners?

A. As I mentioned a moment ago, it's interbedded sand and shale streaks ranging in thickness of 10 to 60 or 70 feet. It's low permeability sands. The average permeability in our area on the coring we have done, which have been rather extensive in those two wells, has been about half a millidarcy. The porosity runs 9.7%. The water content, connate water, is about 45%, but we have estimated and our consultants have estimated that there is something in the range of 90 to 125 billion cubic feet per section in the Mesaverde.

Q. What makes it difficult to complete the conventional

drilled wells for commercial production in there?

A. Of course the cost is the prime deterrent. The completion methods we consider, normal completion methods which now may be abnormal to what they were a few years ago --

CHAIRMAN BRETSCHNEIDER: What is the depth of this zone?

THE WITNESS: In this particular well that now is being drilled, the top of the Mesaverde is 6,130, and it ranges -- the total Mesaverde ranges from 26 to 39 hundred feet thick in that area. We expect that this location to be 26 to 28 hundred feet thick.

CHAIRMAN BRETSCHNEIDER: Are most of these 16 wells all bottomed in the same zone?

THE WITNESS: No. There have been at least two, I believe, that have gone on to the coal section at the basal portion of the Mesaverde. Most of them have stopped several hundred feet above the basal portion of the Mesaverde.

Q. You are saying then that it's uneconomic to complete these wells with the present known techniques in the sand that is there, is that right?

A. Yes. We made a tongue in cheek calculation one time that if we paid nothing to operate the well it would take us 86 years to get our money back on conventional completion.

Q. Would you describe what Austral has done in this

area, Mr. Frank?

A. Yes. In early 1965 when we became interested in this area because of the possibility of nuclear stimulation, we made arrangements with Southern Union to acquire their operating rights in the area and some operating rights of others as well at the time. In mid 1965 we employed CER Geonuclear Corporation as our consultant, anticipating working toward the operation of nuclear stimulation. We started the preparation of a feasibility study, a copy of which you have here, about the same time that we started drilling our first two wells, our 394 Federal and our 2995 Federal "A". That feasibility study was completed and filed with the Atomic Energy Commission in July, 1966. Then we appeared before the Commission in Washington in early December of 1966 and made our presentation to them, and followed that with a letter of complete commitment to this project in early February of '67. Since then we have been working a great deal with Lawrence Radiation Laboratory, a contractor for the Atomic Energy Commission, and the Atomic Energy Commission to prepare a technical operations plan for the actual work that will be done in this project. We now are at the stage of having the technical operation plan or the final draft and it should be ready and in their hands approved by the end of the month; after which we will make our preparations for the contractual matters that we

have not yet finalized with the government.

We started on good faith building the road that is into the location and our 2595 we started and finished it in late September of this year. The road itself, incidentally, cost \$105,000. It was necessary to make an engineered graded road so that we could get heavy equipment in. We also commenced the drilling of this first test well in November.

Q. This is the first unit?

A. Yes, which will eventually be an instrument well.

Q. This is the third well you have drilled in there?

A. Yes, and it's expected that well will cost a little over \$250,000, and it's primarily for reservoir analysis, after which it will be instrumented and stemmed with necessary grouting material prior to the firing of the nuclear device which will be fired approximately 285 feet northwest of this location in a new hole.

Please understand all this has been accomplished just on good faith because we are confident the government has given us enough indication that they will approve our project that we have proceeded without a contract between ourselves and the government. We also installed four continuous recording automatic weather stations in the area of the well at various elevations. Those were installed with the help of the Federal Weather Bureau and also in cooperation

with the Public Health Service of the State of Colorado, and the information from that is being sent to all interested parties, including, I believe, Mr. Jaco here with the Public Health Service.

We'll be finishing this well that we are now drilling along at the end of the month, after which we'll have some extended test periods, and then as soon as contractual arrangements have been made with the government for the total project, why, it would be our intent to commence the drilling of the big hole. We would anticipate coming back to you in probably March to make application for that off-pattern well which presently is intended to be 285 feet northwest of this Hayward 2595 well. If the plans aren't changed between now and then it will have 30-inch casing set between 7 and 8 hundred feet and a 28-inch hole drilled to the depth of 8,000 to 8,400. We have not yet picked the point at which the device will be fired but it will be below a depth of 7,000 feet, dependent upon the appearance of the reservoirs between 7,000 and 8,500.

Q. What is your opinion on the timetable of this additional drilling and detonation itself? If you had the say, when would you pick it?

A. We are aiming at the fall of '68 to fire. We need to be realistic about it and understand that the government is looking at the spring of '69, but we are

attempting to do all that we can to see that it's fired in the fall of '68.

Q. How much will that emplacement well cost you do you estimate?

A. About \$550,000 if everything is trouble free.

Q. Would you tell the Commission what your relationships have been with the Colorado State Health Department and other Colorado agencies involved in this?

A. We have made an adequate -- whether we have touched base with all the proper authorities we are not certain -- but we have made an effort to keep them posted, particularly the Public Health Service, on all the things that we have done up there and what we intend to do and, of course, in the early planning stages there is not an awful lot of material being sent to them but as the tempo of the project picks up there will be more material and, of course, we have attempted an educational program to all those that are interested in and asked for this educational program that CER is sending out on nuclear energy. Those are not specifications with respect to our project at this time, but later on there will be additional specifications. Included in that educational program is a report on the Rulison project, Dragon Trail, and I believe Bronco.

MR. VOORHEES: I might say the Colorado State Department of Health has a radiological section which is

established by statute, and the head of that section is Mr. Jaco, I'm not sure if he is here or not -- he may be -- and this is the prime contact that Austral has been maintaining with the state offices, that and this Commission.

Q. You have mentioned CER. Would you tell the Commission what CER is, Mr. Frank, and also perhaps describe briefly the division of responsibility for the different functions that are going to be involved in this shot?

A. Yes. CER Geonuclear Corporation was a combine -- I should probably let Hal --

Q. He will tell about it but just identify it.

A. It's a combination of three companies formed for the specific purpose of a consulting firm available to the public for underground nuclear engineering: Continental Oil Company, Edgerton, Germeshausen & Grier, and Reynolds Electric, and among those three companies Reynolds, I believe without exception, has done all the fielding and firing of all the underground nuclear devices on the test site, of which there have been over 200, and Edgerton, Germeshausen & Grier have done all the instrumentation on all the underground nuclear devices that have been fired; so they have a background of experience that qualifies them to do anything that is needed that is not covered under our normal oilfield drilling practices.

Q. Besides this monitoring well that is now being

drilled and the emplacement well, briefly what other physical facilities will you be using in connection with your shot?

A. On the well that is now being drilled it will be highly instrumented, both during the time we are testing it with bottom hole continuous recording pressure instruments as well as surface measuring equipment so that we can flare and/or dispose of the gas to one of the pipelines. Incidentally, we have made arrangements for short term sale of the gas so it isn't flared from this well, and then after the completion of the testing period and during the period of time that we will be attempting to put the device in the hole, why, there will be no activity as far as production facilities are concerned. During the time of the firing of the device there will be much recording equipment, all of which I think Mr. Aronson will talk about in just a moment of seismic and other.

Q. Assume this shot is successful, what sort of results are you dreaming about in terms of reserves and markets and use and so forth?

A. I mentioned earlier the figure, the estimated reserve of 90 to 125 billion cubic feet per section. We have run codes to find out what our best estimate was on the recoverable reserves. I think Hal intends to mention this later too, but from that data we would anticipate, after firing the nuclear device, that we would be able to maintain a minimum of 5 million cubic feet per day of gas production

from each well for the first 10 years after firing the device, after which the decline would start and at the end of the 20-year period the well would still be capable of making about 1500 MCF per day.

COMMISSIONER HOFFMAN: How does that compare with conventional or the present method of completion?

THE WITNESS: The wells in the area now are capable of making from 50 to 130 MCF a day. The one we have now could make about 130 to 150 MCF a day.

Q. Where would this gas go if you got that much gas, do you have any idea?

A. Yes. Our present plans -- we don't yet have an answer yet from Gasbuggy -- is that this gas would not be used for home consumption. After we have the answer from the Gasbuggy and the radioactive analysis from that it could change this, but we would anticipate now that this gas, even though it might be somewhat radioactive, could be used for the creation of electricity or for industrial use, and in using it for industrial purposes the waste gases from that could be easily handled to the extent that we would anticipate no problem like might occur if radioactive gas -- highly contaminated radioactive gas were used for home consumption. We understand that after voiding two or three chimney loads of gas from the calculated information from that would be that the radioactivity would be at a level

low enough that would cause no problem, but even then we would not anticipate using it for home consumption and could visualize the creation of an area, if this gas is all there and if this project is successful, could visualize the creation of an area that might be a major electrical area.

Q. Finally, Mr. Frank, do you see any problems in the development of this field, assuming the test is successful?

A. Yes. The Plowshare program as all of you probably know was set up through the cooperative efforts of government and industry and this was created in 1957 and was considered really only a research facet of the possible industry, and no arrangements were made in either the 1954 Atomic Energy Act or the 1957 Plowshare program for the continued development of the project after the research had proved it successful. So there will need to be legislation enacted in order to commercialize the use of atomic energy devices. We and other companies are working on this currently. I am chairman of a legislative subcommittee whose objective it is to create guidelines for legislation which will allow the firing of the second, third, fourth and additional shots in an area after it has been proven. Naturally we know that legislation can't be created overnight, nor can we tell the legislature how it will be written, but our intent is to develop guidelines and do what friendly pushing we can because those of us that are associated with this atomic

industrial form have great confidence that this is a new era in engineering in the oil field.

Q. Do you get a generally sympathetic response from the people that you talk to, the legislators and others?

A. We sure have.

Q. Do you have anything else you would like to tell the Commission, Mr. Frank?

A. No, I believe not at this time.

CHAIRMAN BRETSCHNEIDER: Would the Commission like to ask the witness any questions? Do you mind now if we consider cross examination of the witness or should we wait for your other witness?

MR. VOORHEES: Whatever the Commission wishes.

CHAIRMAN BRETSCHNEIDER: Does anyone else here wish to pose any questions of the witness? Is there any opposition here now to the program that wants to be heard now or do you want to wait until afterward if there is any opposition?

COMMISSIONER HOFFMAN: I have one question. You have set apparently four sections and the participating area around these wells. I didn't read it close enough, I assume though that that is still flexible, you can't say in advance that one atomic well will drain four sections, can you?

THE WITNESS: No, I'm sorry, I didn't make that clear. Our anticipated program would be on 320-acre spacing.

COMMISSIONER HOFFMAN: But the participating area, as I see this map here, is four sections.

THE WITNESS: That's right. The ultimate development of each participating area would include eight shots.

MR. VOORHEES: I could perhaps explain that that 4-section pattern was prescribed by the United States Geological Survey in Washington. This is their formula and it is obviously arbitrary and it was done because of the uncertainty at that point, and perhaps now, as to what these devices would do, and the contemplation was that they wanted to permit each shot to hold a reasonable area but not the whole unit; so this is why he in effect has required the detonation of 20 devices in order to hold the entire unit, and ultimately, of course, if it works there will be considerably more devices detonated.

COMMISSIONER HOFFMAN: I am sure your wording must have some flexibility in it. After a little experimentation you don't have to stick with this necessarily.

MR. VOORHEES: Well, we have to get the U. S. Geological Survey consent to change it because it was their idea.

COMMISSIONER HOFFMAN: And then that is fixed in effect at the moment?

MR. VOORHEES: As far as I am aware it is in the agreement, yes, sir.

COMMISSIONER ROUNDS: Mr. Frank, you submitted the cost of the emplacement well at \$550,000?

THE WITNESS: Yes.

COMMISSIONER ROUNDS: Does this include the atomic device or is this the cost of the well itself?

THE WITNESS: No, sir, this is the cost of the well. By this 1954 Atomic Energy Act we are not allowed to handle or pay for the device. The published prices on the devices range from a 10 kiloton device at \$350,000 to a megaton at \$600,000. They have published those prices. Whether or not they are realistic is not known at this time and really it's not important I think. There has been the argument forwarded that the sale of these devices should repay all the costs of all the development of those devices, but we know in any kind of research this is not possible, the first one or the first 10 can't return that cost, so it's not known whether these costs are realistic but they do have those prices published and this is to include the fielding, firing, and the safety of the device while it's being handled and in place being fired.

COMMISSIONER ROUNDS: Thank you.

CHAIRMAN BRETSCHNEIDER: You may call your other witness.

(Witness excused)

HASKELL HAROLD ARONSON

called as a witness on behalf of the Applicant, being first duly sworn, upon his oath testified as follows:

DIRECT EXAMINATION

BY MR. VOORHEES:

Q. Would you state your name please?

A. Haskell Harold Aronson.

Q. Where do you live, Mr. Aronson?

A. Las Vegas, Nevada.

Q. By whom are you employed?

A. CER Geonuclear Corporation, Las Vegas.

Q. Would you describe briefly your education?

A. I am a graduate of the University of Colorado.

I have two degrees, two Bachelor degrees, one in engineering and one in business. I have some advance work in management.

Q. Would you also tell the Commission the history of your employment since your graduation?

A. I am a registered professional engineer in the State of Texas. I have worked for a combine since my graduation in 1952 with a firm called Reynolds Electrical and Engineering Company, which is actually a combine of a general contractor, mechanical contractor and the like. This group has been set up to work with the Atomic Energy Commission in their programs of testing here in the United States. I have worked in Los Alamos in some of their work, mainly at

the Nevada test site, and in Las Vegas. The work involved has been from the construction field onto areas of being a staff consultant assigned to the Atomic Energy Commission operations office in Albuquerque in about a year and a half period. Since 1960 I have been responsible for the fielding for the AEC as a contractor, but for the AEC of all the so-called off-site projects for the Atomic Energy Commission that they have detonated in the United States. This is in Carlsbad, New Mexico, in 1961, two projects in Hattiesburg, Mississippi, in 1964 and '65, one in Fallon, Nevada, in 1964. These are the off-site projects.

In addition, I have had responsibility for all the areas of communication and engineering for this Reynolds Electric combine.

CHAIRMAN BRETSCHNEIDER: If there is no objection from the Commission we'll accept you as an expert witness.

Q. Mr. Aronson, you have heard Mr. Frank's description of this project. Would you tell the Commission what CER Geonuclear is and what has been their experience and their present responsibility to the extent you can?

A. The company was formed three years ago on the basis of the up and coming Plowshare program. With the intimacy of the program as we have had with Plowshare, and seeing how it has come about and the potential that it shows, the three companies: Continental Oil, EG&G or Edgerton,



Germeshausen & Grier, and Reynolds Electric, formed in an effort to furnish a consulting service to those people in industry who might be interested in utilizing nuclear explosives for peacetime applications. The approach to it now is in a consulting capacity. Hopefully in the future CER would like, based on their past experience, to act as not only a consultant but a fielding facility for industry to furnish somewhat of a turn-key service to industry who would desire this, anything from the consulting of the various geologic portions all the way through the safety to the fielding and the decontamination later.

The background of the companies is that EG&G, Edgerton, Germeshausen & Grier, and Reynolds have worked for the Atomic Energy Commission since before the AEC was formed, when it was the old Manhattan District corps of engineers. EG&G has fired every nuclear device AEC has ever detonated except for one, and that was down in the Pacific, this was in 1952. They are responsible for all the scientific support to the AEC and its technical laboratories; the laboratories are responsible for the design, the actual carrying out of the diagnostics of the documentary photography, all of the timing, firing, electronics, has always been the responsibility of EG&G.

Reynolds Electric on the other hand has been what they call the technical support contractor. They

have furnished all of the fielding services for the devices themselves and for all of the contractors involved. This involves everything from the logistics of the warehousing and vehicular types of work to the communications, anything from on-site to worldwide nets, all of the signal cable work and the construction required. These two companies put together have in essence furnished all of the support and have done the work for the AEC as contractors since they have been testing here in the United States.

Q. And all of this experience through CER Geonuclear is available to this project?

A. Yes. What we have done -- not trying to sound too altruistic but realizing it's going to be a long road before these become commercial because of the legislative and public acceptance -- we have worked with firms like Austral to bring about a better appreciation of what can be done, and assisted Austral in the various workings with the various government organizations, Department of Interior, Atomic Energy Commission, and the like. Because of our background in this we feel we can help expedite this program.

Q. Mr. Aronson, you heard Mr. Frank talk about Rulison and the geology that was there, the stringers of gas-filled Mesaverde which cannot be commercially completed by conventional means. You brought a diagram with you. I wonder if you would just briefly tell the Commission

what happens when one of these nuclear devices is exploded, maybe tell them what it is in terms of everyday knowledge. Is it a hydrogen bomb or atomic bomb or what is it, and perhaps briefly show what happens when one of these is shot off?

A. I brought a couple of our brochures here and the center page has a diagram which I will give to you and I will work off of this one here. The setup on the projects are that for economics we are looking to use a thermonuclear device, this is your so-called hydrogen bomb. The reason being is the tritium that is used as the major factor is a lot less expensive than you would find in your normal, what you would call atomic or fission bombs. The approach to this is also to get as clean a device -- you have heard this -- radioactive free as possible. What we do now is place this device down in an emplacement hole which has been discussed, and this device is going to be in this case about 20 inches in diameter, and the device itself is like four feet high, with the diagnostics it will be more, but that is the package of energy that you have. You have an awful small source here and this is the entire Plowshare program is the idea of using this bundle of energy of tremendous power for use of these kinds of normal fracturing methods. All you are doing is furnishing a big bomb, a big boom. The idea now is that when this is detonated the source of energy releases a tremendous amount of pressure in the form of heat,

energy, light, and a lot of pressure. It will cause the surrounding area to contract a little bit and the tremendous power will expand to the point at which the overburden pressures in all equal the pressure inside of this cavity which is formed.

Now, this is in microseconds. Now a microsecond is a millionth of a second. To throw a commercial in here, the work that we do, like EG&G, they can get over 500 signals out of this device before it's destroyed in these milliseconds. They do it in what they call "nanoseconds." A nanosecond is a thousandth of a millionth of a second, and they can get 500 separate distinct signals out of there for diagnostic.

With this pressure that then becomes equated here, all of the expansion ceases. The temperature starts to drop and within a few seconds it then becomes a liquid, and the force or gravity pulls that down to the bottom. Approximately 95% of the radioactivity which was created in here becomes from the vapor into a liquid and falls down here and solidifies into an unleachable melt. All right, after all of this volume has been created then the overburden pressure comes in, and with this being in the case of Rulison 200 feet in diameter, the roof is unstable and starts to fall in. You end up with a configuration of this nature (indicating), taking the volume which was created

here and now being transposed into this entire volume.

Now what have we done? We have pushed out some of the surrounding area and we have fractured out for a considerable area. We have ended up with an area that with proper design can take your geologic formation and fracture across this so that in essence instead of a 7-inch well bore with permeability coming in you have ended up with a 200 foot infinite well bore, infinite permeability. Now why have we done this? In this area here there is a tremendous amount of porosity but little permeability. By creating this and fracturing out we have increased that permeability to a point that coming into this area will now, by production, become an effective and economical approach. So all we have done is just take a large source of power, completely contained, and put it into this configuration.

Q. Would you relate that to Rulison and how far below the ground and so forth, what you contemplate for Rulison specifically?

A. As Mr. Frank stated, until we actually drill down with that first hole and get the geology through this area the exact location of the shot is not planned. I might editorialize in this way and say in the long run we are talking about probably two shots of probably a 200 KT magnitude. However, we feel since this is an experiment we can get enough information and do it with a 50 kiloton, 50 to 60

kiloton, shot and get this kind of information. Based on the 50 to 60 KT, we are talking about a 200 foot radius and a height of 500 to 550 feet in this area.

Now the approach is that you will be down at least 7500 feet, and the AEC has come up with a handy-dandy rule of thumb that the area of containment for safety and all should be based on a factor in this kind of material of 400-W, which is the yield to the one-third power or the cube root of that. So you are talking about a system here that over 2,000 feet of cover is more than is really required for safety purposes. So as far as containment and all, this is more than adequate for all AEC safety standards.

Now the emplacement I might speak on for just a minute here would be putting this device down on a small drill string and then alternately stemming this entire hole with grout and a very dry angular sand which takes up this cushion, and the stemming will be designed with a safety factor which will be more than we have ever used before simply because we have a lot more space, but the laboratories say anything over 2,000 feet from the device to the top of the stemming is adequate. That is all we need.

Q. In this case you are looking at something like 6,000 feet?

A. Well, we would not completely stem the hole on this for probably 2,500 feet, and then the rest of the

stemming would be much lesser type grout.

Q. Could you tell the Commission a little bit about one of these that has already been detonated to the extent you may have knowledge that is not classified? What happened when this was tried at Gasbuggy as far as anybody knows?

A. Gasbuggy was the first shot that was actually fired in a gas-bearing formation. We have shot, as Mr. Frank said, over 200 shots in all kinds of other geologic formations: dolomite, granite, basalt, but never in an actual gas-bearing formation, and all of the results to now on Gasbuggy look very favorable. Some of the problems, and I am sure you have seen in the newspaper, were strictly conventional drilling problems, the nuclear did not enter into it at all. The results as we see them now are that the shot went off without any kind of venting, therefore, the stemming design was proper. There was no seismic damage, no claims, no problems along this nature; some people calling in, but no real claims. The drillback, which was conventional again, they had a problem. They came into the cavity within one foot of predicted height. They had predicted -- this was a 26 kiloton explosive. Now let me say a kiloton is the equivalent of 1,000 tons of TNT, so we are taking again a little package about this big and we are cramming a heck of a lot of power into it.

On Gasbuggy this 26 KT was predicted to have

about a 334 foot high chimney and they hit at 333, so the prediction was quite good on this. We have gotten into a gas sample. However, this was just last week and the analysis has not yet come out. The idea being now is to shut the hole up, analyze this gas sample, and then that would predicate when they would go back in and start their production testing. A wild guess of say six months would be probably a reasonable time to go back and start testing, but as far as the majority of the items the project was a complete success.

It was not ever considered to be a fully commercial experiment. It was quite expensive. It was the first one -- El Paso really had their necks on the line. because of the possible public opinion against the nuclear explosive and all. They have cracked a lot of barriers which aren't strictly technical but are something that is leading to the acceptance very very readily.

Q. Mr. Aronson, you mentioned this feasibility study which has been furnished to the Commission. This is the blue one?

A. Right.

Q. Did you have a hand in preparing that?

A. We prepared this by going through what we know the AEC is going to require. This is one of the back-up services that we have of having done a lot of this for the AEC, and also knowing what we haven't done what else is

required, we built this document up based on what would be required for acceptance of the project by the Atomic Energy Commission.

Q. There is a study of the safety factors which might be involved in this particular area in there, is there not?

A. Yes, not as detailed as it will be before we finalize this, but would you want to go into that a little bit?

Q. Yes. Would you briefly tell the Commission some of the things that you considered in terms of attempting to determine what might happen on the surface and to water and grazing and animals, people, buildings, roads, and so forth in making this study?

A. We made a very extensive surface check of the entire area, first from the proposed area to see if there was any geologic faulting and the like that showed up on the surface. The criteria from the AEC based upon a 2,000 foot depth shows you should not have a fault any closer than 1,000 feet. We found no problems in that and we are much deeper.

Along that line, some of the final determinations to be made are that we have developed computer programs through our basis in the oil company, mainly through Continental Oil, that with the production testing which we will do in this hole can predict some of the underground geology to faulting, flat spots and curves. We then extended our survey out to look at any kind of surface facilities,

buildings, what have you, streams and the like. We went in as far as -- well, we hit Rifle and this entire area and we made a good check of buildings and the like to see what we thought and came back with our predictions and located this in a place that as far as the seismic area there could be some plaster cracking but there is not any kind of a damage to facilities.

In the area of water we did a lot of work on this, checking it out and, of course, completing this as we go down the hole now. The surface water on Battlement Creek and all this is so far below any place that would be close to any fracturing that the surface facilities would have no problems whatsoever. As an example, we have shot two times in Hattiesburg, Mississippi, at depths of 2500 and 2600 feet. Above that shot zone we had three full water bearing strata and none of them had any trace of radioactivity.

Now there is a tremendous amount of work that goes into this, checking the migratory water systems and all, and the AEC absolutely will not allow any shot to go unless they are firmly convinced of the safety of these things; so that we have, with our background, researched the surface facilities down as far as any known water bearing strata to see what kind of migration there is, so this has been quite thoroughly checked.

We have gone into other areas too based on

what they have done overseas and here, even to seeing what kind of percolation might evolve from the depth of a shot. We have done this in Nevada extensively and all of these shots, the majority of them, are just in an alluvium, just a big rock pile, and they poke down pieces of data-gathering instruments to see whether there has been any percolation, and this does not come about so that at 8,000 feet the assurances of any kind of surface leakage is not there.

As far as shooting the device, you have to take into consideration the time of year. There are some range cattle and the like up there during the summer. You just don't shoot when they have hunting season or any cattle up there. So all of these things have been pretty well -- and this is why we are saying late in the fall would be the earliest or in the winter sometime when there are not people around.

I repeat one thing: that this is researched to the point that the AEC has gone through all these things will not approve the shot until all precautions have been taken.

Q. Is it fair to say that just as a matter of conclusion that there is no possibility of this shot venting to the atmosphere?

A. I am going to have to hedge on this one. There has never been a shot venting to the atmosphere through a

drill hole that was stemmed. Now there has been venting to the atmosphere in some various shots, mainly through tunnels, and that is about as far as I can go. I don't think that you can make an absolute statement that it would never never happen. Conversely, I would like to say though that we have run calculations on venting to the atmosphere and that the total affluent from a device yield of this type would be the same as the affluent from a stack of a coal-burning power plant putting out 1,000 megawatts of power in two days. Please appreciate, gentlemen, that this radiation is something that people have lived with all of their lives. You can move from Los Angeles to Denver and get more solar radiation because of that one mile closer to the sun than you would get from all the atmospheric tests that have gone on since 1945. I am trying to just put this in perspective.

Q. Really what I mean is, is there any possibility that this thing will blow out through the surface?

A. It has never been done before on any kind of a drill hole. That is about all I can say.

Q. And from what you know and the studies you have made and so forth, is it fair to say that there is no reasonable possibility of any effect on existing water supplies out there, surface water supplies?

A. No, no.

Q. Would you describe briefly what safety and

monitoring facilities will be involved in this?

A. For the first project the start of the area would have around the surface emplacement hole what they would call "Rams", remote area monitory systems, for detection of any kind of radiation which could possibly come up. Now on Gasbuggy they had a leakage out of one of the control cables, and all they did was cut it off and put a tie on it, but the quantities are that finite in picking up radiation. Then you would have, through the Public Health Service, either state or federal, some kind of background counting systems, which we already have out, by the way, to check the area for any background. There is considerable, especially on the Western Slope of just where the air has leached some of this uranium, you get a background count, so we want to make certain that there is no adverse reaction against somebody who gets a count or sees a count and it should be documented as to whether this caused it or whether this is a normal background area.

In addition to that, we plan to make, of course, a very over-all structural check of all of the buildings and document the various areas with seismographs and all for any possible kind of damage.

Q. Will you limit access to the area at the time?

A. The area will be closed off and very closely controlled by the operations people. There will be no one in

the area or any even animals close to the shot zone. I might talk about animals. I appreciate that everybody always thinks about the deer and all in that area. We have deer that have been living at the test site for 15 years and if anything they have prospered from it by everybody feeding them. We have never had a problem from anything to rodents, to rats, to rattlesnakes.

Q. It doesn't hurt them?

A. No, sir.

COMMISSIONER HOFFMAN: Does anybody eat the deer?

THE WITNESS: Yes, sir, when they catch them.

The problem is that is sort of illegal too.

COMMISSIONER HOFFMAN: I didn't mean it from a legal standpoint.

THE WITNESS: Yes, sir.

Q. Mr. Aronson, in this area there are recognized and known deposits of oil shale. Could you describe what will happen to the mineability and availability of this oil shale for future use?

A. Well, the shot is scheduled at such a depth just to cover the Mesaverde formation for the gas and will not fracture even any kind of formations above that, and if there is any concern regarding any kind of mineability of any of these things the radiation is contained in that area and the only place that you would get any radiation

aside from that is bringing any gas to the surface, so that if you are a few hundred feet away in any direction in any of the geologic formations that is not involved. We have run tests with drill holes, cased holes and uncased holes, as close to 100 kiloton detonations at 1,000 feet and have not gotten any fracturing or anything in the holes themselves. We put a fluid in them and noticed a pressure raise through them, but that is it. In the case of mines, we have several tunnels at the test site which have been unharmed. As a matter of fact, we have even complexes. We have one simple tunnel and may shoot two or three shots over the same tunnel, so as far as running any kind of existing mines at all, if you are that close you just don't shoot.

Q. One final question. Would you describe briefly the various relationships of the people who are going to be involved in this. Starting with the Atomic Energy Commission, what is their specific function and at what point do they exert influence and control and so forth?

A. Well, the AEC you must appreciate is unique of all government services where it contracts for all its work. The AEC has, out of 125 to 135 thousand people, only 4 or 5 thousand actual employees of AEC, the rest of them are contractors, and this is why we go back and we do the work for them.

In the case here, the AEC we feel will always

have the responsibility for the device itself, as far as the manufacture, the design, storage, the transportation of the devices, they will always have the ultimate responsibility or say-so on public safety. We would work in this framework of furnishing the necessary back-up information for the various safety contracts and all these that could be accomplished outside. It is possible in some of the early shots that we, as industry, would use an AEC contractor to do some of this work but it would all be contract type things. The AEC has a responsibility for the control and they would hold the device. The rest of it will be done by us.

Q. Is there anything else you would like to tell the Commission about this shot?

A. Only that we see a tremendous potential in this and feel that if properly done in the early stages that this can be a successful approach to some items which are now uneconomic, not only the oil and gas, but possibly the mining in this state too. The reason for saying that is that we are being doubly cautious in these initial shots off the test site for the beginnings of the commercial approach so that we will not have any kinds of problems in the safety area mainly, but selfishly we just can't afford to have any kind of venting or any kind of claims like this; so the precautions that will be done in this, if the shot goes,

and I am saying that if, the AEC will not allow it to go unless they are assured of all things being taken care of.

MR. VOORHEES: Are there any questions from the Commission?

CHAIRMAN BRETSCHNEIDER: Any questions from the Commission or the staff?

MR. ROGERS: No.

CHAIRMAN BRETSCHNEIDER: Any from the audience or others here interested in the project? Would anyone like to ask the witness any further questions? Under those circumstances I think the witness is entitled to be excused.

(Witness excused)

MR. VOORHEES: If the Commission please, I forgot to ask Mr. Frank one question and I would like to recall him and ask him the question.

CHAIRMAN BRETSCHNEIDER: All right, sir.

G. W. FRANK

having been previously duly sworn, was thereupon recalled and testified further as follows:

DIRECT EXAMINATION

BY MR. VOORHEES:

Q. Mr. Frank, the Commission is being asked to approve the Unit Agreement and the Unit Operating Agreement under a statute which permits this kind of approval as in the public interest for conservation or as reasonably necessary to

increase the ultimate recovery or to prevent waste of oil or gas. Now you went into the history of prior wells in this area and what you expected to get out of the nuclear completion, and in order to pull that together specifically in the language of the statute I will ask you if in your opinion this Unit Agreement and the Unit Operating Agreement are in the public interest as reasonably necessary to increase the ultimate recovery of gas from this area?

A. Simply, yes. It's an obvious thing I believe that without this type of engineering involved that that gas will remain there until some better method is found, so nuclear engineering is our approach to this and certainly will, if successful, make this area a commercial gas reserve as opposed to a non-commercial now.

Q. One final question. It is correct, is it not, that it would be unfeasible to attempt this nuclear completion except on a unit arrangement? In other words, it would be impractical to do it on a lease-by-lease basis?

A. Very impractical, I am sure you can understand.

MR. VOORHEES: That is all.

BY COMMISSIONER HOFFMAN:

Q. Was your previous testimony that the size of this reserve was 200 billion per section?

A. No. Our feasibility study shows this also, but we have had four reserve analyses completed on this and they

range from 90 to 125 billion cubic feet per section, per 640-acre section.

Q. I thought I heard you mention 190 to 200 billion. Where did I get that, just misunderstood you?

MR. VOORHEES: They did indicate that the present production of some of these wells were 150 MCF.

Q. Well, your testimony is 90 to 125 billion per section?

A. Yes, sir.

Q. Rather than the 200 I thought I heard?

A. Yes, sir.

Q. So that is the size of the thing that we are protecting or trying to find or get?

A. I think that we have estimated that in just this small area. Certainly we don't control all the gas in that area there but there is in the order of 9 to 10 trillion cubic feet of gas underlying those properties.

COMMISSIONER HOFFMAN: Okay, thank you.

BY CHAIRMAN BRETSCHNEIDER:

Q. You mean the properties under the unit?

A. Under the Rulison unit, yes, sir.

Q. Under the 50,000 acres?

A. Yes.

Q. How much would be outside roughly?

MR. VOORHEES: 94.6%.

CHAIRMAN BRETSCHNEIDER: Yes, you mentioned that.

MR. VOORHEES: It will be more than that I think.

A. We are still receiving signatures for approval of this.

COMMISSIONER HOFFMAN: For the record you are not asking for forced unitization?

MR. VOORHEES: No, sir.

COMMISSIONER HOFFMAN: And those who are not signed will simply be outside the unit for participation?

MR. VOORHEES: That is correct. We are asking for approval of this agreement which is between the parties who have already signed. We are not asking that anybody be forced to unitize.

CHAIRMAN BRETSCHNEIDER: Would anyone be entitled to sign it afterwards?

MR. VOORHEES: Yes. There are provisions -- I can qualify that -- there are certain leases in here which have a provision in the lease itself which says that if there is a unit which is approved then that lease interest is committed to that unit. This is an agreement entered into by the lessor when he signs the lease itself, so those people, I presume, would be subject to the unit since it is approved by the United States and hopefully if it's approved by this Commission, but this is because of the provision in their lease which provides for that.

CHAIRMAN BRETSCHNEIDER: Would anyone else like to ask the witness any questions?

MR. VOORHEES: I might say this: that a notice of this hearing was mailed to every person that we know of who has an interest in this unit area and who has not signed the unit. That mailing was done and there is in the files of the Commission an affidavit to that effect.

MR. ROGERS: Yes, we have that affidavit on file.

MR. CRUTCHER: On this 125 billion you referred to, is that gas in place or recoverable?

THE WITNESS: That is gas in place.

MR. CRUTCHER: Do you have an estimate on recoverable?

THE WITNESS: Probably a maximum of 50%. We would anticipate that each well will recover in the order of 17 to 18 billion in the first 20-year period.

MR. NELSON: Has the cost for the AEC for this shot been budgeted?

THE WITNESS: No. We anticipate contractual negotiations within the next month to six weeks. We also anticipate the total cost of our project to be considerably less than that of El Paso's which was publicly quoted as 4.7 million dollars. It's pretty obvious, I believe, that the economics are such that you couldn't afford to spend 4.7 million dollars and make money out of their project, or perhaps ours. Although negotiations have not started on

the contract, we anticipate paying for all those things that industry can pay for.

MR. NELSON: Is the contract negotiations and the budgeting a simultaneous affair?

THE WITNESS: No.

MR. NELSON: What are the mechanics?

THE WITNESS: Of course the Budget Bureau controls that money that goes into the government's portion. However, there are certain portions of their costs which are already allocated under their annual grant which this year happened to be 20.6 million dollars toward this Plowshare program. We anticipate using a very small portion of their budgeted money because of the different outlook that AEC now has as compared to what it had at the time of the El Paso project. You know the budgeting in Washington is extremely severe right now and no money is spent on anything without going back to the Budget Bureau, so their costs on the project similar to ours would be very minor.

MR. NELSON: You will have two steps then: You will have the contract negotiations with the AEC and then you will also have the steps necessary to get the budget approval for the Rulison shot or the AEC will have to go through that?

THE WITNESS: Yes.

CHAIRMAN BRETSCHNEIDER: Have you concluded your presentation?

MR. VOORHEES: I don't know if Mr. Jaco is here or not. I think Mr. Haymaker of the United States Geological Survey is here, I wasn't planning to call him but if you would like to have him say something, why, he is available, I believe.

CHAIRMAN BRETSCHNEIDER: Would you like to say something, Mr. Haymaker?

MR. HAYMAKER: I don't think there is much that can be added to what has already been said other than I will confirm that the unit program has been reviewed and approved by the Geological Survey and Department of the Interior, and as far as I know there has been no part of it unapproved.

CHAIRMAN BRETSCHNEIDER: Your department is fully in favor of the program?

MR. HAYMAKER: Yes, sir.

MR. VOORHEES: That is all we have.

CHAIRMAN BRETSCHNEIDER: Does anyone else wish to have anything to say or ask a question?

MR. SCHWAB: Excuse me for my ignorance, but since you mentioned that if somebody is a holdout they would be excluded from the unit itself, would you clarify that for me please?

MR. VOORHEES: The unit has been approved and therefore operations can be conducted under it. The area around that could conceivably be affected by the initial shot

is 100% committed, there are no outstanding interests anywhere near this first shot. I would assume that no unit operations would ever be conducted on a piece of land which was not 100% committed, but such land might conceivably be entitled to some form of participation. If that interest in that piece of land had not been committed, then obviously there is no relationship between that interest and the right to participate under this agreement, so it would not participate. Now in the event there was a piece of land which actually had gas coming out of it for example and there was an interest in there which was not committed, and I can't really conceive of that possibility because I don't believe this amount of money involved in these shots would be spent on any tract that wasn't 100% committed, but if that happened then there would, of course, be a separate accounting to that person on the basis of the volume of gas coming out of his tract and he would participate on the basis of what was produced, not what was allocated to that particular tract.

MR. SCHWAB: Also in this respect though -- I agree I feel there would be no property damage or anything -- is there a surety bond to be placed in case of damage?

MR. VOORHEES: There is an act of Congress called the Price-Anderson Act which makes available 560 million dollars to pay damages for a nuclear accident of any kind, and it's as broad as it can be drafted which occurs under

the Plowshare program, so the possibility of an uncompensated damage claim arising from this is nil.

MR. SCHWAB: Thank you.

CHAIRMAN BRETSCHNEIDER: Anyone else now?

MR. ROGERS: No, sir.

CHAIRMAN BRETSCHNEIDER: Under those circumstances we probably can close the hearing and thank you very much for all the information you have given us, it was very enlightening as far as I am concerned.

I want to give the Commission an opportunity to vote on this problem. Gentlemen, you have heard the testimony of the witnesses and you have heard the discussion of the problem, how do you wish to handle it? Do you wish to vote on it now?

COMMISSIONER SCHMIDT: Yes.

CHAIRMAN BRETSCHNEIDER: Do I hear a motion that the Commission approves the action called for?

COMMISSIONER SCHMIDT: I make such a motion.

COMMISSIONER DUNN: Second.

COMMISSIONER HOFFMAN: Just a comment. I think our approval of the use of nuclear devices should be limited to our function which is conservation and methods of conservation itself. I think we should have a very clear statement and I wish you would make one as to our responsibility in that respect and that in our opinion the AEC is responsible

for all safety and other matters. Would you make such a statement?

MR. VOORHEES: I might say that the application requests your approval of the use of nuclear completion techniques only to the extent that their use is approved by the AEC, that is in the application.

COMMISSIONER HOFFMAN: I am only hoping we can get a clear statement of what we are approving in that respect.

COMMISSIONER SCHMIDT: I move that we approve the Unit Agreement for the development and operation of the Rulison Unit Area, Garfield and Mesa Counties, Colorado, and the Rulison Unit Operating Agreement, and approve the use of nuclear completion methods in unit operations to the extent that they are approved by the Atomic Energy Commission, and I make that motion.

COMMISSIONER HOFFMAN: I think that makes it clear as far as we are concerned.

COMMISSIONER SCHMIDT: I make that as a motion.

CHAIRMAN BRETSCHNEIDER: You are making that as a motion now?

COMMISSIONER SCHMIDT: Yes.

COMMISSIONER HOFFMAN: I will second that motion.

CHAIRMAN BRETSCHNEIDER: The motion has been made and seconded that the unit be approved as dictated by Commissioner Schmidt. All in favor signify by the usual sign.

COMMISSIONER SCHMIDT: Aye.

COMMISSIONER ROUNDS: Aye.

COMMISSIONER DUNN: Aye.

COMMISSIONER HOFFMAN: Aye.

CHAIRMAN BRETSCHNEIDER: Aye. Contrary? It
is carried and so ordered.

(WHEREUPON the hearing in Cause No. 139
adjourned at 11:45 o'clock a.m., January 16, 1968.)

C E R T I F I C A T E

I, Donald E. Weimer, Certified Shorthand Reporter, hereby certify that I personally recorded in shorthand the proceedings in Cause No. 139 of January 16, 1968, in the first instance, and that I later transcribed the same and that the foregoing record is true and correct to the best of my knowledge and belief.

Donald E. Weimer

Certified Shorthand Reporter