

thing in which the Atomic Energy Commission people probably are going to have to provide much of the leadership in terms of timing. Much of this will come out of their budget rather than our own, of course.

I can say, on the basis of my talks with Dr. Seaborg the other day, that they are very enthusiastic and very anxious to move as rapidly as you can lay out an orderly program.

I think probably something like Project Bronco is a couple of years away or it may be three, but if Gasbuggy goes well, I think this will encourage everyone to move on to the next stage and see what can be done in oil shale.

Senator Moss. You indicate that probably 20 percent of the oil shale is in private ownership now and that under this blocking up program I would assume there is a likelihood that larger blocks will come under private ownership control.

Do you envision that there might be some acceleration if the private landowners want to get the cooperation of AEC, to try to develop the *in situ* process earlier?

Mr. UDALL. No. My own feeling would be because of the public interest factor that the AEC would want to carry out its initial programs on Federal lands in order to do the maximum that it could to help the total effort here, to develop the technology, develop a process, rather than to give an advantage to any particular individual or company or group of private owners.

Now, the pattern you have in Gasbuggy includes my Department, the AEC, and a natural gas company. In that instance the patents and everything else will be fully protected because what the AEC wants and what we want is that if this proves possible and feasible, that we don't give it to one monopoly, one company or small group of companies. It must be available to everybody so that the whole country gets the advantage of it. I think this is the thing that we want to keep our eye on in terms of the development aspect.

I would add one other factor, Senator, as far as Project Bronco is concerned. Many of the private holdings are said to be quite thin or shallow. This is understandable because many of the patented mining claims were made on visible outcrops. It is our operating theory, on the other hand, that atomic explosions will be most useful where the deep deposits are. The Piceance Basin is undoubtedly the place to begin in terms of the richness of the deposits that are there. The economics will be more favorable in that region than to use these expensive explosions elsewhere.

Senator Moss. Do we know enough about the technology of this yet for you to tell me whether, using the nuclear energy on the oil shale, the kerogen, would eliminate and preclude any extraction of dawsonite or other mineral there? Would this nuclear method wipe it out?

Mr. UDALL. We don't have the final answers on this but I think the preliminary indications would be that it would not if you do these correctly.

Senator Moss. There are some people who are interested in this area who believe they have a patented process now for the use of nuclear energy to extract oil. Is there any conversation going on with the AEC about the use of this patent?

Mr. UDALL. I would rather you ask the AEC people the question on this, Senator. I am not really qualified to give you much of an answer.