SUMMARY OF OXY'S MIS RETORT START-UP DEVELOPMENT PROGRAM

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When the Phase I Cooperative DOE/OXY Program was completed in 1979 with the operation of Retort 6 at Logan Wash, there were a number of technical areas that clearly required more development work to advance OXY's MIS technology to commercial readiness. The major areas included:

-Rubblization, to provide more uniform void distribution.
-Retort inlet and outlet design to provide improved sweep efficiency.
-Retort ignition development to provide as rapid and uniform ignition as possible.

Development work on these and associated aspects was a major part of the Phase II Cooperative DOE/OXY Program that will be completed when full-scale Retorts 7 and 8 finish retorting later this year. The rubblization work will be reviewed by OXY's Tom Ricketts later today and has been reviewed on earlier technical programs that many of you attended Our work on retort inlet design has been discussed to some extent in the Quarterly Progress Reports submitted to the DOE in fulfillment of our obligations under the Cooperative Agreement. More detailed review of this work will be performed in summary and final reports to the DOE and in technical presentations and publications that OXY plans to prepare after Retorts 7 and 8 are completed. Part of our work on ignition has also been discussed briefly in the Quarterly Progress Reports; however, much of this work is proprietary and has not been presented. While we do plan to disclose this important work at future technical meetings, we feel that a review at this Symposium as a preface to Sandia's presentation on Mini-Retorts 3 and 4 would be in order because as Dr. Hommert emphasizes in his paper, OXY's Mini-Retort Program was specifically designed to provide optimum ignition systems and procedures for Retorts 7 and 8. The Mini-Retort outlet configurations and collection systems were therefore not designed with complete retorting as an objective, although once the retorts were ignited we did decide to operate them to completion.

To provide a sound basis for designing effective ignition procedures, laboratory studies were carried out at Occidental Research Corporation to define quantitatively the behavior of oil shale under conditions of temperature and gas composition expected during ignition of MIS rubble. These studies were carried out using thermogravimetric analyses and differential thermal analyses on the range of the oil shale grade and ignition gas conditions expected in our operations. The results, which defined the effects of the independent variables on the "ignition temperature" were used to develop startup procedures that could be tested in a 15.2 cm diameter packed bed pilot retort having a 16 kg capacity. The procedures demonstrated in the 15.2 cm retort were then studied in a 1.2 meter diameter pilot retort with 1.5 tonnes capacity where the effects of shale particle size could also be determined. Improvements in the ignition procedure were developed in this system.

To supplement these pilot ignition studies, two additional pilot retorts were constructed later in 1980 to enable simulation and modelling of the flow patterns and heat transfer mechanism expected in the field retorts having both a plenum for ignition and retorting and a bulked full configuration. These studies, which continued after ignition of the Mini-Retorts, have been very useful in designing the systems that were used to ignite Retorts 7 and 8.

Additional concurrent analytical work that supported these programs include development of analytical models and associated computer programs for simulating the heat-up of the rubble surface and the plenum surfaces and the effects of the heat-up conditions on roof behavior, a very important aspect of large scale MIS retort ignition.

The Mini-Retorts that Dr. Hommert will discuss next were ignited using the procedures developed based on this comprehensive program. In addition, a third Mini-Retort, MR-1, was constructed and ignited using a hot inert gas generator to demonstrate the final procedure that was used to ignite full-scale Retorts 7 and 8.

Retorts 7 and 8 were ignited in January, 1982 and December, 1981, respectively, and are

presently running at the designed retorting rates. We expect to discuss the ignition and operating performance of these retorts in upcoming reports to the DOE and in future technical meetings on oil shale.