FIGURE D–18.—Launch complex 39D with vehicle 500 F in place.

Over the past year, we have had some troubles, and here is an event which I thought would be of interest to you. Figure D–19 is the liquid oxygen storage tank at pad A. This drawing (fig. D–20) will be used to illustrate the operations of this facility and the problem that occurred. The lox tank is a large tank, as you can see. The outlet pipe is located as shown in the figure. It has an outlet out to the pads, through the T joint and by the redundant lines.

These two pumps, each capable of 10,000 gallons flow per minute, serve the two outlet lines. From the T the line goes in this direction through a manual valve, through an automatic valve, which could be actuated remotely, then through the pump and up to the pad.

At the time the accident occurred, this particular line (fig. D–21) was being used. What happened was that suddenly this pipe broke as shown. An analysis showed the following series of events to have occurred: (1) The manual valve was opened and then the automatic valve started to open by remote control; (2) as the second valve started to open, gas against the face of the valve came through very quickly; (3) suddenly the gas was followed by a wall of liquid oxygen which impinged on the valve element opening against the flow of liquid, and the forces were such that it broke the pipe; and (4) the section at the flexible connection broke, as you can see.

A point that I would like to make is that the operation just described is, in fact, an R. & D. effort. The flow of liquid oxygen through this pipe is 10,000 gallons a minute. Nobody has done that before. We