

Interoffice Communication

To Veldon Messick, Chemical Plant, Aberdeen

From Cindy Ziobro, MED, Ponca City

Date September 27, 1982

Subject RESULTS OF TESTING RUPTURE DISKS AT BS&B - ABERDEEN

Conclusion: Burst tests at BS&B showed that damage in the center of the dome is much more critical than damage in the outer radius. Testing also showed that changes in dome curvature and height, due to damage, are much more critical than scratches or nicks which do not change the curvature of the dome.

Discussion: On August 23, 1982, John McCulley (PED), Cary Brown (PED), Craig Johnson (MED), Renny Fritz (OKC), Veldon Messick (Aberdeen) and Cindy Ziobro (MED) attended a meeting with BS&B in Tulsa to evaluate the scratches found by the Aberdeen plant on lot 82002673-1. These were 6" disks which were rated at 189 psi at 72°F.

Several disks were burst as they were, when they were received at Aberdeen. One of these disks ruptured at 174 psi which is below the $\pm 5\%$ tolerance. The attached table shows the results of all of the tests. Some of the disks were intentionally "damaged" by Conoco in an attempt to determine what types and sizes of damage were critical.

BS&B have done testing to determine the reversal pattern for the SB90 disks. They have shown that the disks should begin reversal from the center and then rupture. Figures 1 and 2 show some of the disks after the rupture. After the rupture some disks appear to have opened evenly like Figure 1. Others appear to have rolled through the reversal and started the rupture on one side (Figure 2). However not all disks which opened unevenly ruptured at a low pressure. Figure 3 shows a disk (No. 3) which was damaged with a large dent.

Another theory on the cause of scatter of burst pressures within one lot was the dome height. Disks are made with a set hydraulic load. Thus the dome height may vary from disk to disk within a lot. Dome height was recorded on the majority of the disks. No correlation could be drawn from this data.

Perhaps, the most significant test was performed on disks 13 and 15. These disks were damaged in the crown area and the dome height was changed only 0.011" and 0.006". The damage was very difficult to detect without measuring the dome. Both disks ruptured below the $\pm 5\%$ pressure limit. Therefore any such damage occurring after the 90% proof test of the disks could go unnoticed. If the plants want to monitor this type of possible damage, the dome heights would need to be measured after the 90% proof test, prior to installation. Then the dome heights could be measured after being in service and compared to the original height. If a change did occur, it would prove that damage was occurring in the process.

Veldon Messick
Page 2
September 27, 1982

Samples of the scratched disks are being prepared for each plant. This will provide a reference for the mechanical personnel involved with inspecting the disks for damage.

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