

Early Saturn V Propellant Systems Activities

By Ed Fannin

This occurred on one of the early SATURN V APOLLO launches, while I was still housed in the launch control center. We were nearing the final part of the countdown and would be going into the terminal count that night. It was about 1:00 PM and I was getting ready to go home to get some sleep before coming back in about 10:00 pm just before the start of propellant loading.

My S1C section chief came into the office and told me that Boeing, the S1C stage contractor, was having failures of one of the regulators (reg) in their GSE and the engineers didn't have clue as to what was wrong. The purpose of the reg was to supply helium to perform a critical function in the LOX suction lines which was to initiate "thermal pumping" to prevent "geysering" in the suction lines which fed the big five 1.5 million pounds of thrust F-1 engines. Remember that the LOX suction feed lines were quite long, the LOX tank being located above the fuel tank and passed through the fuel tank to the engine compartment. It would become even more critical if we had a cutoff in the terminal automatic sequence with a very real potential of significant damage to the suction lines and the F-1 engine LOX pumps.

I had no choice but to call my boss Dr. Hans Gruene, Director of Launch Vehicle Operations, (LVO), explained the critical nature of the reg function and recommended that we not start propellant loading until Boeing fixed the reg. He asked the telephone operator (during these critical time periods the operator stayed on the line to be able to get others as needed), to get Rocco Petrone, Director of Launch Operations (LO) on the line. Rocco came on and Dr. Gruene asked me to explain to Rocco my concern and recommendation, which I did. Rocco agreed to hold propellant loading until Boeing fixed the reg and instructed Dr. Gruene to call the Boeing Chief engineer for the S1C and tell him we would not proceed with propellant loading until they fixed the reg.

Well you can imagine what that did; a lot of scurrying within the Boeing organization, phone calls amongst Boeing and the reg vendor to find the problem. Rocco told me to go home and get some rest before coming back in, which I did. I returned as planned about 10:00 pm and was told there was a big meeting in the conference room, so I went there. When I opened the door Rocco called out, "There he is!" (Rocco was always very pleased when one of "his people" elevated a potential problem to management). Wow, all of the NASA hierarchy was there it seemed. Rocco, Dr. Gruene, Dr. Debus - Director of KSC; Dr. Wernher von Braun - Director of Marshall Space Flight Center; NASA Headquarters people; KSC program people; Dr. Arthur Rudolph - SATURN V MSFC program Mgr., and the Boeing launch site managers, plus others.

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Rocco had me explain the criticality of the reg. function which had to do with keeping “geysers” from forming in LOX suction lines by coalescing bubbles from the boiling LOX to one large bubble which could “sweep” the line and result in damaging water hammer by the refilling of LOX in the line. It turned out that the reg vendor was installing the wrong part in the reg causing the failure so that was corrected, 2 regs were pre-tested, flown to the launch site, one installed and tested in the console, and we proceeded with a successful launch.