

FY00 Status Report on the Hydride Storage Vessel (HSV)

by

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September, 2000

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SMTD

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Summary

The HSV in storage in MTF has been monitored during FY00, and its overpressure has been sampled and analyzed. The HSV's internal pressure continues to rise slowly, and the overpressure still analyzes as 100% ^3He . Because conducting annual isotherms on the Ti sample seemed to significantly alter its ^3He release characteristics, an annual Ti sample isotherm was not determined. The Ti sample overpressures continued to behave as expected based on past performance.

Part 1. The Hydrogen Storage Vessel

The first loaded HSV, HSV-002, was loaded on April 3, 1996 and delivered to the MTF where it was installed on a monitoring manifold. The HSV's temperature and pressure have been monitored since that time. A plot of the raw pressure data is shown in Figure 1. This Figure extends the data range of the same figure in the FY99 report. As such, all prior comments regarding the data still apply to the regions present in FY99.

In general, a pressure increase is observed with time. This increase is showing some curvature now, although the process of grab sampling the overpressure induces significant upsets to the profile. The straight-line fit reported in FY99 still seems adequate enough to suggest no catastrophic pressure increase is expected in the upcoming year. At that point however, some more sophisticated calculations may be in order to try to predict subsequent behavior. As reported last year, based on the straight-line fit "It would take over 1500 years at the current generation rate to reach 500 psi." Of course, that generation rate will significantly change when the breakout point is reached.

The HSV overpressure was sampled on Sept. 6, 2000. The overpressure sample was analyzed on Sept. 7, 2000, and contains 99.98% ^3He , with 0.013% of all three-hydrogen isotopes detected.

The plot has a new problem point indicated, near the end of the current data. A flat portion can be observed there. This was due to the Baratron Signal Conditioning Unit (Type 670) freezing up at a fixed number. This condition was discovered during the grab sampling, and was corrected by cycling the unit's power.

Part 2. The Titanium Tritide Samples

Nine titanium tritide samples were originally prepared with varying tritium and deuterium loadings for long term storage behavior studies. One sample had been used to collect pure tritium isotherm data on an annual basis, but this sample is now retired (Ti-3). Figure 2 presents the on-board pressure sensor reading for the Ti samples so equipped (formerly Figure 3 in the FY99 report). As above, the new data has simply been added to last year's Figure, so all prior commentary is still applicable. No unexpected behavior is noted. Ti-2 continues to show a more significant pressure increase than the rest, as it has always done.

Pathforward

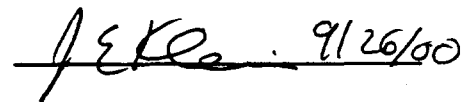
In FY01, the HSV and Ti samples will continue to be monitored.

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Peer Review
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Figure 1.

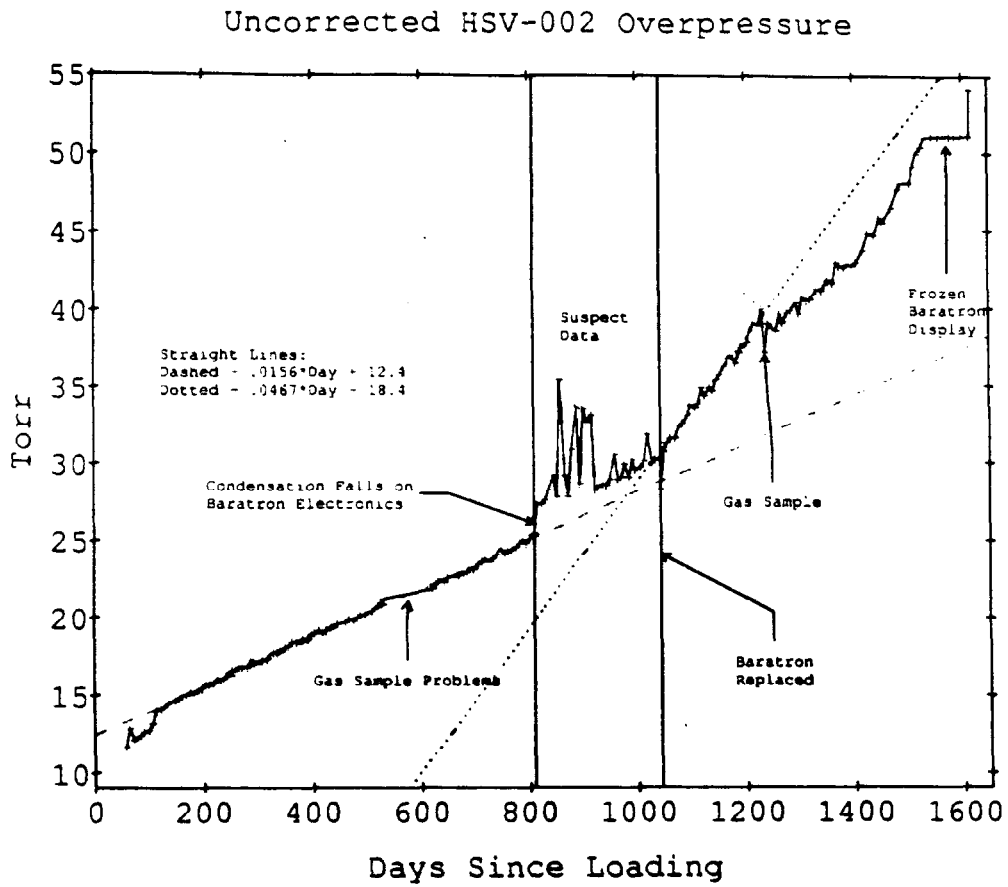


Figure 2. Ti Sample Cell Pressures

