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B/L: 72.02
SYS: Hypergolic
Vapor
Scrubbers,
SLS-1

Critical Item: Relief Valve (1 Item Total)
Find Number: A137585
Criticality Category: 1S

SAA No: PS000000-001	System/Area: Hypergolic Vapor Scrubber/ SLS-1
NASA Part No: 79K80451-4	PMN/ Name: S70-0570-04/ GN2 Purge Panel
Mfg/ Part No: Anderson, Greenwood & Co./ 81JS48-4	Drawing/ Sheet No: 79K18888/ 4

Function: Provides overpressure protection to the panel output.

Critical Failure Mode/Failure Mode No: Fail open/PS000000-001.001

Failure Cause: Broken spring/damaged seat due to corrosion/fatigue.

Failure Effect: Loss of GN2 hazard proofing purge to vapor scrubber's pump and electrical boxes could result in fire/explosion possibly causing loss of life in the event of a hazardous condition.

Time to effect: Loss of GN2 flow to the scrubber pump and electrical control boxes would take seconds. Loss of GN2 atmosphere in the purged enclosures will lag loss of GN2 flow by minutes.

Detection method: Pressure drop detectable on downstream scrubber pressure gage which is monitored continuously by personnel during scrubber operation.

ACCEPTANCE RATIONALE

Design:

- This component was designed in accordance with NASA Specification 79K80451-4.
- Component specifications:

	<u>Rated</u>	<u>Actual</u>
Set pressure (psig)	55-82	56-61

- The proof pressure is 1.5 times set pressure.

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• **Materials:**

Body, Spring - 316 SST to provide a long life, rust-proof spring.
Internal metal parts - 300 Series SST to provide rust-proof components.
Seats, Seals - Teflon to provide a durable seal.

- GN2 from the upstream distribution panel is sampled for particulate level prior to GSE connection. Due to the contingency use of this equipment (propellant tank drain) an upstream filter was not deemed necessary.

Test:

- GN2 flow through the S70-0570-04 panel to the scrubbers is required for operation of the 3" and 6" scrubber valves and is verified prior to scrubber connection to facility power (per OMI V1070). This verifies the GN2 purge is present and the hardware is functioning properly.
- Annual calibration (per OMI V2239.002) and validation (per OMI V2239.001) of S70-0570-04 panel checks cracking and reseal pressures to verify proper operation of relief valve.
- Qualification and acceptance testing was in accordance with the requirements of NASA component specification 79K80451-4. Acceptance testing included the following:
 - Proof
 - Leak
 - Functional (Cracking, Reseat)
- Testing after refurbishment is performed in accordance with the requirements of NASA component maintenance drawing 79K90451. Revalidation testing includes:
 - Cracking pressure
 - Reseat Pressure
 - Leakage

Inspection: No inspection for the critical failure causes is performed.

Failure History:

- The PRACA database was researched and no failure data was found on this component in the critical failure mode.
- The GIDEP failure data interchange system was researched and no failure data was found on this component in the critical failure mode.

Operational Use: This equipment is for contingency use only in the event propellant tank drain is required at SLS-1.

- **Correcting Action:** There is no action which can be taken to restore the GN2 purge if lost. However, the System Engineer would be notified of pressure loss and would provide instructions for best safing the operation based on training and experience.
- **Timeframe:** Minutes (to interrupt draining operations if action directed by System Engineer).