Critical Item: Programmable Logic Controller (PLC) **Criticality Category:** 1
NASA Part No: None **Total Quantity:** 2
Mfg/Part No: Allen-Bradley / SLC 5/03
System 10 & 15 Ton Bridge Cranes

Find No.	Qty	Area	PMN	Baseline	Drawing / Sheet
PLC	1	SSMEPF	H70-1528	036.00	Demag 387 447 49 / 3
PLC	1	SSMEPF	H70-1529	036.00	Demag 387 446 49 / 3

Function:

Performs control for the motion of the hoist, trolley and bridge.

Failure Mode No. Failure Mode	Failure Cause Failure Effect	Detection Method Time to Effect	Crit Cat
09CR00-001.003 Unsolicited command	Internal component failure or software failure. PLC could initiate or continue a crane motion in an uncommanded direction or speed resulting in loss of life and/or loss/damage to a vehicle system	Visual 1 second	1

ACCEPTANCE RATIONALE

Design:

- Designed to industry standards. UL listed.
- Internal diagnostics verify all crane controls each time the crane is used.
- The PLC is electrically isolated from external voltages/currents.
- An overspeed activated load hold/halt drum brake prevents free fall of the load.
- The E-Stop circuits are independent from the PLC circuit.
- The software was written and incorporated by the contractor.

Test:

- Crane software was validated and tested per the acceptance test procedure.
- Before each use functional checks of the hoist, trolley and bridge will be performed in all axis per OI O-105.
- Proofload test has been performed in accordance with NSS/GO-1740.9. During this test validation of the functional operations of the crane was accomplished.
- OMRS File VI requires the performance of an annual operational test to verify proper operation of all crane controls. The test will show that all limit switches, E-Stops, and speeds indicate the PLC performs as expected.

Inspection:

- None

Failure History:

- No failures were experienced during validation testing.
- Current data on test failures, unexplained anomalies, and other failures experienced during ground processing activities can be found in the PRACA database. The PRACA database was researched and no data was found on this type of component in the critical failure mode.

Operational Use:

Correcting Action	Timeframe
• Operator or observers may mitigate the failure effect by pushing the E-stop. • At any time the pendent is left unmanned or the load is in a static position power to the crane will be removed through the pendent E-Stop. • A wall mounted E-Stop will be manned during all critical lifts and suspended load operations.	3 seconds