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B/L: 389.00
SYS: 250-TON
BRIDGE
CRANE, VAB

Critical Item: Relay, Auxiliary Hoist (2 Total, 1/Crane)
Find Number: 2XR
Criticality Category: 2

SAA No: 09FY12-005	System/Area: 250-Ton Bridge Crane (#1 & #2)/VAB
NASA Part No: NA	PMN/ Name: K60-0533, K60-0534/ 250-Ton Bridge Crane (#1 & #2)/VAB
Mfg/ Part No: General Electric/ CR120AC4002AA	Drawing/ Sheet No: 69-K-L-11388/ 17

Function: N.O. contacts close to energize the brake relays, 2BR and 2BR1, when the aux hoist controller is moved to release the brakes in normal operation.

Critical Failure Mode/Failure Mode No: N.O. contact fail closed/09FY12-005.047

Failure Cause: Welded contact, binding mechanism

Failure Effect: Brake relays will remain energized. Brakes will not set when auxiliary hoist motors are commanded, via the Master Control Switch to stop. The load will descend with regenerative braking at 1.7 ft/min (0.34 in/sec) max (based on maximum load capacity of the hoist, in reality this would descend slower). The worst case would be attempting to bring a critical load (SR8 forward assembly) to a stop while hoisting or lowering, the failure occurring, and the effect being the critical load descending and striking the VAB floor, transporter, work platforms, MLP, or Shuttle Stack resulting in possible damage to a vehicle system.
Time to effect: seconds.

ACCEPTANCE RATIONALE

Design:

<u>Contact Ratings</u>	<u>Actual</u>
300 volts	120 volts
10 amps	Testing required

- Contact Material: Silver Cadmium Oxide, Self-cleaning
- Mechanical life expectancy is 10 million operations.
- This relay was off-the-shelf hardware selected by the crane manufacturer for this application.

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Test:

- OMRSD file VI requires verification of proper performance of hoist operational test annually.
- OMI Q3088, Operating Instructions, requires all crane systems be operated briefly in all speeds to verify satisfactory operation before lifting operations.

Inspection:

- OMI Q6003, Maintenance Instructions, requires annual inspection of contacts and contact members for burning, pitting, proper alignment, and discoloration caused by overheating; visual check of closing coils for deteriorated insulation and evidence of overheating or burning.

Failure History:

- The FRACA 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:

- Correcting Action:
 - 1) The failure can be recognized via the ammeter (lack of current) and the Selsyn (positions change), or the failure of the brake set light to illuminate that are in view of both operators.
 - 2) When the failure indication is noticed, the operator can stop all crane operations by pressing the E-Stop button, or set the brakes by pressing the foot switch, S2.
 - 3) Operators are trained and certified to operate these cranes and know and understand what to do if a failure indication is present.
 - 4) During all critical lifts, there is at least one remote Emergency Stop (E-Stop) operator observing the load lift, and can stop the crane if a failure indication is noticed.
 - 5) Operationally, the crane must be operated in the fine or float speed mode if a critical load is within 10 feet of any structure in the direction of travel.
- Timeframe:
 - Estimated operator reaction time is 3 to 10 seconds.