A MEMBER OF THE TAIYUAN HEAVY MACHINERY GROUP (太重集团)

Technical Bulletin / Safety Alert

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(This document supersedes all previous versions of the above TBSA – N/A)

Subject: Nautitech Methane Shutdown Systems – Solenoid Valve

Date: 19th December 2014

Applicable to: VLI Driftrunner, VLI Brumby & VLI JUG-A-0 UL/UV Where Installed (N.B. – this may affect other machines using the Nautitech Methane Shutdown System, owners and end users should consult the relevant OEM for their recommendations)

Note: Minimum PPE required to carry out any inspections contained in this TBSA shall be protective clothing & footwear, safety glasses, hearing protection & any site specific requirements. A JSA or equivalent should be completed prior to performing these tasks.

Occurrence:

VLI advises that the Nautitech Methane Shutdown System Solenoid Valve (VLI Part No. 0601-50028) was recently identified to have failed in service to the open position on three (3) separate VLI machines at the same Queensland coal mine. Two (2) failures occurred on separate VLI JUG-A-0 UL/UV machines and one (1) failure occurred on a VLI Driftrunner.

When the Nautitech Methane Shutdown System Solenoid Valve fails to the open position, the automatic shutdown of the diesel engine system (due to detection of methane gas concentration exceeding 1.25%) via the pneumatic shutdown circuit cannot not occur. The Nautitech Methane Shutdown System will however continue to display methane gas concentration levels and provide indication via a warning light system. The VLI diesel engine system manual shutdown function remains unaffected.

Nautitech Methane Shutdown Systems are installed to all VLI JUG-A-0 machines operating under diesel engine system design registration nos. MDR074246DES, MDR074246DES-1, MDR074246DES-2 and MDR114991DES. Nautitech Methane Shutdown Systems are an optional installation to VLI Driftrunner and VLI Brumby machines.

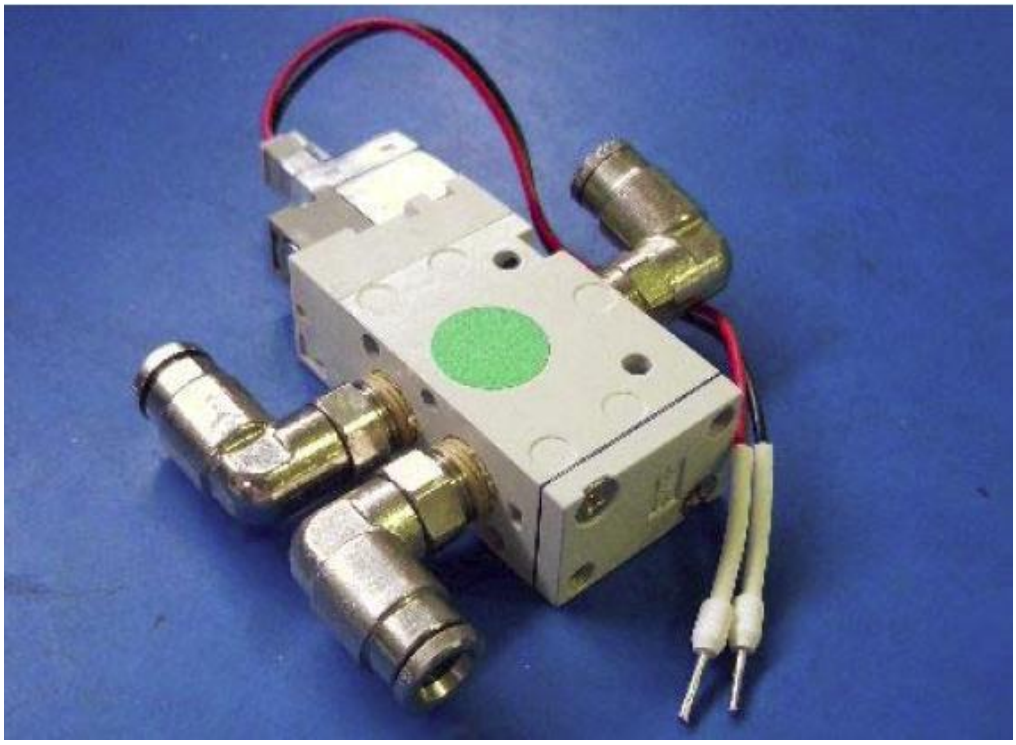

Figure 1: Nautitech Methane Shutdown System Solenoid Valve
(VLI Part No. 0601-50028)

Investigation Results and Discussion:

The failed Nautitech Methane Shutdown System Solenoid Valves were disassembled and inspected and found to have failed in the open position due to wear in the valve body spool bore. These solenoid valves form part of the pneumatic shutdown circuit of the diesel engine system, which includes machine specific air filtration and water separation devices to minimise pneumatic circuit component contamination, wear and deterioration. The end user that has reported the recent solenoid valve failures has confirmed that each of the relevant vehicles was installed with air filtration compliant with the OEM design. Each of the valves had reportedly been in service in excess of 4,000hrs (machine run hours). After further examination and comparison with new solenoid valves, VLI has concluded that the failed solenoid valves have exceeded their serviceable life.

Previously the recommended service life of the Nautitech Methane Shutdown System Solenoid Valve was not defined. However based on the recent occurrences and subsequent investigation, VLI and Nautitech now recommend that the solenoid valve is replaced at a maximum service interval of 4,000hrs (machine run hours). Consideration may need to be given to site specific conditions when determining the replacement interval of the solenoid valve.

Recommendations:

Where Nautitech Methane Shutdown Systems are installed to VLI equipment, VLI and Nautitech recommend that the Nautitech Methane Shutdown System Solenoid Valve is replaced at maximum service intervals of 4,000hrs (machine run hours).

In all other respects, Nautitech Methane Shutdown Systems are to be managed and maintained in accordance with the manufacturer's (Nautitech) recommendations.

Where assistance is required in relation to Nautitech Methane Shutdown Systems compliance and management, please contact VLI or Nautitech directly.

Supporting Documentation:

Nautitech Technical Bulletin Safety Alert MS00017 18th December 2014

Please ensure this document is circulated to all relevant personnel within your organisation.

Should you have any further queries please contact your VLI Representative.

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Nautitech Mining Systems Pty Limited

ABN 40 094 272 616

Date: December 18, 2014 Reference: MS00017

Technical Bulletin Safety Alert

Manufacturer: **Nautitech Mining Systems Pty Limited (NTMS)**

Equipment affected: **Air Solenoid**

Background

A customer has reported three instances of field failures of Air Solenoids (Part Number PL118534). As a result of the failure the machine was able to start and run although the methane system was not powered up. There was, however, a display of methane gas concentration and a warning light that the system is in bypass mode. In the three instances above the Air Solenoid was stuck in an open position.

PL118534

Normal operating conditions

The Air solenoid is a components located within the NTMS enclosures forming part of the shutdown system. The Methane Shutdown Systems affected are:

- Ex d Juganaut Shutdown System
- Ex d Basic Shutdown System
- Ex d ia Juganaut Methane Master
- Ex d ia Basic Methane Master

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Investigations

It was confirmed that the Air Solenoids were jammed open causing the methane system to be bypassed. Further investigation, by the customer and NTMS, has attributed the failure to worn component that have exceeded its operational life.

Recommendations

Replace the Air Solenoid at 4000 hours or as per mine site's maintenance procedure whichever is less.

Other information

1. **Clean air must be used**

   Compressed air used must not contain chemicals, synthetic oils containing organic solvents, salts or corrosive gases, etc., as this can cause damage or malfunction

2. **Air filters must be used**
   Install air filters close to valves at their upstream side. A filtration degree of 5 Um or less should be selected

3. **Exhaust mufflers must be cleaned or replaced every 6 months to prevent excessive pressure build up**

4. **Install an air dryer, after cooler or Drain Catch (water separator), etc.**

   Air that includes excessive drainage may cause malfunction of valves and other pneumatic equipment. To prevent this issue install an air dryer, after-cooler or Drain Catch (water separator), etc.

5. **If excessive carbon dust is generated, eliminate it by installing mist separators at the upstream side of valves.**

   If excessive carbon dust is generated by the compressor, it may adhere to the inside of valves and cause malfunction.