

**Type of Incident:** Loss of Containment

**Function:** Remediation Management

**Location of Incident:** Constantine, Michigan

**Country:** USA

**Tr@ction No:** IR-4187819

**Date of Incident:** July 23, 2012

**Brief account of Incident:**

On Monday, July 23rd, a release of Light Nonaqueous-Phase Liquid (LNAPL) and groundwater was discovered at the BP Quarterline Road USPL River Rouge Pipeline remediation site Constantine, MI. Fluid was leaking from the fill port and vent of two of the 300 gallon ASTs used at the site to store recovered LNAPL. It is estimated that 615 gallons, of which approximately 319 gallons was LNAPL and 296 gallons was petroleum impacted water, was released from the system.

**Immediate Cause:**

The run time settings/program in the LNAPL pump PLC became corrupted, possibly due to an electrical grid anomaly. It appears that the corrupted settings/program called for the continuous operation of several pumps, whereas the normal program is designed to cycle individual pumps on and off as needed. Soon after, it appears that the electrical load placed on the Pump PLC due to the corrupted program caused the pump PLC internal chipsets to fail. The chipset failure kept solenoid valves controlling air flow to the pneumatic pumps to remain open thus continuing operation of the pumps.

**Photographs:**



**Inside of the pump control panel**



**One of the overfilled ASTs**

**System Cause:**

Continuous operation of the pumps caused two ASTs to become completely filled in a short period of time. The High and High High level controls in both ASTs were installed to perform a redundant control function to instruct the pump PLC to shut down the pumps, which did not occur due to the corrupt program.

**Lessons Learned:**

1. PLC program re-boot should never cause automatic reset of system operation in a corrupt or unmanaged state.
2. High and High High fluid level controls should always trigger separate, independent control functions, and High High should result in an E-Stop of the remediation system recovery equipment.
3. Any operational change to a remediation system via an MOC should have stronger ties to IM components such as re-commissioning punch lists to identify corrective actions that must occur before the system can be re-started.

For additional info please contact your BP IM Coordinator.

- Andrew King**
  - Retail, Pipelines & Terminals - MOW
- Dennis Beckmann**
  - Retail, Pipelines & Terminals - EOR
- Collin Gregory**
  - Retail, Pipelines & Terminals - WOR
  - Mining
- Craig Murski**
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