



2 May 2012

OSHD/SPECS/MHI/PS/01-2012

To: All refineries, petrochemical and chemical plants handling, processing and/or manufacturing flammable substances

### **Circular on De-oiling/Removal of Flammable Liquids from Pipelines**

Pipelines containing flammable liquids may be opened from time to time for various reasons such as inspection, maintenances etc. Before opening such pipelines, de-oiling/removal of flammable liquids needs to be done. Such works, if not properly carried out, can be extremely hazardous due to the inherent risk of fire and/or explosion from the flammable liquids. Companies should take note of the following points when carrying out de-oiling of such pipelines.

#### **De-oiling/Removal of Flammable Liquids**

2 Open de-oiling of pipeline containing flammable liquids should be avoided. This is because sources of ignition cannot be totally eliminated in the open. Instead, companies should consider using a closed system. The closed system would entail a closed loop draining of flammable liquids, including a closed loop flushing and/or purging with inert materials.

#### **Effective Measures to Prevent Spillage of Flammable Liquids and Eliminate Ignition Sources**

3 Companies should reduce the risks of fires and/or explosion by addressing the unsafe conditions that may result in such accidents. To do so, companies should:

- a. Conduct proper identification of pipelines carrying flammable liquids to verify the source and flow, in preparation for the removal of their contents. Up-to-date as-built drawings must be used to identify low-point drains, vent and flush points, branch connections, gauges and isolation valves associated with the pipelines. A walk-down of the pipelines should be carried out to verify or positively identify the associated fixtures and piping system. Planning of the de-oiling/removal works should take into account these checks.

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- b. Take effective measures to prevent the build up of static charges and the generation of potential static sparks. Petroleum fuels have low electrical conductivities. As a result, static charges can build up when petroleum fuels move in contact with other dissimilar materials. This can occur when petroleum fuels flow through pipes or flexible hoses. When enough charges are built up, a spark may be generated and fires and/or explosions could result if the vapour-in-air concentration is within the flammable range. Pipelines must be effectively earthed to prevent accumulation of static charges. Measures to prevent the build up of static charges include (but not limited to) proper bonding and grounding, by controlling flow rates in the pipelines to reduce the rate of charge generation and etc.
- c. Ensure that risk assessment and safe work procedures take into account the risk of fires and/or explosion whenever flammable liquids are involved in de-oiling/removal works. The risk assessment and written safe work procedures should be specific to the pipeline where the removal, flushing and/or purging of flammable liquids is to be done. A permit-to-work (PTW) system should be implemented to control the execution of the removal at critical steps and to ensure that all safety measures are complied with throughout the removal. Proper lock-out and tag-out procedures should also be in place to isolate the pipeline from the system before removal works commence.

#### **Ensure Effective Supervision of Work**

4 Supervision should be provided during de-oiling/removal of flammable liquids from pipelines, including the first break of the line after the necessary flushing and/or purging with inert materials and draining. Where unforeseeable risks not identified in the risk assessment are encountered during execution, workers should immediately stop work and alert their supervisors and the risks should be effectively addressed before work resumes.

5 For clarifications, please contact Jaime Lim at [Jaime.Lim@mom.gov.sg](mailto:Jaime.Lim@mom.gov.sg).



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