REMEDIATION MANAGEMENT
INTEGRITY MANAGEMENT COMMUNICATION
Lessons Learned One-Pager

Type of Incident: **Near Miss - IM Related**
Business Unit: Remediation Management
Location of Incident: Cupertino, CA (#495)
Date/Time: November 12, 2008 at 13:30

Brief Account of Incident: A contractor (RM supplier) employee entered a remediation compound and opened the control panel to perform work. A gasoline smell was detected. The contractor left the compound to allow the panel to ventilate. Upon returning and investigating the matter further, the hydrocarbon concentration in the panel was found to be 150 ppm. The concentration was found to be 10,000 ppm inside the electrical conduit leading from well MW-6 to the panel. It was also found that the conduit seal-offs (which should have been filled with a sealing material to prevent vapor transfer) had never been filled.

Detailed Description: A more detailed investigation was carried out. The Dual Phase Extraction system consists of an SVE system plus groundwater pumping with an electric pump. There are several possible explanations for the sequence of events that led to the high hydrocarbon concentration at the panel. However, what is not in doubt is that: 1) The electrical conduit running from the pump to the control panel provided the pathway for the hydrocarbon to reach the panel, and 2) The conduit contained seal-offs (also called seal fittings or EYS fittings) which had not been filled with sealing material.

The picture above shows an example of an open, unfilled seal-off in a well vault.

Risk Assessment and Mitigation: Electric conduit has a small diameter and therefore presents considerable resistance to the flow of large quantities of vapor. This significantly limits the number of scenarios that can lead to a high concentration of hydrocarbon flowing through it and reaching the panel, suggesting that the probability of such an incident occurring again is very low, even if seal-offs are not filled. If this incident had led to a flash fire, the consequences would likely have been very minor because the amount of vapor present with a high hydrocarbon concentration would have been very small (e.g. the volume of the electrical conduit, and perhaps the panel). There would not have been sufficient fuel present to create a significant risk. Nevertheless, such conditions must be prevented.

An analysis was carried out to determine appropriate mitigations to prevent such a hazard. Although a wide variety of engineered solutions are conceivable, it was concluded that ensuring that the seal-offs are filled is the simplest and most direct approach to avoiding this hazard in the future.

Lessons Learned/Recommendations:

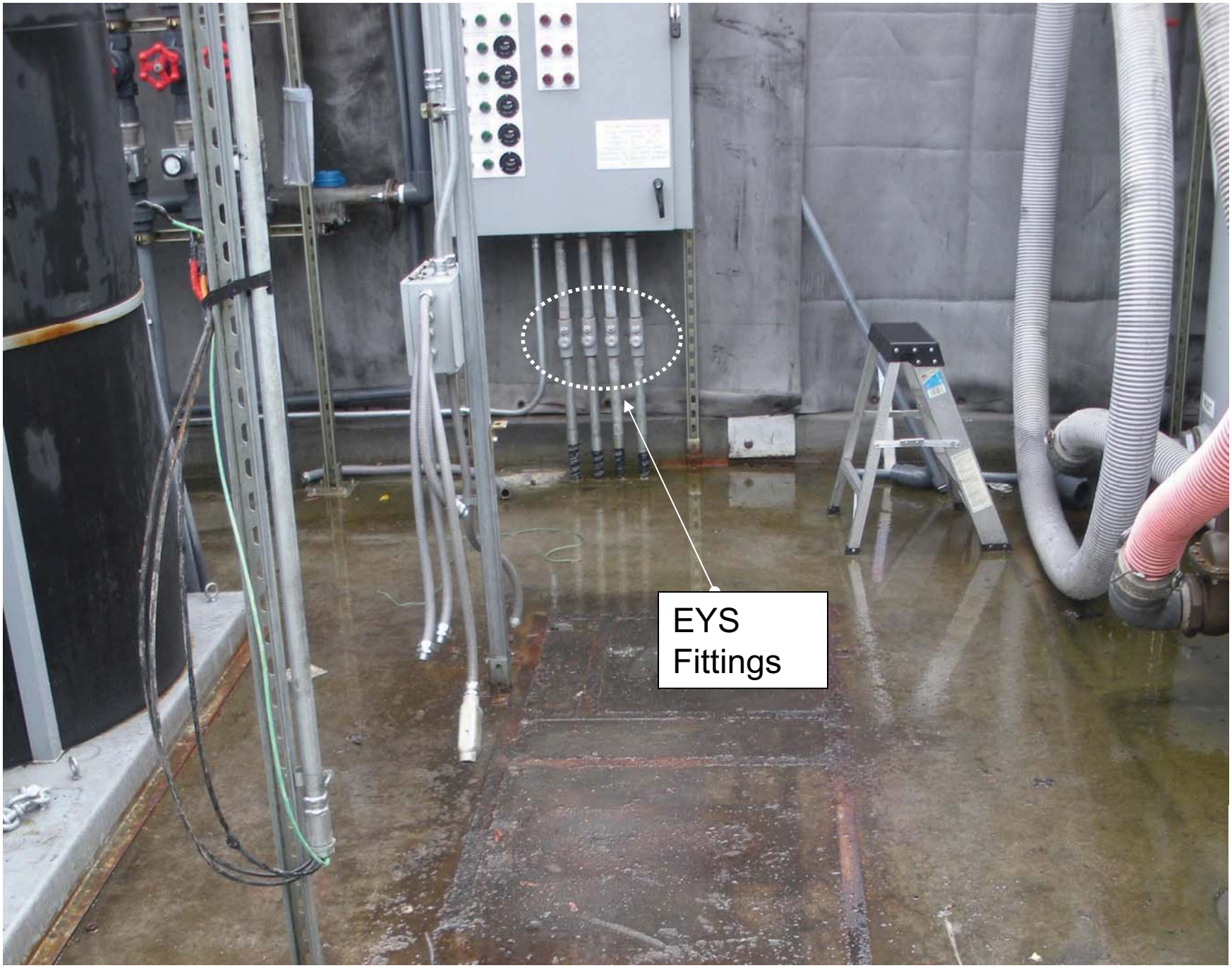
1. Systems containing seal-offs should be checked to ensure that the seal-offs are correctly placed and have been filled.
2. Systems should be evaluated to see if others present a scenario that could lead to a high hydrocarbon concentration in conduit. If there are any systems that present a similar hazard as this incident , and DO NOT contain seal-offs, then the system should be shut down and a hazard review conducted to determine if seal-offs should be retrofitted.
3. For new systems and system retrofits, the requirements regarding seal-offs in the RM IM Engineering Design Manual (see Section 16, Electrical Classification) on the IM website must be followed.

The following slide pack contains several pictures that will help identify the appearance and typical placement of seal-offs.

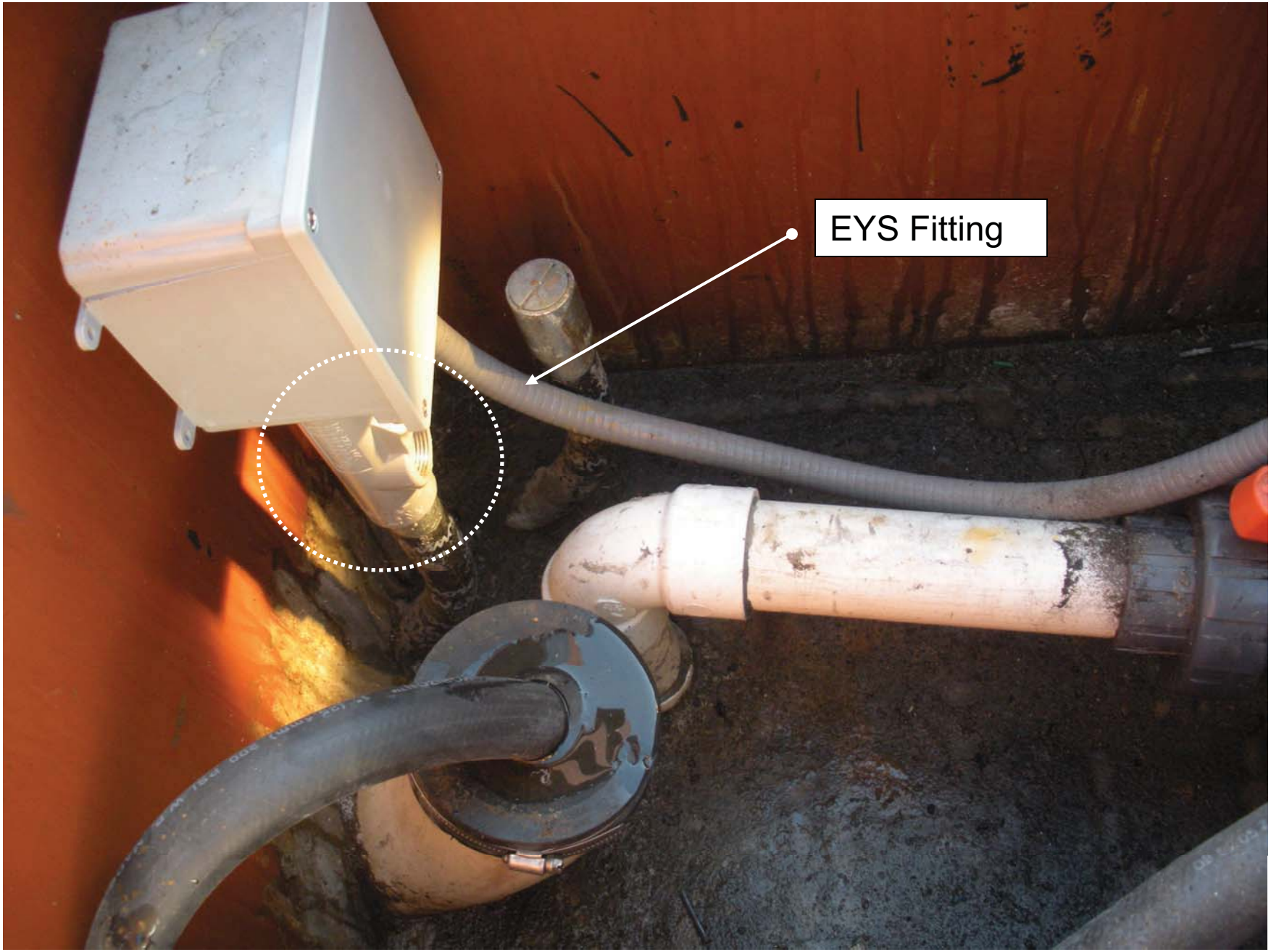
Note: the EYS Fittings referenced in the slide pack are seal-offs made by a particular manufacturer. This is the link to their web page on seal-offs (hold down the CTRL key when clicking the link):

http://www.hubbell-killark.com/pdfs/eny.pdf

Typical Remediation System Control Panel



Typical Remediation System Well Vault



Close-up of EYS Fitting in Well Vault

EYS Fitting

(shown before adding sealant)