Incident Learning: Tank Overfill

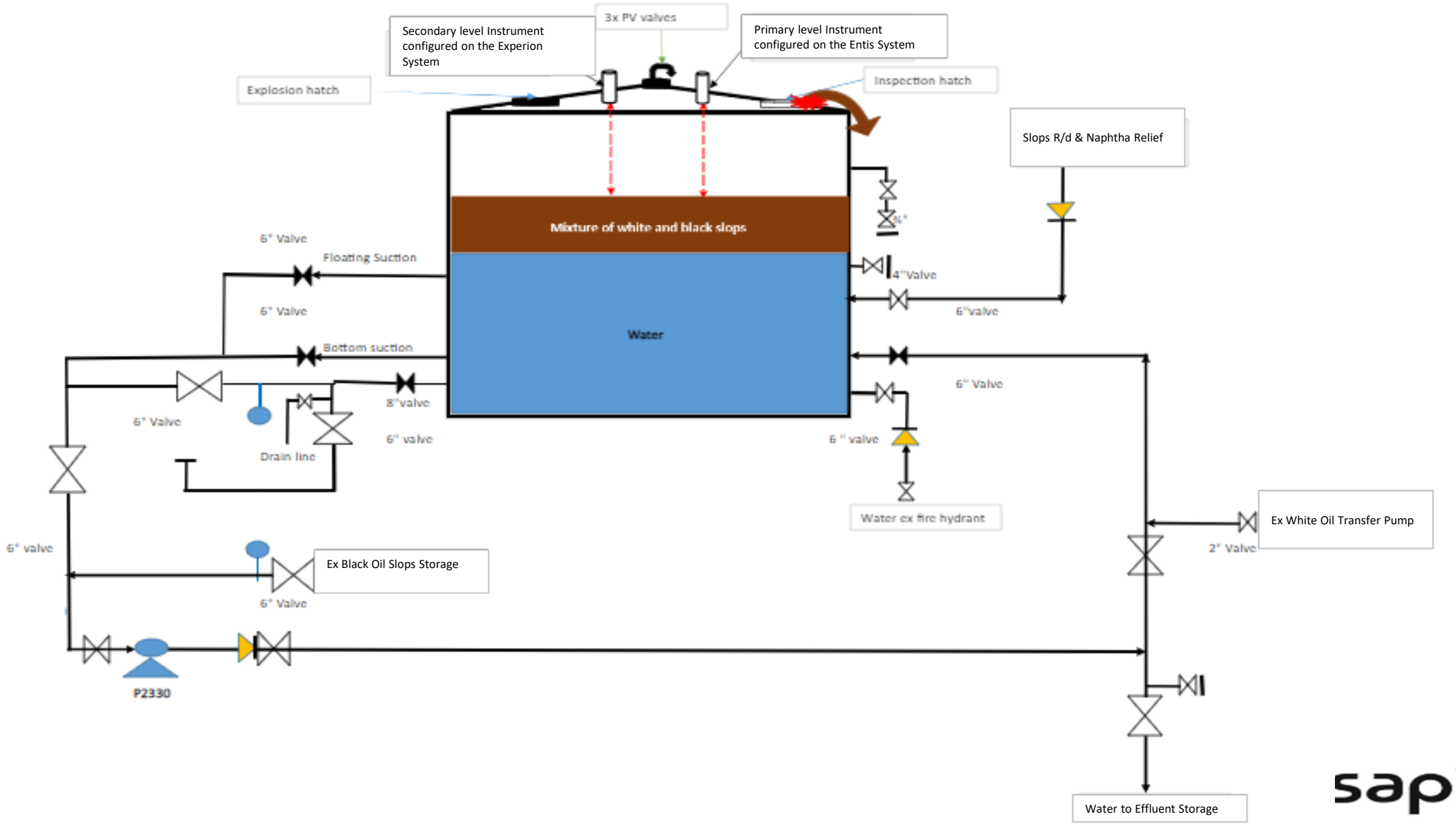
BRIEF DESCRIPTION OF EVENTS

From 5th to 8th May 2023, fire water was being pumped into a slops tank to dilute the tank contents and correct conductivity, prior to releasing to the trade effluent system.
The activity started at 23H00 on Friday, the 5th May. The stop dip was set just below the tank maximum safe working level and the estimated time to completion was 40 hours.
Approximately 27 hours later the primary level instrument on the tank failed. Filling continued and 4 hours later the level indication returned. A further 12 hours later, at the start of Sunday night shift, the tank independent high high-level alarm annunciated. The primary level instrument was checked, sufficient ullage was noted in the tank and the high high-level alarm was acknowledged.
Filling continued and 6 hours later, around midnight on Sunday, the tank overflowed .

IMPACT

The Incident was classified as an API Tier 1 incident. An LOPC estimated at 196600 kg of black and white oil Slops was released into the tank bund.

Incident Learning: Tank Layout



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Incident Learning: Investigation Outcomes

ROOT CAUSES

Projects lack of rigor in commissioning and close out:

- A project was implemented on this tank to upgrade the high-level alarm (primary instrument) and install an independent high high-level alarms (Secondary Instrument). The primary level instrument on this tank was accepted from projects, based on testing at low operating levels. Concerns for reliability at higher levels were not tested or resolved. When the tank was filled to a higher level than the normal operating range for the first time during this activity, the gauge lost readings. When the readings restored 4.5hours later, it remained erratic around 12.6m until the tank overfilled.

Acceptance of poor equipment reliability and normalizing the abnormal:

- Project personnel advised Operations to wait an hour when the level instrument lost signal and the level would stabilise. This became the norm and the operations protocol to validate faulty instruments was not followed.

Compliance with Operating Protocol key to Managing Tanks:

The Operations Team received multiple signals of a problem, and either rationalised them or were busy with other activities, and continued filling**.**

- The gauge failure was noted, but the teams were accustomed to this and expected the reading to restore. Operations protocol to verify faulty instruments and stop tank movement in the event loss of level reading were not followed.
- The independent High-High Level alarm enunciated, and the instrument was believed to be faulty based on a check against the primary level instrument. Verification of faulty level instruments and escalation of alarm protocols were not followed.
- 3 hourly stop dips and the 24-hourly stop dips indicated a problem. These were interpreted as indicative of a hose rupture and the hoses were confirmed as sound. An alternate explanation of the readings was not considered.