Improperly Maintained Well Control Equipment

There have been several recent offshore incidences where fluids used in well control equipment systems have been improperly maintained. Two identified fluid contamination issues include:

(a) Nickel leaching into demineralized water in well control equipment, fluid systems.¹
(b) Calcium soap build-up in some control fluid systems, potentially caused by mixing the liquid concentrate with a chemical commonly used to disinfect drinking water on a rig.

¹ Well control equipment Systems and subsystems (components, parts, or assemblies) used to control pressure within the wellbore: detect unplanned influxes of formation fluids into the well; prevent, control, or divert the flow of fluids from the well; purge formation fluids from the well; and separate formation fluids from the drilling fluid.
Contributing Factors

A review of the two well control equipment systems incident investigation reports indicated the causes were:

- The operator did not follow the manufacturer’s published water specifications and submerged tungsten-carbide coated seal plates in the demineralized water, causing nickel leaching.
- The operator mixed calcium hypochlorite into the well control equipment systems fluid concentrate and did not follow an existing company-issued safety alert that stated, “under no circumstances should concentrate be mixed with calcium hypochlorite.”
- Fluid quality was contaminated by the build-up of calcium soap in the well control equipment systems, which caused debris build-up around the valve seal plates.

BSEE recommends operators and contractors consider the following:

- To prevent nickel leaching, equipment owner/operator should develop and implement a water hardening system and use water that has not been fully deionized as a base for the control fluid.
- Ensure offshore personnel operating well control equipment systems follow the OEM safety bulletins for fluid quality specifications.
- Provide detailed instructions, training, competency assessment, and supervision to equipment operators and maintenance personnel to maintain hydraulic fluid quality.
- Incorporate these incidents as part of the safety talks for personnel directly involved in these operations as well as other appropriate discussions.
- Verify and document whether well control equipment systems installation and commissioning meet approved OEM specifications. If inspections do not meet OEM specifications, corrective action(s) should be taken and documented.
- Ensure personnel are trained and records documented in well control equipment systems control configurations, well control equipment systems maintenance, and maintenance of hydraulic fluid quality to the OEM specifications.
- Share lessons learned for well control equipment systems described herein among operating companies, rig operators, system OEMs, and component
OEMs (commodity manufacturers) for relevant critical systems, ensuring they are put into practice.

- Document and verify maintenance of well control equipment systems operations and associated valves adhere to fundamental principles and requirements per:
  - API Spec 16D 2nd Edition (Control Systems for Drilling Well Control Equipment and Control Systems for Diverter Equipment)

  – BSEE –

A Safety Alert is a tool used by BSEE to inform the offshore oil and gas industry of the circumstances surrounding a potential safety issue. It also contains recommendations that could assist avoiding potential incidents on the Outer Continental Shelf.

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