

HEALTH. SAFETY. SECURITY. ENVIRONMENT.

HSSE Bulletin



Safety – Our Goal, Our Commitment

March 19, 2009

USE THE TOOLS!

Conduct a SPSA prior to every task and ensure that your JSA addresses the activity, and read and comply with each JSA requirement.

If there are ever any safety issues or concerns, contact your supervisor, local health and safety officer, site operations manager, or corporate HSSE, so that the safest and correct approach is considered and implemented.

Tom Baylis

Director of HSSE



Investigation Outcome: Chemical Oxidation First Aid Case

Summary: During a recent chemical oxidation injection, a GES employee was splashed in the eyes with a hydrogen peroxide solution.

Incident Description: As an engineer attempted to connect a hose to an injection manifold, a PVC fitting failed and a hydrogen peroxide solution splashed under his safety glasses and into his eyes. Serious injury was avoided by the quick and appropriate response of on-site staff with appropriate care, confirmed by a subsequent medical evaluation.

Findings: The **loss investigation (LI)** identified materials incompatibility as the underlying cause, compounded by a **Job Safety Analysis (JSA)** that did not require goggles during this stage of the activity.

Preventative Measures: As a result of this incident and the LI findings, (1) the JSA for hydrogen peroxide and ozone injection has been revised to require safety goggles while oxidizers are in use; and (2) the chemical oxidation engineering policy has been revised to address the use of PVC for injection wells and piping.

What went wrong?

- The incident was caused by the unexpected failure of a PVC fitting, which resulted in the sudden release of pressure, causing hydrogen peroxide to spray out of the injection well and into the employee's face. The engineer was wearing safety glasses, but the pressure caused the hydrogen peroxide to spray under the safety glasses into the individual's eyes. Because a splash hazard was not anticipated, safety glasses were indicated as sufficient eye protection, and the JSA did not indicate the need for goggles or other splash protection.
- The underlying cause of the incident appears to be the incompatibility of PVC and/or PVC glue with ozone. GES' Chemical Oxidation Engineering Policy addresses material compatibility, but did not prohibit the use of PVC for ozone applications.

How was the incident managed?

Immediately following the incident, the staff on site responded quickly and calmly – flushing his eyes with water and checking for injuries. As a precautionary measure, the employee's condition was evaluated by an emergency room physician. Fortunately, the incident only resulted in minor discomfort to the employee, and the emergency room physician determined that no medical treatment was necessary. The engineer was able to return to work the next day.

What was found after the investigation?

The investigation revealed that the injection well and the coupling that failed were constructed of PVC. During previous injection events, ozone and hydrogen peroxide had been injected into the well. This loss occurred at the PVC fitting where the PVC glue

appeared to be compromised, likely due to exposure to ozone. Although some material compatibility charts indicate that PVC is rated "good" for ozone applications, it was previously determined that PVC should not be used with ozone due to the potential for chronic deterioration. GES' engineering policy included a recommendation for the use of stainless steel or other materials with ozone, but this was not a requirement.

How can we prevent this from happening again?

As a result of this incident, revisions have been made to the JSA for hydrogen peroxide and ozone injection and the chemical oxidation engineering policy. All staff working on chemical oxidation projects are required to read the revised documents. Changes are presented below.

Any variance from this policy will require written approval from corporate engineering.

JSA – Peroxide and Ozone Injection

All staff on site must wear goggles from the moment oxidizers are in use until all injection activities have been completed.

Chemical Oxidation Policy

1. Prohibit the use of PVC for new injection wells or piping that will be used for ozone injections.
2. For existing chemical oxidation injection wells that are constructed of PVC, one of the following options must be implemented:
 - a. Replace the PVC injection well with a stainless steel injection well.
 - b. Use another oxidizer in place of ozone, such as sodium persulfate, hydrogen peroxide, or another oxidizer that is compatible with the well materials.
 - c. Replace the top 2 feet (minimum) of the injection well with stainless steel or other approved compatible material.

USE THE TOOLS!

As with most incidents and injuries, this loss could have been prevented.

Remember, **GES REQUIRES:**

Everyone who works for or on a GES project must use the LPS tools and must comply with GES HSSE requirements.

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