



Mensagens para Pessoal Operacional
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Perda de Contenção Primária (LOPC) início de um incidente Dezembro de 2025

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Corrosion Under Insulation (CUI)

What can happen?

- A metal pipe insulation system is installed because of extreme corrosion. The quality of the pipe insulation system is not periodically reviewed during the inspection. A pipe insulation system is considered to be effective if it is well insulated and functioning at the time it is installed or made to function. If the pipe insulation system is not effective at the time it is installed, it may not be effective at any time. Because there was no inspection of the pipe insulation system, it was not determined that the pipe insulation system was not effective at the time it was installed.

Do you know?

- Common CUI insulation fails in certain types of tanks, pipes, and equipment. It is important to inspect the insulation system to ensure that the insulation does not fail.
- Urgent action must be taken if CUI occurs.
- In the industry, other forms of damage before insulation, improper insulation, or damage after insulation are common causes of LOPC.
- It is important to inspect the insulation system to ensure that it is effective.
- What are other risks? Two things contribute to insulation and more damage from the start. CUI may occur if:
 - Proper insulation leads to greater and faster environmental insulation, which may reduce insulation and the damage potential.
 - Improper insulation leads to greater and faster environmental insulation, which may increase insulation and the damage potential.

Take care of the insulation in your plant to prevent corrosion!

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Janeiro de 2014

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How do you know your safety devices are working?

Did You Know?

- Actuator safety devices, such as limit switches, or shutdown systems must be tested at a regular, or scheduled, interval to ensure they are functioning properly, particularly true of gas detectors which are sensitive to the environment and need to be calibrated.

Are Safety Devices Reliable?

Fig. 1 One of the H₂S detector alarms

Fig. 2 H₂S alarm warning light

Fig. 3 H₂S detector location

Fig. 4 Safety device reliability

Microcontroller logic is used to continuously monitor normal operation of your plant. If they are not working correctly, they will not be able to detect problems such as disabling them, failure to isolate, or failure to shut down the system.

In October 2021, a lone worker employee responded to a piping leak in a food plant and an untrained wastewater operator responded to the underground of formation to inspect extraction. The wastewater operator was not wearing a respirator and did not have any training. At some point, the pump automatically started, and water began to spray out of the pipe. The lone worker employee was exposed to H₂S. The employee died from exposure to H₂S. The tragedy was preventable if the lone worker had been trained to respond to an emergency into the wastewater system. The lone worker was also exposed to H₂S and died.

There were many failures in process safety management systems that contributed to the incident:

- The contributing factor - the failure of the H₂S alarm system. The alarm system failed to detect the presence of H₂S in the system. However, the alarm panel did not receive a signal from the detector. The detector was connected to the alarm system when inspection and testing are complete.
- Failure of the operator to verify that the required test had been performed. Other detectors were correctly set, but the signals were not received by the alarm system.
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What Can You Do?

- If you are involved in inspecting or testing safety devices, inspect, and verify that all safety devices, short circuit protection, and other components are functioning properly.
- Test the safety devices to ensure that they are functioning properly.
- Verify that the safety devices are functioning properly.
- Report any issues with safety devices to your supervisor.
- Report any issues with safety devices to your supervisor.

Inspect and test your safety systems to be sure they work!

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Outubro de 2021

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Wrong material + Wrong tank = Trouble

Did You Know?

- Every day, millions of pounds of hazardous materials are transported across the country in railcars, vehicles, trailers, barges and ships to the user sites. Most of these materials are transported in the correct tanks.
- Where delivery drivers are directly involved in unloading these materials, they must be trained to identify the correct tanks and make sure the tank is the correct one.
- Highly manual activities such as chemical loading and unloading, and the use of hand tools, are often required when loading and unloading.
- Hand tools are often used to move materials in and out of railcars or to only the correct material hose can be connected to the correct tank.

On October 20, 2016, two incompatible materials were loaded into the wrong tank car at a chemical processing facility in Arkansas. Arsenic, the most toxic element in the periodic table, was released during an erratic handling procedure. Both the driver and the receiver of the materials were not properly trained to connect the correct tank to the correct hose.

Results of inspection, testing, and maintenance activities:

- Test results should be reviewed to determine if there are any potential risks associated with the current configuration of the piping and equipment.
- Identify potential risks associated with the piping and equipment.
- Review piping and equipment configurations to determine if there are any potential risks associated with the current configuration of the piping and equipment.

What Can You Do?

- When making rounds, take notice of the piping labeling, including tank numbers, tank sizes, and tank types.
- When loading or unloading stations have multiple tanks, ensure the connections are correct and unobstructed.
- Read and follow the instructions for unloading. If there are any questions, contact your supervisor or manager and have them corrected.
- Failure of the operator to verify the correct connection to the correct tank.
- Failure of the operator to verify the correct connection to the correct tank.
- Errors and incompatibilities in the unloading procedure can lead to serious consequences, such as fires and explosions.

Manual chemical transfers require accurate procedures that are consistently followed!

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Maio de 2023

Os incidentes de Segurança de Processo ocorrem em operações de instalações de todos os tamanhos, nas indústrias petroquímicas e em muitas outras indústrias que manipulam produtos químicos. Muitos incidentes de processo têm uma coisa em comum; eles começam com um evento de Perda de Contenção Primária (*Loss of Primary Containment - LOPC*). Aqui estão 3 Beacons anteriores que demonstram este fato:

A corrosão pode ser uma causa escondida de LOPC. O Beacon de Janeiro de 2014 mostra como o isolamento pode esconder e promover a corrosão sob o isolamento (*Corrosion Under Insulation - CUI*).

(<https://ccps.aiche.org/resources/process-safety-beacon/archives?page=3>)

O isolamento deficiente de tubulações e equipamentos é uma causa frequente de eventos de LOPC. O Beacon de Outubro de 2021 cobre um incidente onde o isolamento deficiente provocou a morte de 2 pessoas.

(<https://ccps.aiche.org/resources/process-safety-beacon/archives?page=2>)

A liberação de materiais perigosos também pode ser causada por mistura de materiais incompatíveis. O Beacon de Maio de 2023 mostra um exemplo onde adicionar o material errado num tanque pode ter impactos muito grandes. (<https://ccps.aiche.org/resources/process-safety-beacon/archives?page=2>)

Você sabia?

- A Perda de Contenção Primária é uma liberação não planejada ou descontrolada de material da contenção primária.
- Os eventos de Perda de Contenção Primária normalmente são precedidos por sinais de aviso tais como corrosão severa ou válvulas terminais em serviços perigosos sem bujões ou flanges cegos.
- A LOPC pode ser causada por muitos fatores que não os listados acima como: choque de veículos, danos mecânicos, vibrações, má operação, material de construção errado, alterações de temperatura ou pressão, entre outros.
- O isolamento danificado permite que a água entre no interior do isolamento e cause corrosão (CUI);
- Os eventos de LOPC são evitáveis!

O que você pode fazer?

- Ao fazer rondas procure por vazamentos e reporte-os rapidamente.
- Coloque barreiras em volta dos vazamentos até que o material esteja identificado e o vazamento interrompido.
- Reporte a falta de isolamento ou danificado.
- Assinale vazamentos que ocorram no mesmo local ou com o mesmo material. Isso pode indicar um ponto fraco no sistema ou um problema maior.
- Compartilhe eventos de LOPC durante as Análises de Perigos do Processo (PHAs).

Evite LOPC – mantenha materiais perigosos no lugar correto!