



**UNITED STATES COAST GUARD**  
U.S. Department of Homeland Security

**FINDINGS OF CONCERN**  
**Sector San Francisco**

June 18, 2018  
San Francisco, CA

Findings of Concern 002-18

**IMPROPER FIXED CARBON DIOXIDE (CO<sub>2</sub>) SERVICING PROCEDURES**

Purpose. The U.S. Coast Guard issues findings of concern to disseminate information related to unsafe conditions that were identified as causal factors in a casualty and could contribute to future incidents. Findings of concern are intended to educate the public, state, or local agencies about the conditions discovered so they may address the findings with an appropriate voluntary action or highlight existing applicable company policies or state/local regulations.

The Incident. In February 2018, a service technician was conducting annual servicing of an existing small passenger vessel's engine room fixed fire extinguishing system pierside. While installing the last discharge hose, the technician held the adjacent cylinder discharge head for leverage. The downward pressure applied caused an accidental release of three of the vessel's four CO<sub>2</sub> fire system bottles. The service technician was able to safely egress prior to the CO<sub>2</sub> discharge and no other personnel were in the affected space.

Contributing Factors and Analysis. The investigation identified improper servicing procedures not in accordance with the manufacturer's servicing instructions as a contributing factor to this incident. The failure to remove the discharge heads from the cylinders and disconnect the flexible metallic discharge bend hoses from the heads were the unsafe conditions identified. Vessels built on or prior to March 10, 1996, similar to this one, are not required to have a discharge manifold lockout valve to prevent an accidental CO<sub>2</sub> discharge during fixed fire extinguishing system servicing. However, the fire protection equipment regulations were updated to include this requirement for vessels initially constructed or certificated on or after March 11, 1996. These facts, when combined, can lead to an elevated risk to servicing technicians and crew aboard the vessel.

Findings of Concern. Coast Guard Investigating Officers have identified the following voluntary actions for an owner/operator of similar vessels in similar service to mitigate the risks associated with the above contributing factors:

- Provide technician refresher training on properly servicing cylinder valves and discharge heads for fixed fire extinguishing systems. This particular incident involved the C-O-Two, Norris Industries, and Model VF cylinder valves with AP-6 discharge heads fixed fire extinguishing system unique to this vessel. However, each fire extinguishing system poses unique challenges to the servicing technicians, which is why refresher training is critical.



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- Install a lockout valve at the fixed fire extinguishing system discharge manifold to isolate the storage cylinders and prevent any potential CO2 discharge into the engine room during servicing.
- Create a Standard Operating Procedure (SOP) to include inspecting valve assemblies at regular intervals and securing the engine room from entry/occupancy while servicing.

Closing. These findings of concern are for informational purpose only and does not relieve any entity or party of domestic or international safety, operational, or material requirements. For any questions or comments please contact Sector San Francisco Investigations Division at [SectorSF.Investigations@uscg.mil](mailto:SectorSF.Investigations@uscg.mil).