

SPRING 2022



Environmental Health & Safety From Experience

Failure Modes and Effects Analysis: Build Your Own Crystal Ball

Hopefully, compliance with permit limits is not a significant issue at your facility right now: Your equipment is in good shape and your operators educated and effective. What happens tomorrow, though? Do you know how much funding to request for next year and can you justify that amount?

One tool that can help with these questions is, perhaps, a familiar friend: the Failure Modes and Effects Analysis (FMEA). Used by the military as early as the 1940s, FMEA is a step-by-step approach used to identify possible failures in a system or process.

- Failure Modes means the ways that something can fail. Failures are equipment malfunctions and can be potential or actual.
- Effects Analysis refers to listing and rating the consequences of those failures. What happens when you lose compressed air to that valve? Will it fail closed or open? What happens then?

It is possible you use or have used this tool already. Many facilities complete a FMEA prior to installation of major systems, but never revisit that system later. Many utility systems undergo changes over the years, resulting in

different operating procedures and risks. Just like audit tools that look for gaps in compliance, the FMEA tool should be used periodically to look for changes in failure risk priorities.

Hixson has used FMEA to help our clients study existing environmental systems like wastewater pre-treatment systems. We gather the various stakeholders, including operators, environmental managers, and others, to walk through the system step-by-step. Failure modes are rated

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EXPERIENCE IN BRIEF

A quick reminder: We are fast approaching the annual July 1st reporting deadline for the U.S. Environmental Protection Agency's (USEPA's) SARA 313 Toxic Release Inventory (TRI) for chemicals. Some of the chemicals routinely reported by the food production industry include nitric acid from Clean-in-Place (CIP) chemicals, nitrates manufactured in the wastewater treatment process, and anhydrous ammonia used in the refrigeration systems. A chemical not likely to need reporting is Ozone (O₃) (for filler or post-filler water disinfection), but this should be verified based on your situation.

according to how serious their consequences are (e.g., very little due to a redundant system or would directly cause a permit violation), how frequently they occur (e.g., weekly, annually, not yet), and how easily they can be detected (e.g., sensors, alarms, inspections). The end result is a prioritized list of the ways the system can fail.

And with that list, you have effectively built a crystal ball showing the highest-priority failure in the future. The results of a FMEA can help you confidently:

- Write new SOPs that reduce failure through improved maintenance.
- Request funds to replace aging equipment, equipment that fails frequently, or add redundancy to compliance-critical systems.
- Re-write programming to alarm for conditions that could predict permit violations.
- Identify a priority facility (if you manage several facilities).

Want more information on how to conduct a FMEA or its benefits? Contact Hixson today!

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