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>
> —Shane Kling
> Co-Founder
> Environmental intellect

Cleaner air and lower costs.

Environmental intellect uses AutoCAD P&ID software to support LDAR compliance.

Project Summary

The Clean Air Act in the United States requires that operators of petroleum refineries, chemical plants, and many manufacturing facilities develop leak detection and repair (LDAR) programs. Traditionally, most operators have relied on manually intensive processes to manage their LDAR programs and the records required to demonstrate compliance. Even when they follow their LDAR programs diligently, many operators lack confidence in their degree of compliance. This is due to the fact that manual LDAR compliance processes often cannot keep pace with changes that occur at many facilities.

Environmental intellect (Ei), an environmental and safety compliance software provider based in Laramie, Wyoming, has developed a technology that uses intelligent piping and instrumentation diagrams (P&IDs) to enable more efficient and automated LDAR compliance. With AutoCAD® P&ID software powering the intelligent P&IDs, Ei's solution allows operators to:

- Generate real-time compliance calculations and reports
- Account for facility changes in compliance processes more automatically
- Link maintenance, operational, and design systems to compliance processes
- Save time and money while improving the reliability of LDAR processes and documentation

The Challenge

The United States Environmental Protection Agency (EPA) takes LDAR compliance very seriously—and it is easy to understand why. LDAR regulations are intended to reduce fugitive emissions. Fugitive emissions of hazardous chemicals, such as volatile organic compounds (VOCs), harm people and the environment. And despite the efforts of operators to spot and resolve leaks, the EPA estimates indicate that the failure to identify and repair leaks at petroleum refineries could be resulting in additional VOC emissions of over 80 million pounds annually.[1]

Operators must demonstrate that they are following their LDAR programs rigorously. Otherwise, failing to comply may come at a great cost—as much as US$10,000 per day per overlooked valve, as stipulated in many EPA Consent Decrees. Operators use P&IDs to document and guide compliance processes; yet the traditional P&IDs many operators rely on are manually maintained CAD drawings that do not support a deeper level of connectivity about the engineering information and regulatory requirements for components or processes. This can lead to compliance issues that range from inaccurate identification of components that must be monitored to failure to maintain appropriate compliance records.

"Refineries and chemical processing facilities are highly dynamic," says Jess Askey, a software architect and one of Ei's founders. "When processes change, so do compliance requirements. It is all too easy to fall out of compliance with P&IDs that do not automatically reflect real-time operational activities."

Autodesk®

AutoCAD P&ID helps generate more accurate compliance reports—faster.

The Solution

Seeing the challenges that operators face with traditional LDAR compliance processes, the founders of Ei decided to develop a more automated and effective approach. They saw the emergence of intelligent P&ID technology as a potential cornerstone for better LDAR compliance. Intelligent P&ID software allows designers to create P&IDs that include underlying information about processes and component properties. In the context of LDAR compliance, this intelligence makes it possible to link the P&ID with compliance information.

Ei developed a solution that integrates intelligent P&ID software with its Ei LDAR Module and links the drawings to an operator's LDAR database. The Ei LDAR Module uses the P&IDs and LDAR data to help determine compliance requirements—in real time. To drive the P&ID portion of its solution, Ei selected AutoCAD® P&ID software. AutoCAD P&ID stood out from other intelligent P&ID software because it is built on the AutoCAD platform, and many operators already use AutoCAD® software for design.

"An accurate set of intelligent P&IDs provides a solid foundation for an effective LDAR program," explains Askey. "AutoCAD P&ID software can help smooth the transition to intelligent P&IDs. It doesn't take much time or effort for an AutoCAD-trained engineer or draftsperson to get started with implementing this enhanced drawing technology."

Enhanced Compliance Workflow

Using AutoCAD P&ID software and the Ei LDAR Module, operators can move away from the manual processes they now use to manage compliance. The management of change (MOC) process provides an excellent example of how it works.

Today, a facility must process the compliance aspects of hundreds or even thousands of MOCs manually. A MOC might begin in the engineering department with the addition of a new or larger pipe to carry a hazardous chemical, such as benzene. A compliance engineer analyzes the LDAR implications of the change and manually enters the change into the compliance database. The engineer then drafts it into the plans used to document LDAR compliance. Through the life of the pipe and associated equipment, the operator's LDAR database will schedule the required inspections for leaks. Compliance personnel track the inspections for leak detection and manually add them to compliance documentation through the use of data loggers or handwritten notes.

"The traditional process is expensive and error-prone," says Shane Kling, co-founder of Ei and the company's engineering and business development leader. "Often, operators use disconnected, manual processes to drive updates to systems. Miss a step or fail to document a leak repair, and the facility is out of compliance. Unfortunately, it is easy to miss a step or fall behind on updated LDAR requirements impacted by the MOC process."

The Ei solution together with help from AutoCAD P&ID software transforms and simplifies the MOC workflow. Taking the example above, with this system, an engineer drafts the piping change into AutoCAD P&ID. The Ei LDAR Module performs real-time compliance calculations and updates the LDAR compliance database by alerting the end user of a change that impacts the compliance program. Integration with asset management and maintenance work order systems enables the operators to track compliance documentation—in real time. The Ei solution is even capable of integrating with the distributed control systems (DCS) that monitor temperatures and flow rates, making it possible to distinguish process stream characteristics that impact LDAR applicability.
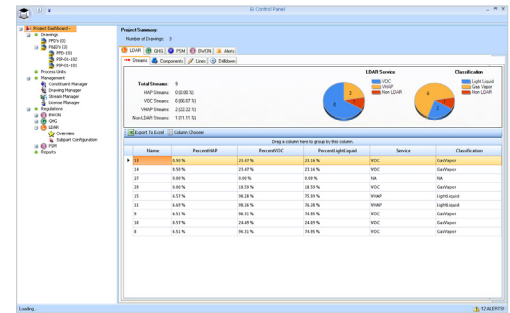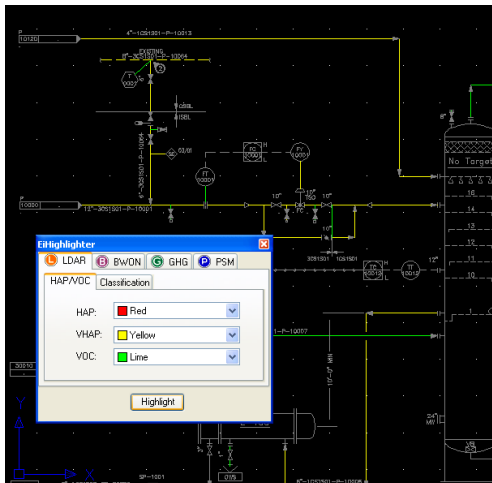
Askey adds, "With the Ei LDAR Module utilizing AutoCAD P&ID technology, it is easier to maintain up-to-date LDAR applicability drawings. The integration across various data systems that touch compliance processes gives users a single source of compliance information."

The Result

As operators adopt AutoCAD P&ID software and the Ei LDAR Module, Ei believes that streamlined LDAR compliance will lead to significant benefits. "Today, LDAR compliance is a source of frustration and concern over noncompliance, as well as a capital expense for operators," explains Kling. "AutoCAD P&ID and the Ei LDAR Module automate key aspects of compliance. As this technology is implemented, long-term costs can be reduced, and accuracy and operators' confidence in compliance processes can increase. It's not just good for the environment—it's good for business."

Learn More

Stay ahead of LDAR compliance requirements with help from intelligent P&IDs. Visit **www.autodesk.com/autocadpid** to learn more.

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