

On the cover



Derek Lukey checks a pressure transmitter during plant rounds at Encana.

# The process of preventing industrial disasters

By Ryan Parton

When a catastrophic incident happens — such as a large-scale explosion — the results can be devastating to the employer, the workers, and the community. So how can we protect the people we care about from the worst-case scenario? Looking at safety from a process perspective could point the way.

Already in use at some larger firms across the province, such as oil and gas companies Encana and Westcoast Energy, process safety is now gaining ground in other industries through a new WorkSafeBC team and initiative. What these companies have implemented could help your business prevent events that no one should ever have to face.

### What is process safety?

Process safety is a proactive form of risk assessment combined with engineering that focuses on preventing catastrophic fires, explosions, accidental chemical releases, and structural collapses, especially in facilities that use, process, and handle hazardous materials. The goal of process safety is to identify and mitigate any critical hazards at industrial workplaces, thereby preventing the occurrence of potentially catastrophic events. In January, WorkSafeBC launched a new initiative that focuses explicitly on this form of risk management.

“We’re now going beyond the idea of what is hurting you today — the day-to-day occupational hazards and exposure issues — and into the catastrophic potentials,” says Budd Phillips, manager, Prevention Field Services with WorkSafeBC and operations lead for the new Process Safety Team. “What are those big events that could go from something that seems somewhat minor and inconsequential to the point where you could have multiple fatalities?”

### Applying process safety principles

Though Canada lacks explicit process safety regulations such as those found in the U.S. and elsewhere, several B.C. companies — particularly those in the oil and gas sector — are already ahead of the curve. Encana, which operates a handful of gas processing facilities and more than 1,500 well sites across northern B.C., is one such example.

Encana’s process safety strategy begins long before its facilities are even built. During the design phase of any new facility, its personnel run through an extensive HAZOP (hazard and operability) study, reviewing a wide variety of scenarios representing countless potential deviations from normal operating conditions.

“It’s really about starting to look at safety from a more technical standpoint, right from the design of a new facility through to decommissioning,” says Brad Gushlak, process safety manager for Encana.

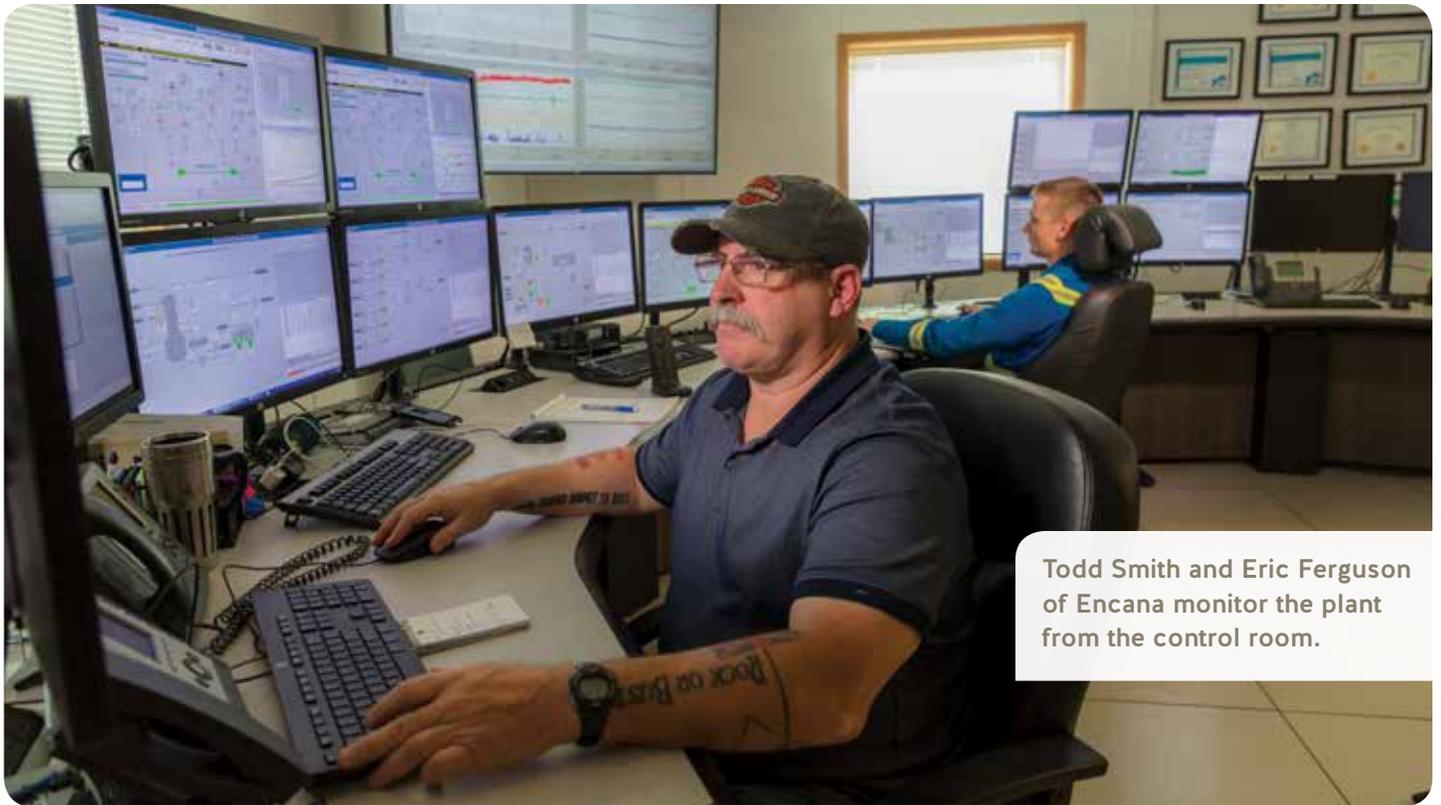
“You have to make sure that for every deviation, whether it’s high flow or low pressure on process equipment, that there’s a certain amount of safeguards in place ... We do all this work and all these checks to ensure that something doesn’t get over-pressured or over-filled, and if it does that there’s a system in place to make sure that it shuts down or is operated safely.”

Once construction of a new facility is complete, every piece of equipment undergoes another comprehensive series of tests, and a rigorous commissioning process ensures all critical systems are operating as intended before the facility is deemed operational — and that’s still just the beginning. Equipment continues to be inspected at regular intervals once the facility is up and running, and Encana requires a documented procedure for key operational tasks, along with competency tests to ensure the operator has the required skills to perform them safely.

“The same process safety principles are carried on through the life of the facility, from our major facilities right down to our simplest sites,” explains Rob Finlay, operational superintendent for Encana’s facilities and infrastructure in the Dawson Creek area. “One of the bigger ones for us is managing change. If we have to make changes to mechanical piping, a process condition, or even a temperature, that’s all evaluated. Do we have a misdirected flow? Do we have the potential for lost containment from this change?”

**“Whenever you change something in your operation, you have to consider the ramifications of that change.”**

—Budd Phillips, manager, Prevention Field Services, WorkSafeBC



Todd Smith and Eric Ferguson of Encana monitor the plant from the control room.

Change management, in fact, is what Budd Phillips refers to as a “cornerstone” of process safety.

“Whenever you change something in your operation, you have to consider the ramifications of that change,” he says. “Maybe you need to do maintenance on the piping that you normally run your process chemicals through. You don’t just turn the valve and allow it to happen; you make sure that when you make a change, all the system’s safeguards are in place.”

### Actively managing risk

The challenge is that process safety can be difficult to prioritize among other health and safety initiatives that are quantifiably measurable in incidents or lost work days. After all, the catastrophic outcomes that process safety is designed to prevent virtually never happen.

Unfortunately, history has shown us what can happen when the bigger picture is neglected. In 1984, in what’s largely regarded as the world’s worst industrial disaster, more than 4,000 people died from a toxic gas leak at a pesticide plant in Bhopal, India. In 1989, a series of explosions at an industrial chemical facility in Texas killed 23 people and injured many more. Much closer to home, four workers died and 41 were injured in two

B.C. sawmill fires in 2012. All of these disasters, plus many more, were deemed to have been preventable.

Through the Process Safety Initiative, WorkSafeBC aims to collaborate with B.C.’s employers and provide resources to help them identify potential process hazards, implement controls to mitigate them, and create contingency plans in case something goes wrong. The Process Safety Team will initially focus on six industries: oil and gas, chemical processing, biomass energy production, pulp mills, pellet mills, and other wood processing. Fifty employers have been selected for inspection over the coming year, after which time the initiative is expected to extend beyond those initial high-priority sectors.

“We want to make this a pragmatic, valuable process,” says Gordon Harkness, a manager with WorkSafeBC’s Risk Analysis Unit and co-lead of the Process Safety Team. “Our initiative is not about giving employers more papers to fill out, or new boxes to check off. It’s about actively managing risk, and protecting the people who work for you. If you are undertaking industrial processes, you have to understand the hazards that your processes pose, and you have to implement controls and actively manage those controls.”

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—Roy McKnight, manager of safety, Westcoast Energy

“A lot of it will come down to an employer’s due diligence,” adds Phillips. “Are they willing to analyze what they’re doing, how they’re doing it, and what they can do to make it safer?”

### **Process safety doesn’t have to be complicated**

As Encana demonstrates, process safety can be a highly complex and involved process. At its most basic level, however, it boils down to a very simple concept.

“It really is about identification, assessment, and control,” says Roy McKnight, manager of safety for Westcoast Energy. “What’s the risk, what are we doing about it, and how are we controlling it? It’s not complicated.”

A subsidiary of Enbridge whose footprint in B.C. includes 16 gas processing facilities and approximately 1,100 employees, Westcoast Energy has adhered to a U.S.-style process safety program since at least 1990.

“We have our occupational health and safety programs that really focus on personal safety so that people know what to do to protect themselves,” explains McKnight. “What you do through process safety is you treat the asset itself as a thing that you also have to protect. So you reduce things like corrosion, you do better preventive maintenance, you have leak detection systems in place. It’s very simple engineering solutions that are designed into the system before you even build the plant.

“A lot of industries that latch onto process safety automatically start calling around for experts,” he adds. “What you need to do first is start talking to the guys who are working on the floor — they’ll tell you exactly what needs to happen. As an asset owner or manager you may not like what they have to say but, honestly, when you go talk to them they will walk you straight to the problem.”

McKnight describes Westcoast Energy’s “Safety Sundays,” a weekly walk through of every facility looking for indicators of potential problems and chatting with equipment operators.

“For us, it’s all about local ownership and engagement,” he says. “We sit down with plant staff and say, ‘Here’s what we’re trying to solve. We need to keep that chemical in that tank — how do we do it without hiring 10 more people and without introducing more hazards or risks?’ We’ve kept it simple and effective and — knock on wood — it’s proving to work.”

For more information about how to implement effective process safety management, visit [worksafebc.com](http://worksafebc.com) and search for “process safety.”



**Eric Ferguson at Encana posts a notice to the health and safety bulletin board.**