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BACKGROUND

Gas Code Enforcement Arrives In Petroleum Industry

Full compliance, however, is a far from simple matter, say the affected companies.

BY JOZEF JACHNIAK, P.ENG.
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In 1999, a fatal accident brought the Alberta government face-to-face with liability issues involved in the safety of gas-fired equipment used by the petroleum industry. A gas safety code developed by the Canadian Standards Association was supposed to prevent such accidents, but it was not until July 2001 that it was included into Alberta's law.

This law was additionally reinforced in November 2003, when the House of Commons passed Bill C-45, which amends the Criminal Code of Canada by establishing rules for attributing criminal liability to organizations, including corporations, for the acts of their representatives which affect the safety of workers and the public.

Owners of gas-fired equipment are worried about the law's implications for several reasons. They say it is difficult, if not impossible, to fully comply with the code. Firstly, there is a limited selection of certified components and a lack of flexibility regarding interpretation of layouts and control system requirements.

Secondly, the certification and approval process and infrastructure are not adequately developed. And thirdly, the process is both costly and time consuming.

The B149 Code was first published 46 years ago then rewritten a few times, first by the Canadian Standards Association, then by the Canadian Gas Association, and most recently by the CSA again, which published the latest version in January 2000.

Two important definitions in the code need to be explained – "gas" and "appliance."

Although the original code was written only for natural gas and propane installations, the latest code defines gas as any mixture of natural gas, manufactured gas, propane, propane air, propylene, butane (normal butane and isobutane), and butylene. The new amendment to the code will most likely expand the definition of gas to include field gas.

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To serve society and protect the public by regulating, enhancing and providing leadership in the practice of the professions of engineering, geology and geophysics.

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To provide members with relevant information on topics of professional and general interest thereby enhancing commitment to the professions and the Association.

The term appliance, which to many may mean a household appliance such as a water heater or heating furnace, is currently used in the code in a much broader context, referring to any device used to "convert gas into energy that includes any component, control wiring, piping, or tubing required to be a part of the device."

These two definitions cover practically any appliance from a small device comparable in size to a portable domestic barbeque (20,000 BTU/hr) to a 50,000 times larger field-erected industrial boiler or furnace (1,000,000,000 BTU/hr).

Excluded from the definitions are gas-consuming devices installed in marine pipeline terminals, new appliances which already have an approved standard, small manually operated appliances with an input rating of less than 20,000 BTU/hr, gas used as a refining or petrochemical feedstock, gas destined for processing at liquefied natural gas bulk plants, gas used as a vehicle fuel or any other fuels used in combination with gas.

Contrary to popular belief, the above definitions do not exclude refinery equipment, but only devices or their portions which use gas as a feedstock for chemical reactions. It is the function of an appliance which determines the applicability of the B149 Code and not its location in the refinery.

Enforcement Takes its Time

Why haven't you heard about the B149 Code before? The answer is quite simple: its implementation has never been enforced in the petroleum industry – until now.

The code originally made its way, on a voluntary basis, to various larger industrial and utility projects for which it was promoted simply as good design practice. With time, it has been used on smaller projects and has become a standard for all industries, except for the petroleum industry.

The reason for slow implementation of the code was the fact that, until adopted by legislation, B149 was just a standard and not a legal requirement. Provinces generally set their own safety standards, and developed their own rules and regulations covering gas consuming installations. As the CSA developed its own safety codes, they slowly replaced provincial regulations, with the penetration so complete that eventually most provinces adopted some of them in their entirety.

The petroleum industry, with its own standards and fixed appliance designs, has not been exposed to this "code evolution." Hence, little impetus for change.

The landscape shifted, however, with the 1999 fatality and several close calls in the following two years. Litigation was brought against the province, and its subsequent investigations revealed that the number of incidents related to unsafe gas practices was higher than originally believed and poised to climb even higher.

In order to limit its liability exposure, Alberta's government had no choice but to legislate improvements to safety related to gas appliances, and the B149 Code was identified in July 2001 as one way to reach that goal. The gas safety regulations are now included in the Alberta Safety Codes Act and are enforceable by law.

According to the Gas Code Regulation: "No person may

manufacture, install, sell or offer for sale any equipment related to gas systems for use in Alberta unless it has been (a) tested and certified by a certification organization accredited by the Standards Council of Canada, or (b) inspected and accepted by a certification organization"

A first-time violation of these rules carries a maximum penalty of \$15,000 plus \$1,000 for each day the offence continues and/or a six-month jail term. Second and subsequent offences carry a maximum penalty of \$30,000 plus \$2,000 for each day during which the offence continues and/or a 12-month jail term.

Delivery Does Not Mean Certified

In an ideal world, all gas-fired appliances would be delivered from the factory certified for use by one of the recognized certification bodies, such as CSA, ULC, Intertek Testing Services, Entela, or Quality Auditing Institute. However, the reality – particularly in the petroleum industry – is that almost none of the appliances currently installed or available on the market are either certified, or identical, since to do so unit by unit would be prohibitively expensive.

The certification process is designed for large quantities of consumer products, but it tends to be costly and time-consuming for the one-off production of industrial appliances, which are often custom-designed and custom-fabricated. The level of repetition in equipment layouts or component selection is very low due to process requirements, space restrictions, or simply because of operator's standards or preferences.

This means that almost every industrial appliance is different and must be custom-approved.

There are an estimated 20,000 uncertified industrial appliances in Alberta, and there is little commonality in their design and components. If all of these appliances had to be modified and certified at an average cost of \$30,000 each, the total cost to the industry would be in the range of \$600 million.

Due to the sheer magnitude of the problem, it is likely that the upgrading and certification of existing appliances will have to be spread over a long time, perhaps until existing appliances are in need of modification or replacement.

Compared to B.C. or Saskatchewan, which both still have Provincial Gas Safety Services, Alberta is in a unique situation. After having privatized these services in 1995, the Alberta Government does not have the flexibility necessary to manage the certification process and currently has to rely on certification bodies to provide this service.

But these bodies are not structured to handle such non-repetitive situations. They don't have testing standards, facilities or experience to deal with oilfield equipment, and they don't have the engineering flexibility to accept variations from the standards.

Room for Flexibility

Petro-Canada Oil and Gas, however, has developed what it believes might be a better approach.

The company successfully negotiated with the province to provide a variance from the code, which allows it certain flexibility in interpretation based on an engineering assessment of each specific

application. If certified components cannot be found, the company is allowed to use suitable non-certified components as long as an equal or better level of safety is achieved.

Approval is based on past good track record, international approvals or test reports, while interpretation of the code and application of any variances must be done by a professional engineer registered with the APEGGA.

The goal of this "variance approach" is to make the appliance approval process workable while maintaining the basic intent of the code – to improve gas safety. Petro-Canada Oil and Gas is obliged to use the code to the extent possible, and only vary from it when certified components, layouts, burner management or control systems are not available or prescribed installation, testing, or commissioning practices are not possible, or if the application of any code requirement would jeopardize the integrity or safety of the process.

Compliance with the B149 Codes is now required by law and is a reality in Alberta. The variance approach developed by Petro-Canada Oil and Gas is a practical alternative to full code compliance.

Not only is it in compliance with the legislation, but it fulfills the general intent of the code to improve the overall safety of gas-fired equipment, while at the same time assuring the continuity and viability of petroleum operations.

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