



UPSTREAM OIL AND GAS FLARING, INCINERATION AND ENCLOSED COMBUSTION – A REVIEW OF RELEVANT REGULATIONS AND INDUSTRY BEST PRACTICES

EXECUTIVE SUMMARY

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A photograph of an industrial facility, likely an oil or gas processing plant, in a winter setting. The ground is covered in snow. In the foreground, there's a large, dark, curved pipe structure. In the background, there are various metal frameworks, pipes, and structures, some with snow on them. The sky is overcast. A semi-transparent blue box is overlaid on the left side of the image, containing text.

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COVER PHOTO CREDIT:

BC Oil and Gas Commission

CSA GROUP RESEARCH

In order to encourage the use of consensus-based standards solutions to promote safety and encourage innovation, CSA Group supports and conducts research in areas that address new or emerging industries, as well as topics and issues that impact a broad base of current and potential stakeholders. The output of our research programs will support the development of future standards solutions, provide interim guidance to industries on the development and adoption of new technologies, and help to demonstrate our on-going commitment to building a better, safer, more sustainable world.

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EXECUTIVE SUMMARY

The upstream oil and natural gas (UOG) industry uses various methods for conserving or disposing natural gas that is produced from wellheads, associated with hydrocarbon liquid flows, or released during planned and unplanned pressure relief events. When gas conservation is not possible, flaring, incinerator and enclosed combustor technologies are commonly used to safely combust natural gas streams. Regulatory enhancements to reduce venting activity and methane emissions are expected to increase the number and type of combustion technologies deployed for disposing natural gas.

Well and facility licensing follows provincial guidelines and directives that define allowable natural gas disposal practices. However, a common Canadian standard that specifies minimum best practices has not been established. Moreover, there is some uncertainty regarding design standards for low pressure vapour combustors given anticipated uptake by the UOG operators.

This research aims to assess and document regulations and industry best practices related to UOG flaring, incinerating and enclosed combustion systems. It summarizes key regulatory points relevant to the subject matter but is not a complete compendium of all potentially related regulations. It focuses on un-assisted flares typically installed at UOG facilities for the disposal of paraffin hydrocarbons (alkanes). Steam or air-assist systems used to reduce smoke by promoting turbulence and entrain air within the flared gas stream are outside of the scope of this report.

The research report provides the following key elements:

- Overview of relevant UOG flaring, incineration and enclosed combustion regulations for Alberta, British Columbia and Saskatchewan;
- Current industry practices and alignment with regulatory requirements;
- Approach to regulating equipment design, installation and operation for the United States (US) federally and in key states, as well as Norway; and
- Performance guideline considerations as a preamble to proposed standard text for individual system components.

For performance guidelines, the following relevant design factors, which consider industry feedback and referenced regulations, are proposed. These guidelines are not intended to replace the role of qualified professional engineers or established design codes. Instead, they identify performance elements that should be achieved.

1. Liquid Separation

4. Backflash Control

7. Noise

2. Conversion Efficiency

5. Stack Design

8. Flare Pits

3. Ignition Systems

6. Spacing and Setbacks

9. Monitoring

This research is intended as a resource to support the CSA Z620 Technical Committee in developing a new standard on Flaring, Incineration and Enclosed Combustion.

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