



## Enforcement of CSA B149.3 Gas Code in Alberta

Presented by:  
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## ENEFEN Engineering?

- ➔ Small consulting firm located in Vancouver
- ➔ In combustion business since 1981
- ➔ Incorporated under new name in 2003
- ➔ Over 500 combustion related industrial projects
- ➔ Capacities up to 600 MM BTU/hr
- ➔ Evaluation – Engineering - Education



## ENEFEN work in Alberta

- ➔ Consultant to oil & gas companies (regulatory, design and combustion efficiency issues)
- ➔ Member of UGFEAR (Upstream Gas Fired Equipment Approval Requirements) Committee under auspices of CAPP (Canadian Association of Petroleum Producers)
- ➔ Liaison between petroleum industry and Alberta Municipal Affairs, SaskPower, and BC Gas Safety Authority
- ➔ Developed first in Alberta Engineering Approach Variance on behalf of Petro-Canada Oil & Gas



## What is CSA B149.3 Code?

- ➔ B149.1 Natural Gas and Propane Installation Code
- ➔ B149.2 Propane Storage & Handling Code
- ➔ B149.3 Code for Field Approval of Fuel Related Components on Appliances & Equipment

***Component of CSA B149 Family of Codes***



## Is B149.3 a new code?

- ➔ First published by CSA in 1958, 1962, 1966
- ➔ In 1969 split into B149.1 – natural gas and B149.2 - propane
- ➔ In 1968 CGA published CGA3.0 – fuel valve train diagrams
- ➔ Published by CGA 1976, 1978, 1980, 1986
- ➔ In 1989 fuel train diagrams brought into B149.3-M89
- ➔ CGA amalgamated into CSA
- ➔ Latest revision January 2000

***B149 Code is 46 years old but is being gradually updated***



## What is gas?

- ➔ ORIGINAL DEFINITION: natural gas or propane
- ➔ CURRENT DEFINITION:
  - a) Atmosphere gas – any mixture of natural gas, manufactured gas, propane, propane/air, propylene, butane, and butylene
  - b) Reaction gas – products of reaction with air in endothermic reactor
- ➔ FUTURE DEFINITION (TIL) – any mixture of natural gas, manufactured gas, liquefied petroleum gas, LP gas-air mixture, mixed gas, field (raw) gas

• ***Gas definition is being expanded***



## What is an appliance?

- ➔ Appliance - a device to convert gas into energy that includes any component, control wiring, piping or tubing, required to be a part of the device

***Any non-certified device or its part performing this function is covered:***

***PORTABLE HEATER – 20,000 BTU/hr +  
To  
INDUSTRIAL BOILER – 1,000,000,000 BTU/hr +***



## What is excluded?

- ➔ Installations in marine pipeline terminals
- ➔ Gas where used as a feedstock in petroleum refineries and chemical plants
- ➔ Gas designed for storage and handling or both at LPG bulk plants
- ➔ Gas where used for natural gas for vehicles
- ➔ A new appliance for which there is an approved standard
- ➔ A manually operated appliance with an input not exceeding 20,000 BTU/hr used for industrial application
- ➔ Other fuels used in combination with gas

***Exclusion for petroleum industry: where gas is used as a feedstock to a reaction***



## Can the exclusion be based on the location of the appliance ?

- ➔ No, exclusion is based on the function of an appliance and not on its location in a specific plant.
- ➔ No industry is excluded from the code

***Most petroleum appliances or their applicable gas portion are not exempt***



## Why haven't you heard about the B149 until now?

- ➔ B149 has never been enforced in the petroleum industry

***Code is old – enforcement is new***



## Where was B149 first used?

- ➔ Originally used on larger projects (utilities, institutions) on a voluntary basis
- ➔ Adopted by combustion systems manufacturers as a good design practice
- ➔ Made its way through smaller projects to most of \_ industries except petroleum.

***CSA B149.3 = Good design practice***



## Why was the B149 implementation so slow?

- ➔ B149 is just a standard (guideline) and not a legal requirement until it is adopted by legislation
- ➔ There was no incentive to implement Code
- ➔ There was a perception that petroleum industry was self-regulated and systems were safe

***Legislation was lagging behind***



## Where was the provincial government?

- ➔ Responsibility for public safety is in provincial jurisdiction
- ➔ Provincial legislation defines which public safety standards are to be followed and enforced.
- ➔ Each province developed their own rules and regulations regarding building, plumbing, electrical, pressure vessel, gas, etc.
- ➔ Each province had their own provincial safety departments to interpret and enforce regulations
- ➔ As CSA safety codes became available they slowly started replacing old provincial regulations
- ➔ ***CSA CODES WERE ADOPTED BY PROVINCES THROUGH "EVOLUTION"***



## Where are the Provinces now?

- ➔ Alberta – Gas Safety privatized in 1995
- ➔ British Columbia – just privatized in April 2004
- ➔ Saskatchewan – Will not privatize for now
- ➔ Ontario – enforcement by TSSA (quasi-government)

***As writing of the codes was privatized so will the interpretation and the enforcement***



## What brought the change in the enforcement?

- ➔ Accident in 1999 involving fatalities in the petroleum industry
- ➔ Several “near-misses” in 2000/2001
- ➔ On-going litigation involving the Province of Alberta
- ➔ In July 2001 B149 Code was identified as a vehicle to improve safety related to gas appliances
- ➔ Gas Safety Regulations are included in the Alberta Safety Codes Act and are enforceable by law.

***Improved Gas Safety = Limited Liability***



## How about Federal Government?

- ➔ Westray Mine Disaster in 1992 killed 26 workers
- ➔ United Steel Workers petitioned the Federal Government for greater accountability of corporations in industrial incidents
- ➔ In November 2003 House of Commons passed Bill C-45 which amends the Criminal Code of Canada by establishing rules for attributing criminal liability to organizations for the acts of their representatives, which affect the safety of workers and the public.
- ➔ ANY employee can make the corporation criminally responsible
- ➔ Law is legally enforceable effective 01 April 2004

***Proactive approach to safety required to limit criminal liability***



## What are the penalties ?

- ➔ Alberta Safety Codes Act specifies:
  - first time offence = maximum \$15,000 penalty plus \$1,000 for each day during which offence continues and/or 6-month jail term
  - subsequent offence = maximum \$30,000 penalty plus \$2,000 for each day during which offence continues and/or 12-month jail term
  
- ➔ Bill C-45:  
criminal liability of corporation + civil liability exposure ?  
\$ millions ?????



## What is required ?

- ➔ “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...”
- ➔ There are currently 5 certification bodies accredited for gas inspection:  
CSA, ULC, Intertek Testing Services, Entela, Quality Auditing Institute

***Every appliance or component must be certified or field inspected and accepted***



## What about existing appliances?

- ➔ There are over 30,000 uncertified petroleum appliances in Alberta (other industries?)
- ➔ Most of the existing designs are not certified and must be changed to comply
- ➔ Manufacturers are not experienced with the Code
- ➔ Any existing installations which are modified, upgraded or relocated must be certified (or re-certified)
- ➔ Grand-fathering rule can be only applied to equipment which was compliant with the regulations preceding the change (almost none of the equipment was compliant)

***Grand-fathering does not apply to existing installations (?)***



## What is involved in certification?

- ➔ Existing certification process is designed for mass produced components and appliances
- ➔ A sample of product is submitted to CB and subjected to non-destructive or destructive tests according to applicable standard
- ➔ Once product passes the tests a certificate of compliance is issued to manufacturer which allows product to be labeled in factory.
- ➔ CB conducts periodical audits of the manufacturing process to maintain certification.
- ➔ Certification costs approximately \$30,000 per product and takes 3 to 6 months

***Certification process is not designed for one-off projects.***



## How do you certify one-off projects?

- ➔ B149.3 Code for Field Approval of Fuel Related Components on Appliances & Equipment is intended to address such projects.
- ➔ Application is submitted to CB with project documentation
- ➔ If appliance design complies fully with B149.3 Code and all components are certified, CB conducts field inspection and performance tests of the appliance and once passed CB attaches field approval label.
- ➔ If some components are not certified, CB must perform special evaluation or must obtain variance to the code.

***Field approval process requires that all components be certified or evaluated.***



## Problems with certifications/approvals

- ➔ Most of petroleum appliances are unique and non-repetitive
- ➔ Most of industrial quality components are not available with certification.
- ➔ Certification must be obtained for the entire appliance and not only individual components
- ➔ Certification must be done for each specific appliance size / configuration
- ➔ B149.3 compliant design does not mean certified design
- ➔ Certification body may reject the application if similar certified appliance or component is available
- ➔ Certification process is not clearly defined and left to the discretion of the Certification Body (CB)
- ➔ CB's do not have standards available to evaluate and test petroleum appliances.
- ➔ Certification process is expensive and time consuming
- ➔ CB's are not structured to handle non-repetitive approvals

***Certification process is not effective***



## What is the solution?

- ➔ Industry must comply with the law in order to limit its liability
- ➔ The approval process does not work effectively
- ➔ Solution must work within the existing legal framework
- ➔ The only existing vehicle to make the process work is through a variance to the Code which can be issued by the Alberta Municipal Affairs.



## Engineering Approach Variance

- ➔ The purpose of the variance is to provide alternative c) to the existing regulations to facilitate the non-certified appliance field approval process
- ➔ Petro-Canada Oil & Gas has successfully negotiated with Alberta Municipal Affairs a variance to the B149.3 regulations.
- ➔ PCOG variance is the first variance of this nature in Alberta issued to a corporation
- ➔ Engineering Approach Variance approach is being currently negotiated with AMA by the UGFEAR Committee under the auspices of CAPP



## What is the intent of the variance?

- ➔ (1) The intent is to assure the continuity and viability of operations within the applicable law.
- ➔ In recognition of the fact that B149 codes are difficult to directly apply to petroleum equipment and operations, the variance is intended to provide necessary flexibility of interpretation of these codes
- ➔ (2) The primary objective is to try to apply as much as possible the intent of the code and certified components while maintaining the viability and safety of the process.
- ➔ The interpretation of the Code should be conducted only by a qualified Professional Engineer registered with APEGGA.



## Realignment of Gas Code Legislation

- ➔ Engineering Approach variance is intended to realign the Alberta Gas Safety Regulations requirements with: electrical, pressure-equipment, building, plumbing & sewage disposal systems and elevating devices regulations.
- ➔ It is also intended to realign the requirements with similar requirements in other provinces (mostly BC and Saskatchewan)



## Intent of B149.3

- ➔ Safety of Personnel
- ➔ Safety of Public
- ➔ Protection of Equipment Integrity
- ➔ Protection of Property

BY LAW:

ANY ACCIDENT RESULTING IN INJURY OR  
PROPERTY LOSS IN EXCESS OF \$250  
MUST BE REPORTED



## Main Drivers behind the B149.3 Enforcement

- ➔ Legal implications
- ➔ Liability exposure
- ➔ Insurance requirements (General Liability, Professional Liability)
- ➔ Technical Issues





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