



COUNCIL ORDER No. 0015454

**BEFORE THE FIRE SUB-COUNCIL
On November 6, 2015**

IN THE MATTER OF the Safety Codes Act, Revised Statutes of Alberta 2000, Chapter S-1.

AND IN THE MATTER OF the Order dated June 9, 2015 issued by an Accredited Municipality (the Respondent) against the President and General Manager of an oil field service company (the Appellant).

UPON REVIEWING the Order **AND UPON HEARING** the Appellant and the Respondent; **THIS COUNCIL ORDERS THAT** the Order is **VARIED WITH CONDITIONS.**

FROM:

1. Immediately remove the tank vehicles from the building.
2. Cease use of the building for the storage of tank vehicles until the requirements of Sentence 4.11.2.3.(1) of Division B of the Alberta Fire Code 2014 are complied with.
3. Arrange for construction with #2 above in accordance with Alberta Building Code 2014 under a Building Permit issued by the accredited municipality, and
4. Inform the SCO when each of requirements of this order have been met.

TO:

1. Add the Company Name to the Order.
2. Allow the use of the building for storage of tank vehicles on the following conditions:
 - a. Maintain the building as a Class F-2 industrial building.
 - b. Purge the cargo tank on any 'General Tank Trucks' before the trucks enter the building.
 - c. Drain the auxiliary diesel tanks on the 'Hot Oil Trucks' and 'Hot Pump Trucks' to nominal zero before the trucks enter or are stored in the building.
 - d. Maintain the building heating system to set the ambient temperature in the shop area at 15 °C.
 - e. Create, maintain and post in a conspicuous place in the building, a Fire Safety Plan which includes the Conditions of this Order.

Issues:

The appeal concerns the storage of tank vehicles within a building that has been classified as Medium Hazard industrial Group F Division 2 . There are two issues arising in this appeal.

- I. Does the storage of tank vehicles within a building that has been classified as Medium Hazard industrial Group F Division 2 breach the Alberta Fire Code 2014?**
- II. If so, should the Safety Code Officer's order be upheld or varied?**

Appearances, and Preliminary, Evidentiary or Procedural Matters:

1. Appearing for the Appellant, the Appeal Panel heard from legal counsel for the Appellant, the president and general manager of the oil field service company, and an expert in combustion of fuels, vehicle fuel systems and fuel hazards, including fires and explosions.
2. Appearing for the Respondent, the Appeal Panel heard from the Fire Safety Codes Officer, the Fire Chief, and the Safety Codes Manager from the Accredited Municipality.
3. The Appellant and Respondent confirmed there were no objections to any members of the hearing panel or the jurisdiction of the Safety Codes Council or the Appeal Panel to hear and decide the appeal. The members of the Appeal Panel each confirmed that the panel had jurisdiction to hear and decide the appeal.
4. The Appellant and Respondent confirmed there were no objections to any of the written material submitted to the Appeal Panel prior to the hearing. Neither party had new documentary evidence.

The Record:

5. The Appeal Panel considered, or had available for reference, the following documentation:
 - a) Copy of Order dated June 9, 2015 (Pages 1 to 3)
 - b) The Notice of Appeal dated July 9, 2015 (Pages 4 to 10)
 - c) Acknowledgement Letter Dated July 16, 2015 (Page 11)
 - d) Stay of Order Letter dated July 16, 2015 (Page 12)
 - e) Appeal Hearing Brief Preparation Guide (Page 13)
 - f) Written Notification of Hearing (pages 14 to 15)
 - g) Appeal Brief provided by the Appellant (pages 18 to 270)
 - h) Appeal Brief provided by the Respondent (pages 150 to 312)

Provisions of the Safety Codes Act:

6. The applicable legislation is the *Safety Codes Act* S-1, RSA 2000 (the Act). Further, as the Authority Having Jurisdiction used the existing legislation in making its decisions, the Appeal Panel will apply the *Safety Codes Act* in effect at the time of the Respondent's order.

Section 5

The owner of anything, process or activity to which this Act applies shall ensure that it meets the requirements of this Act, that the thing is maintained as required by the regulations and that when the process or activity is undertaken it is done in a safe manner.

Section 49(2)

An order may be issued to a person who provides services that are the subject-matter of the order or to the owner, occupier, vendor, contractor, manufacturer or designer of the thing or to the person who authorizes, undertakes or supervises the process or activity that is the subject-matter of the order, or may be issued to any 2 or more of them.

Section 52(2)

The Council may by order

- a) Confirm, revoke or vary an order, suspension or cancellation appealed to it and as a term of its order may issue a written variance with respect to any thing, process or activity related to the subject-matter of the order if in its opinion the variance provides approximately equivalent or greater safety performance with respect to persons and property as that provided for by this Act.

Provisions of the Alberta Fire Code 2014 (AFC 2014):

7. The Alberta Fire Code 2014 provides, in part:

Division A

Part 1 Compliance

1.4. Terms and Abbreviations

1.4.1.2. Defined Terms

Combustible liquid means a liquid having a *flash point* at or above 37.8°C and below 93.3°C (See Subsection 4.1.2. of Division B.)

Flammable liquid means a liquid having a *flash point* below 37.8°C and having a vapour pressure not more than 275.8 kPa (absolute) at 37.8°C as determined by ASTM D 323, "Vapor Pressure of Petroleum Products (Reid Method)." (See Subsection 4.1.2. of Division B.)

High-hazard industrial occupancy (Group F, Division 1) means an *industrial occupancy* containing sufficient quantities of highly combustible and flammable or explosive materials which, because of their inherent characteristics, constitute a special fire hazard.

Low-hazard industrial occupancy (Group F, Division 3) means an *industrial occupancy* in which the combustible content is not more than 50 kg/m² or 1 200 MJ/m² of *floor area*.

Major occupancy means the principal *occupancy* for which a *building* or part thereof is used or intended to be used, and shall be deemed to include the subsidiary *occupancies* that are an integral part of the principal *occupancy*. The *major occupancy* classifications used in this Code are as follows:

- A1 – *Assembly occupancies* intended for the production and viewing of the performing arts
- A2 – *Assembly occupancies* not elsewhere classified in Group A
- A3 – *Assembly occupancies* of the arena type
- A4 – *Assembly occupancies* in which the occupants are gathered in the open air
- B1 – *Detention occupancies* in which persons are under restraint or are incapable of self-preservation because of security measures not under their control
- B2 – *Treatment occupancies*
- B3 – *Care occupancies*
- C – *Residential occupancies*
- D – *Business and personal services occupancies*
- E – *Mercantile occupancies*
- F1 – *High-hazard industrial occupancies*
- F2 – *Medium-hazard industrial occupancies*
- F3 – *Low-Hazard industrial occupancies*

Medium-hazard industrial occupancy (Group F, Division 2) means an *industrial occupancy* in which the combustible content is more than 50 kg/m² or 1 200 MJ/m² of *floor area* and not classified as a *high-hazard industrial occupancy*.

Tank Vehicle means any vehicle, other than railroad tank cars and boats, with a cargo tank having a capacity of more than 450 L, mounted or built as an integral part of the vehicle and used for the transportation of *flammable liquids* or *combustible liquids* and including tank trucks, trailers and semi-trailers.

Division B

Part 4 Flammable and Combustible Liquids

4.11. Tank Vehicles

4.11.2.3. Parking inside Buildings

- 1) A *tank vehicle* shall not be parked inside a *building* unless the *building* is specifically designed for that purpose or the cargo tank has been purged in accordance with the Section.

- 2) If a *tank vehicle* is to be parked inside a *building*, provisions shall be made to ensure that there is sufficient space in the tank to compensate for thermal expansion of the *flammable liquid* or *combustible liquid*.
- 3) Before parking a *tank vehicle* inside a *building*, the vehicle shall be inspected to ensure that there are no leaks in the tank, piping or valves.

Position of the Parties

Appellants

From the Appellants' submissions and testimony the Appellants' position may be summarized as follows:

8. The Appellant's Company has operated in this building since fall 2014. It is in year one of a five year lease. The Company operates an oil field service business. The business uses both general tank trucks that carry a cargo of flammable or combustible liquids as well as water, acids, and other process fluids (the "General Tank Trucks"), and diesel-fueled heater and pump trucks that incorporate a large auxiliary diesel tank on the truck (the "Hot Oil Trucks and Hot Pump Trucks") used by the equipment on the truck but not used to propel the truck.
9. Since late December 2014 the Appellant and the Company has attempted to cooperate with the Safety Codes Officer and has made changes to its practices. It amended its safety procedures and installed equipment to drain the auxiliary diesel tanks on its Hot Oil Trucks and Hot Pump Trucks each night before parking the trucks in the building. The auxiliary diesel tanks on these trucks are drained and reloaded outside. As a result of this changed practice and the engineered-design of the auxiliary diesel tanks, there is minimal danger of explosion or fire from vapours and no additional risk of fire caused by the presence of empty tank vehicles in the building. The Company had and continues to purge the cargo tanks on the General Tank Trucks before the trucks enter the building.
10. There are no guidelines to determine if the building was specifically designed to park Hot Oil Trucks and Hot Pump Trucks with empty auxiliary diesel tanks in the building without purging the tanks on the trucks. The expert's opinion is that parking Hot Oil Trucks and Hot Pump Trucks with empty auxiliary diesel tanks inside the building does not exceed the risk contemplated by the design of a Group F, Division 2 building.
11. Other similar businesses in the area engage in the same practices in similar buildings.
12. The Appellant sought a dismissal of the Order, or in the alternative, a variance of the Order to enable it to park the Hot Oil Trucks and Hot Pump Trucks inside the building each night. He referred to the Court Order of The Honourable Associate Chief Justice J. D. Rooke (October 9, 2015 Court File # 1503 12362) as including conditions that the Appellant would find acceptable in a variance. He argued he must be able to park these trucks inside the building overnight during the winter months because of the highly valuable and sensitive computer based equipment on the trucks that is subject to damage due to cold temperatures or theft.

13. While the Company has invested additional resources to alter the trucks and to build a drain station outdoors, the Company cannot afford to comply with the Order to upgrade the building to a Group F, Division 1 building, which could cost around one million dollars. Nor can it afford to comply with the Order to purge each auxiliary diesel tank each day because it would cost hundreds of dollars per tank plus four hours of time each day. The useful life of the tank would be shortened significantly by daily purging, resulting in increased equipment replacement costs of over \$100,000.00 per tank.

Respondent

From Safety Codes Officer's submissions and testimony, the Respondent's position may be summarized as follows:

14. The Alberta Fire Code contains a broad and all-inclusive definition of tank trucks. The Hot Oil Trucks and Hot Pump Trucks fit within that definition. The liquid carried in the tanks is diesel which is a combustible liquid within the Fire Code. As a result, in order to store these trucks in the building, the building must be a Group F Division 1 building or the tanks must be purged.
15. The intent of the Fire Code is to prevent risk of fire and explosion to occupants of the building or the public or fire safety personnel. When the Hot Oil Trucks and Hot Pump Trucks are stored in the building overnight, even if the auxiliary diesel tanks are emptied, there remains a special fire hazard or significant risk of explosion or fire due to escaping diesel vapours, which the Respondent categorizes as a High Hazard under the Alberta Building Code 2014 and the Alberta Fire Code 2014. When a High Hazard exists, the building must be a Group F Division 1 building for high hazard industrial occupancy or the Appellant must purge the auxiliary diesel tanks on the Hot Oil Trucks and Hot Pump Trucks before storing the trucks inside the building. The Respondent urged a strict interpretation and application of the Fire Code in the circumstances and asked the Appeal Panel to uphold the Order.
16. The Respondent has begun to investigate the similar businesses and begun to work with them to obtain compliance also.

Reasons for Decision (Findings of Fact and Law):

- I. **Does the storage of tank vehicles within a building that has been classified as Medium Hazard industrial Group F Division 2 breach the Alberta Fire Code 2014?**
17. The Appeal Panel agrees that a strict approach to the interpretation of the Alberta Fire Code (AFC 2014) shows that the storage of these Hot Oil Trucks and Hot Pump Trucks in the building overnight, with full or partially full auxiliary diesel tanks, would violate the AFC 2014. It would create a higher hazard than the design for the building as classified. In support of its first conclusion, the Appeal Panel makes the following findings for the reasons cited.

- a. The building is classified under the Alberta Building Code 2014 and the AFC 2014 as a Medium Hazard Industrial Occupancy Group F Division 2 building. A medium hazard industrial occupancy allows for more than 50 kg/m² or 1200 MJ/ m² combustible content but excludes situations where the building contents would create 'High Hazard' occupancy. The parties agreed with this classification and the development documents at page 176 – 185 of the Record support this classification.
- b. On December 2, 2014 the Appellant parked its Hot Oil Trucks and Hot Pump Trucks in the building overnight. The auxiliary diesel tanks were full or partially full. The parties agree on these points.
- c. The Hot Oil Trucks and Hot Pump Trucks carry diesel fuel used by the on-board high-capacity diesel-fueled heaters for services on oilfield sites. The Appellant's testimony on this point is undisputed.
- d. Diesel is a combustible liquid under the AFC 2014. The AFC 2014 defines a combustible liquid as one which will burn if heated but does not produce enough vapour to ignite at normal temperatures. It needs to be heated to more than 37.8°C to produce enough vapour for a flash fire. Diesel fuel has a flashpoint of 40°C. The parties agree on this information and the expert confirmed this finding in his report.
- e. The ambient temperature of the building is about 15°C which is much lower than the flashpoint of the diesel. The Appellant's testimony and the expert's opinion lead us to this finding.
- f. The tanks on Hot Oil Trucks and Hot Pump Trucks are Transport Canada certified and sealed, with double blocked valves. The valves on the auxiliary diesel tanks are designed to only open with a positive air flow. The Appellant's testimony here is undisputed.
- g. The definition of 'tank vehicles' in the AFC 2014 is broad enough to incorporate these Hot Oil Trucks and Hot Pump Trucks. They have a fuel tank to propel the vehicle and also have what the parties called an 'auxiliary tank' used by the equipment on the truck. The auxiliary tank has a capacity of more than 450 litres and holds diesel, which is a combustible fluid under the AFC 2014. Again the evidence is undisputed on this point.
- h. The fire hazards presented by tank vehicles stored inside buildings are associated with two hazard mechanisms, which we refer to simply as flammable vapour and combustible energy load. On this point we adopt the evidence and opinion of the expert.
 - i. The first hazard mechanism arises when volatile liquid fuels evaporate to produce flammable vapour-air mixtures inside the tank. If the vapours are released from the tank into the building or if spilled liquids evaporate they can accumulate and ignite leading to flash fires, explosions or ignition of other materials in the building. A building can be designed to manage such a flammable vapour hazard by including gas detection systems, forced ventilation systems, explosion proof electrical and heating systems, and limitations of co-storage of other flammable or combustible

liquids in the building. The hazard arises when the tank vehicle contains flammable liquids which evaporate vigorously enough to create a flammable mixture at their storage temperature or ambient temperature. Combustible liquids, such as diesel, do not evaporate vigorously enough to produce a flammable vapour-air mixture. As a result, the building design features, needed to manage the hazards produced by diesel fuel, are not the same as for flammable mixtures.

- ii. The second hazard mechanism is that the fuel stored in the tank truck increases the combustible energy load inside the building. Diesel fuel has a heating value around 36 MJ/L so a tank with a 1,000 litres of fuel adds 36,000 MJ of combustible content. The hazard rises in proportion to the quantity of combustible liquid stored in the tank vehicle and can increase the combustible content to a point where it exceeds the threshold for the hazard rating on the building. The hazard can be managed by minimizing the quantity of liquid fuel in the tanks when the tank vehicles are stored indoors. Alternatively, the building design features to manage an increased combustible content hazard would include more compartmentalization in the building with more fire separations and firewalls, sprinklers and other fire suppression systems.
- i. The appropriate building design features required for a building that will house a given tank vehicle will depend on the nature of the building, its tank and its cargo. On December 2, 2014 the hazard related to the large volume of diesel stored in the auxiliary diesel tanks when the Hot Oil Trucks and Hot Pump Trucks were parked indoors. This increased the combustible energy load inside the building past the threshold for a medium hazard industrial occupancy building. The building was non-compliant with the AFC 2014. On this point we rely on the evidence from the Appellant, the Safety Codes Officer and the expert.

II. If so, should the Safety Code Officer's order be upheld or varied?

18. The parties acknowledged that since the Safety Codes Officer first inspected the building in December 2014, the circumstances have changed.
19. Those changed circumstances convince the Appeal Panel that a variance of the Order with conditions will satisfy the intent of the AFC 2014 and will meet the requirements of section 52 of the Safety Codes Act. In support of this second conclusion, the Appeal Panel makes the following findings for the reasons cited.
 - a. The tank vehicles in question are the Hot Oil Trucks and Hot Pump Trucks which have auxiliary diesel tanks. The auxiliary nature of the tank tied to its integrated use on the vehicle along with the specific nature of the fuel used in the tank are critical facts upon which this panel relies to give a variance. Both parties provided this information.
 - b. As a temporary measure while investigating, between December 2014 and June 2015, the Respondent allowed the Appellant to drain the auxiliary diesel tanks on the Hot Oil

Trucks and Hot Pump Trucks and to then store the trucks in the building each night. Both parties provided this information.

- c. In 2015 the Appellant's Company changed its practices, including modifying the auxiliary diesel tanks on the Hot Oil Trucks and Hot Pump Trucks to enable rapid drain and building a rapid drain station outside the building. The diesel fuel in the auxiliary tanks on the Hot Oil Trucks and Hot Pump Trucks is regularly drained and can be rapidly drained before the truck enters the building. As well, the Appellant has implemented other safety practices and procedures required by the Respondent and other government officials. One of its Safe Work Practices requires the auxiliary diesel tanks on the Hot Oil Trucks and Hot Pump Trucks to be drained to a nominal 0% liquid level before the truck enters the building for work or storage. Also, the Company does not do any work on the auxiliary diesel tanks; all service work is contracted to licensed facilities. The Company also purges the cargo tanks on its General Tank Trucks before they enter the building. In this part we accept the uncontradicted evidence of the Appellant.
 - d. The Company and Appellant have cooperated with the Respondent. Both parties provided this information.
 - e. If the auxiliary diesel tanks on the Hot Oil Trucks and Hot Pump Trucks are empty, the combustible energy load in the building does not increase past the hazard level threshold of the medium hazard industrial building. This is a significant change from the circumstances in place at the time of the Respondent's first inspection. Both parties acknowledge this and we rely also on the opinion of the expert.
 - f. Insufficient diesel remains in the auxiliary diesel tanks of the Hot Oil Trucks and Hot Pump Trucks to create enough vapour to create a flammable vapour-air mixture that could ignite. To ignite it would need an outside ignition source of greater than 40°C. The building is maintained at a temperature of 15°C, well below the ignition temperature of diesel. There is almost no risk of flammable vapours escaping the auxiliary diesel tanks as designed. These tanks are safer than the normal fuel tank on the vehicles. In this regard, we rely on and adopt the opinion of the expert.
 - g. There is little or no risk of ignition from another flammable source in the building. The building is a modern industrial building. The Company keeps it clean and stores chemicals and other flammables outdoors. The building is otherwise compliant with the Alberta Building Code. On this point we rely on the evidence of the Appellant and the Respondent.
- 20.** The Appeal Panel finds the Appellant's revised practices are sufficient to satisfy the objective or intent of the AFC 2014.
- 21.** Generally, the objective of the AFC 2014 is to establish an acceptable level of risk or performance within the reality that the code cannot describe all possible compliance options. The intent of section 4.11.2.3., as explained by the Technical Advisors and in the Functional Statements F01, F44-OP1.1 AND FO2, FO3-OP1.2, is to limit damage to the building or

occupants arising from the probabilities that vapour from a tank vehicle will accumulate in sufficient quantity to form an ignitable mixture; that fire involving the tank will not be suppressed or controlled; that combustible liquid will leak or spill; and that ignition sources near the tank vehicle will not be minimized.

22. If the revised practices are maintained, the empty auxiliary diesel tanks on the Hot Oil Trucks and Hot Pump Trucks create no risk of sufficient vapour accumulating in the tank and no risk of the vapour escaping the tank. An empty tank adds no additional combustion load and creates no risk of leak or spill. There are no other flammables stored in the building so there are no ignition sources near the tanks. The current practices are an acceptable solution under the AFC 2014 that satisfies the objective of creating an acceptable level of risk.
23. As a result, we find the Varied Order provides approximately equivalent or greater safety performance with respect to persons and property as that provided for by the Safety Codes Act.
24. Finally, the Appeal Panel varies the Order to include the name of the Company because the building is leased in the Company name and the activities occurred in the course of the Company's business.

Signed and dated at Edmonton, Alberta this 3rd day of December, 2015 by the Appeal Panel Chair on behalf of the Panel members.

Chair, Fire Sub-Council Appeal Panel