Managing the Consequences of Dangerous Goods Occupancies in Red Deer

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Abstract

In 1988, Red Deer City Council decided it was necessary to restrict the types of uses that could be established in light industrial areas. At the same time, MIACC was working on guidelines for Land Use Planning that could be applied to Canadian Municipalities. This provided an excellent opportunity to advance MIACC issues and meet the needs of Red Deer in dealing with hazardous materials. Following a presentation to City Council opposing the changes, the Mayor established a Task Force on Dangerous Goods Occupancies to recommend bylaw amendments that would provide a framework for the City to monitor these sites. This multi-sectoral Task Force reached consensus on the necessary changes to the Land Use Bylaw and presented them to City Council for approval. The changes included definitions of Dangerous Goods and Dangerous Goods Occupancy and identified areas where these occupancies were allowed. Inherent in the bylaw was approval of Red Deer Emergency Services for occupancies where Dangerous Goods could be unloaded, loaded, stored, processed, or otherwise handled in the various land use zones. The bylaw has proven to be beneficial to property owners, real estate agents, city planners, and Red Deer Emergency Services, and has been instrumental in minimizing the effects of releases of these materials. This paper will present the background to the bylaw, explain the process for approving Dangerous Goods Occupancies, and provide insight into the significant improvements it has provided to Red Deer Emergency Services.

Keywords

land use planning
dangerous goods
hazardous materials
dangerous goods occupancy

1. Introduction

In 1988, Red Deer City Council decided it was necessary to restrict the types of occupancies that could be established in light industrial areas. At the same time, the Major Industrial Accidents Council of Canada (MIACC) was working on guidelines for Land Use Planning that could be applied to Canadian Municipalities to prevent a Bhopal-type incident. This provided an excellent opportunity to meet the needs of Red Deer in dealing with hazardous materials while advancing
the goals of MIACC. A presentation was given to City Council opposing changes to the Land Use Bylaw based on location of Public Assembly Occupancies since the Dangerous Goods create the risk. Council agreed with the concerns that were raised and the Mayor established a Task Force on Dangerous Goods Occupancies to recommend bylaw amendments that would provide a framework for the City to control Dangerous Goods sites. This multi-sectoral Task Force reached consensus on the changes to the Land Use Bylaw that would provide the required protection for the public, and presented them to City Council for approval.

2. Changes to the Land Use Bylaw

Legislation relating to the Transportation of Dangerous Goods had been enacted in Federal, Provincial, and Municipal jurisdictions. This legislation provided a framework only for transporting Dangerous Goods from one location to another; however, the municipal land use bylaw included requirements that led to conflicts between Dangerous Goods needs and existing occupancies. The most serious conflicts were between public assembly occupancies in Industrial or Highway Commercial Zones and those occupancies where Dangerous Goods were being unloaded since the local bylaw required a separation of 150 m between these occupancies to assure the safety of the public. Since this requirement was not being met in a number of cases, the City of Red Deer required a method to control occupancies where public assemblies and Dangerous Goods occupancies could locate.

The first step in providing this control was to define Dangerous Goods Occupancy, since one did not exist in the zoning bylaws. The following definitions were adopted:

1. Dangerous Goods Occupancy - any occupancy at which Dangerous Goods are unloaded, loaded, stored, processed, or otherwise handled.

2. Dangerous Goods means dangerous goods for which placards would be required if the quantity of material in question were to be transported under the Transportation of Dangerous Goods Control Act and Regulations pursuant thereto.

Having defined Dangerous Goods Occupancies, the Task Force further differentiated between occupancies based on the hazard potential of the material since Dangerous Goods are necessary for the operation of numerous businesses. In the case of materials such as toxic gases and explosives, the only way to protect the public and other occupancies against their hazards is separation through buffer zones. A heavy industrial area, designated I-2, is the normal location for materials with such long-range hazards, since the separation provided is usually adequate, and the population density is low. The Task Force also recognized there are some Dangerous Goods that the City would not want to be handled within the City limits, and while most Dangerous Goods Occupancies would be approved for use within an I-2 zone, the final decision should be open to review by the Fire Department. Therefore, the following change was made to the Land Use Bylaw:

3. Dangerous Goods occupancies are discretionary uses in all I-2 Zones.

Dangerous Goods that do not have such long-range effects do not need to be located within I-2 zones, but could be handled in an area that acts as a buffer zone between the public and the
consequences of a dangerous release. These light industrial zones, designated I-1, would provide facilities for a range of products with a variety of hazard effect distances. Based on these effect distances, the mix of Dangerous Goods could be such that those with longer-range effects could be located away from public areas, and those with local effects could be located at the boundary of the industrial zone. Occupancies handling Dangerous Goods at the boundary between commercial and residential zones should contain materials with minimal hazards and, in the event of a release or spill, have no effect beyond the boundary of their building or lot lines. In addition, facilities in which these materials are handled must be monitored by a knowledgeable agency to ensure the mix of Dangerous Goods remains constant and the public interest is not compromised. Therefore, the Task Force recommended establishment of Dangerous Goods occupancies in I-1 zones be subject to approval of the Fire Department. This control allows the Fire Department to maintain a directory of the locations where Dangerous Goods could be present. To achieve this, the following change was made to the Land Use Bylaw:

4. Dangerous Goods occupancies are discretionary uses in all I-1 Zones.

At the time of the bylaw change, Public Assembly occupancies existed and were encouraged in all zoning areas other than Industrial Zones. The Task Force proposed that Dangerous Goods Occupancies be discouraged outside the industrial zones so a public that is not aware of potential dangers would be protected; however, the Task Force also recognized that some Dangerous Goods Occupancies were intended to serve the public. Gasoline stations are an example of an occupancy that is accepted in commercial zones adjacent to residential areas since, under most conditions, emergencies in such a facility would not affect the public (although such things as leaking underground storage tanks could produce an emergency). The Task Force proposed that those occupancies with public benefit should require Municipal Planning Commission approval after the proposal has been reviewed by the Fire Department. In this way, the community would have a process to assure that the facility is necessary and that reasonable safety precautions have been taken. Therefore, the following change was made to the Land Use Bylaw:

5. Dangerous Goods occupancies are discretionary uses in all commercial zones, based on fulfilling a need of the local residents.

The foregoing recommendations outline areas where Dangerous Goods can be safely located and the Task Force believed that every attempt should be made to have businesses that use these materials locate in these areas to minimize the risk to the public. Therefore, the following change was made to the Land Use Bylaw:

6. Dangerous Goods occupancies are prohibited uses in all zones except Industrial, Commercial, and Direct Control Zones.

In several areas of the City, I-1 zones abutted highway commercial C-4 zones. These I-1 zones had the potential to contain Dangerous Goods that would impact occupancies in the C-4 zone, in particular, the public assembly occupancies. Therefore, in order to ensure that the public risk was not increasing, any future public assembly occupancy in the C-4 zones had to be reviewed to assure that existing Dangerous Goods Occupancies would not endanger the public. It was recognized that as the Dangerous Goods Occupancies with such potential are moved to the I-2 zones, or deeper into the I-1 zone, a natural transition would occur, which would reduce the
hazard to existing and proposed public assembly occupancies; however, until this development occurred, the Task Force recommended that:

7. Public assembly occupancies are discretionary uses, based on their proximity to existing Dangerous Goods Occupancies, in all C-4 zones.

These zoning changes were proposed to assure that the public risk did not increase due to introduction of Dangerous Goods near public assembly occupancies, or introduction of public assembly occupancies near Dangerous Goods Occupancies. The proposals also allowed for a reduction of the public risk over time as the Dangerous Goods Occupancies were relocated away from the public. The discretionary uses also provided an opportunity for the Fire Department to comment on changes and make recommendations to the Municipal Planning Committee as experts in the field. It also provided a mechanism whereby the Fire Department could catalogue Dangerous Goods Occupancies and thereby provide information necessary to protect their personnel from the effects of a fire, explosion, toxic release, or spill in the occupancy.

3. Application of the Bylaw

The bylaw was enacted in 1989 and has been in force since that time. The purpose of including Dangerous Goods Occupancy in the zoning bylaw was to protect the public from the source of the hazard, regardless where it occurred. In the years following the change, the Red Deer Fire Department confirmed that this was happening, so much so that they believed there was a need to better define such an occupancy to eliminate the need to deal with very low risk situations. The change in the definition was meant to bring the bylaw in line with the latest issue of the Alberta Fire Code, and in 1993 the definition was changed to:

8. Dangerous Goods Occupancy - any occupancy where Dangerous Goods in quantities that exceed the amounts specified in Table 3.3.6.A. of the Alberta Fire Code (1992) are unloaded, loaded, stored, processed, or otherwise handled. Service stations dispensing refined petroleum products are excluded.

This bylaw change also highlighted the fact that Table 3.3.6.A. included many substances that were not necessarily flammable but were toxic, corrosive, or even radioactive. By taking responsibility for these materials, the Fire Department took on a role that made them much more than a group that simply fights fires, and the designation as the 'Fire Department' was deemed outdated. The department name was changed to Red Deer Emergency Services to better reflect their responsibilities for emergency response, Dangerous Goods Occupancies, and emergency medical services. The definition was further modified to:

9. Dangerous Goods Occupancy, unless otherwise determined by the Fire Chief, includes, but is not limited to, any occupancy where dangerous goods, as defined in the Transportation of Dangerous Goods Control Act, are unloaded, loaded, stored, processed, or otherwise handled in quantities in excess of the amounts set forth in Schedule “B”.

Schedule “B” (Ref: 3) is reproduced in the Appendix.
4. Benefits of the Bylaw Change

When the original Task Force was constituted, many people believed that it would not be possible to reach consensus on changes to the Land Use Bylaw; the interests of those involved were far too diverse. Nevertheless, as discussions unfolded, it became apparent that the changes would benefit everyone involved.

- Property owners benefited because they were not always aware of the materials that might be handled within their buildings. This in turn could lead to higher potential for fire or other damage that was not in their best interests. By compelling those who proposed to lease the property to disclose the materials they would be handling, the property owner could put trust in the Fire Chief to properly assess the suitability for the given property.

- Real estate agents also welcomed the changes since there was a requirement for disclosure of the materials that would be handled in the facility. Prior to the bylaw change, proposed sales or leases were submitted to the Municipal Planning Commission for approval of the intended occupancy with no guidance as to what might be acceptable. The Bylaw made clear the types of occupancies that would be acceptable and those that were definitely not acceptable. This facilitated their ability to sell and lease property.

- City Planners endorsed the changes since the bylaw laid out specific requirements that had to be met. Prior to the bylaw change, the MPC had wide discretion as to the occupancies that could locate in the various zoning areas. This discretion often usurped the original basis for establishing the zoning area to the chagrin of local planners.

Red Deer Emergency Services may have benefited the most from the change in the bylaw. Prior to the change, the department was in the process of cataloguing Dangerous Goods that were located in the various occupancies in the City. During their annual inspection of facilities, they would often identify a material that they had not previously identified. It was certainly better to find these materials during an inspection, rather than in a fire situation, but success depended on the diligence of the inspector and the awareness and candor of the occupant. By including the Dangerous Goods and their quantities on the occupancy permits (Ref: 5), Red Deer Emergency Services is able to maintain a current inventory of these goods. They review the material inventory prior to issuing the Occupancy Permit and during their annual inspection, and as a result of these reviews they are often able to recommend the best means to handle and store the Dangerous Goods, which tends to reduce the hazard associated with the storage. Red Deer Emergency Services confirmed that Dangerous Goods in new facilities rarely get missed; however, to assure this the inspectors must be diligent in their inspections, Emergency Services must continuously educate the users of Dangerous Goods regarding the registration requirements, and as a last resort, they will enforce the requirements of the bylaw in court.

Changes in Dangerous Goods inventories also have to be reported to maintain an occupancy permit with the hope that occupants will contact Emergency Services prior to bringing in new chemicals. This is still not occurring in all cases, but results are improving since Red Deer Emergency Services has the right to inspect any facility unannounced. If inspectors find a material that has not been included in the list of materials for a site, they issue a ‘Heads-up’ to the emergency responders so they will be aware of the material until such time as the database is
updated. Updating is usually completed weekly. Red Deer Emergency Services also use the inventory information for planning drills and other practice exercises.

A database of Dangerous Goods Occupancies is also important for response in an emergency. Red Deer Emergency Services maintains a computerized inventory of the materials in each of the commercial facilities in Red Deer. The database is accessible by name or address. In addition, the database contains the names of companies that have previously occupied the site, the contact information for those responsible for the site, and a record of any previous emergency calls or incidents that might have occurred at the site (See Figure 1). First responders on the way to the scene of the emergency consulted this inventory data to determine the type of intervention that would be most appropriate. Figure 2 contains a photograph of the exterior of one of the buildings. The Platoon Chief, along with Emergency Responders, the Dispatcher and the Emergency Operations Centre, are also able to access MSDS and Response Guidelines through the computerized system to assure the attack tactics are appropriate to the risk (see Figure 3). Many of the entries contain a floor plan of the facility to assist responders in dealing with the potential hazards (see Figure 4). In this way, application of the bylaw has become instrumental in minimizing the effects of releases of hazardous materials.

5. Closing

The bylaw changes implemented in Red Deer are not a substitute for risk-based Land Use Planning Guidelines; however, the experience in Red Deer has shown that it was not necessary to create new legislation to deal with the consequences associated with handling hazardous materials. By incorporating changes into the existing Land Use Bylaw, the City was able to exercise control regarding if and where Dangerous Goods Occupancies could locate. By including the Fire Chief in the approval process, the ability of the Red Deer Emergency Services Department to monitor hazardous materials was enhanced, thereby allowing the department to plan for, be prepared, and respond in the event of a dangerous goods incident.

References:

1. Internet location of the City of Red Deer Dangerous Goods Route Bylaw: Dangerous Goods Route Bylaw 3152-95 - Schedule A

2. Internet location of the City of Red Deer Dangerous Goods Route Bylaw: Dangerous Goods Route Bylaw 3152-95

3. Internet location of the City of Red Deer Land Use Bylaw: Schedule B - Dangerous Goods and Hazardous Materials

4. Internet location of the City of Red Deer Land Use Bylaw: Part 1 - Title, Definitions, General Operative Clauses

5. Internet location of the City of Red Deer Occupancy Permits & Information: Occupancy Permit Application

6. Internet location of the City of Red Deer Occupancy Permits & Information: Occupancy Permit Information
Appendix A – City of Red Deer Land Use Bylaw Schedule “B”

City of Red Deer Land Use Bylaw 3357/2006

Schedule “B”

Small Quantity Exemptions for Dangerous Goods

The existence of the following quantities of dangerous goods on a site will not be considered to constitute dangerous goods occupancy. Any quantities in excess of this amount will constitute a dangerous goods occupancy and must be approved by the Emergency Services Department of the City.

Designated Hazardous Materials Sites Table

Occupancies where dangerous goods are stored or handled in quantities in or exceeding the amounts listed below are Designated Hazardous Materials Sites

1.1 Mass Explosion Hazard 1 Any
1.2 Severe Fragment Projection 1 Any
1.3 Predominant Fire Hazard 1 Any
1.4 No Significant blast Hazard 1 50 kg
1.5 Insensitive Substance (Mass Hazard) 1 250 kg
1.6 Extremely Insensitive Substances 1 250 kg

2.1 Flammable Gases 2 100 L or kg
2.2 Compressed Gases 2 1000 L
2.3 Toxic Gases Any

3.1 Flammable Liquids 250 L
3.2 Combustible Liquids (incl. Waste Oil) 1000 L

4.1 Flammable Solids 25 kg
4.2 Spontaneous Combustible Material 25 L or kg
4.3 Dangerous When Wet Material 25 L or kg

5.1 Oxidizing Substances 50 L or kg
5.2 Organic Peroxides 1 L or kg

6.1 Toxic Materials 5 L or kg
6.2 Infectious Substances Any

7 Radioactive Materials 3 Any

8 Corrosives 250 L or kg

9 Miscellaneous Dangerous Goods 250 L or kg

1 Any amount that requires license from Explosive Branch (Natural Resources Canada)
2 Amounts listed are the equivalent liquid measure of the container
3 Any amount that requires license from Atomic Energy Regulators
Appendix B – Screen Captures

Figure 1 - Entry Screen to Database

Figure 2 - Picture of Dangerous Goods Occupancy
Figure 3 – Details of Dangerous Goods

Figure 4 – Floor Plan of Dangerous Goods Occupancy