

---

**APPENDIX U**  
**Fire Safety Analysis**

---



Purpose: To ensure the highest level of Fire prevention, detection and response is designed and implemented into the Fibreco Terminal Enhancement.

Highlights of the plan include

- Fire Prevention
  - Modern dust control at rail receiving, transfers, storage and shiploader
  - Full car hopper pit at trail dumper
  - Enclosed conveyors
  - Tramp metal magnets
  - Purpose built, enclosed transfers
  - Modern dust suppression shiploading spout
  - All new electrical systems to comply with local standards
- Early Detection
  - Bearing temperature monitoring on drives and key rollers
  - Fire-fly spark detection at critical transfers
  - Low temperature sprinkler systems on conveyors and critical areas
  - Automatic sprinkler systems for new buildings
  - Fire and smoke detection systems monitored 24/7
- Emergency Response
  - Fire water loop to include access to all areas of the site
  - Site enables emergency vehicle access
  - Local Fire Department involvement in system design and implementation

## 1.0 Introduction

Fibreco currently receives woodpellets by hopper bottom railcar, conveys to storage then ultimately conveys to deep sea vessel. An established Fire Safety Plan has been developed and implemented with the assistance of Orso Loss Control Consulting (April 2013) (included). The terminal enhancement design is intended to unload grains, convey to storage, then convey to vessel for shipment. Processing (cleaning) will not be an activity performed on-site, nor will pelletizing thus reducing fire risk.

## 2.0 Background

Woodpellets by nature range in the 5-10 % moisture range. Handling and storage require great care and attention to ignition sources, dust accumulations and air emissions. Some of the handling systems will be shared with wood pellets and agri-products. The emphasis on fire mitigation will use woodpellets as the base case. The additional products Fibreco will handle are wheat, canola, peas and lentils. Table 1 illustrates the typical properties of the materials in terms of their explosive nature. Detailed system monitoring will enable early fire detection or failure conditions. The facility will adhere to a rigorous preventative maintenance program to identify potential fire risks as well as ensure best practice housekeeping is followed. The facility is to be design and constructed to adhere to the most current NFPA standards, National Building Code, Canada Labour Code Part II and the BC Electrical Code. Modern fire detection, dust control and fire suppression systems are included in the design criteria.

| Material          | Bulk Density (lb/cu ft) | Kst Bar-m/sec | Pmax Bar | MEC g/m3 |
|-------------------|-------------------------|---------------|----------|----------|
| Wheat (inc Durum) | 48                      | 112           | 9.3      | 60       |
| Canola            | 42.5                    | -             | -        | -        |
| Soybeans          | 45                      | 125           | 7.5      | 35       |
| Peas / lentils    | 48                      |               | 4.6      | 50       |
| Wood Pellets      | 48                      | 140 - 160     | 8.1      | 65 - 75  |

**Table - 1**

### **3.0 Fire Protection Measures**

All new Buildings are to be constructed of non-combustible materials. Buildings shall be designed to minimize horizontal surfaces where combustible dust could accumulate. Such horizontal surfaces shall be accessible to the maximum extent possible to assure that regular cleaning and visual inspection can be performed. All equipment on the project site shall be designed to minimize or entirely eliminate fugitive dust emissions via gentle handling systems, dust collection equipment and enclosed conveyors. Purpose built transfers and smooth conveyors are included to reduce the generation of dust.

Fire protection systems will be provided in locations where typical for standard industry practices. Building layouts shall be designed to provide adequate space for escape in the event of fire per national, provincial, and local codes.

#### **3.1 Rail Receiving**

The facility will be designed to receive grains and woodpellets by hopper bottom rail cars. Up to 112 car trains will land on-site. 1 train per day is the estimated frequency. Fully contained rail cars will not allow airborne dust as the train locomotive passes through the building. A dust collection system shall be provided by the rail receiving pit which shall collect dust emissions from the rail car unloading process. Fire/Heat Detection shall be provided within the Rail Receiving Pit area. The loading pit will be equipped with an anti-backdraft system to further mitigate fugitive dust emissions. Access and egress will be via stairs with a secondary emergency escape ladder per NFPA 101.

#### **3.2 In-bound System**

The In-bound system will consist of incline conveyors to a single bucket elevator to a transfer conveyor and ultimately to storage. A tramp metal magnet will be installed early in the receiving system to remove metal which could cause possible sparking. Early detection systems include fire-fly spark detection at head boxes, bearing temperature monitoring on pulleys and key rollers as well as low temperature sprinkler systems. Conveyors will be equipped with emergency stops and interlocks will prevent the possibility of allowing a fire to travel along the system. Dust collection devices will be installed at the transfer points.

#### **3.3 Transfer Towers**

Transfer towers will be mostly open to atmosphere, and as such, do not have stringent fire protection requirements included within. The tower shall be constructed of non-combustible materials, primarily structural steel with concrete foundations. Horizontal surfaces shall be minimized for locations of dust accumulation. Access and egress will be via stairs. Transfer points will be purpose designed to prevent cargo attrition and reduce dust generation.

### **3.4 Silo structures**

Manual dry standpipes, with fire department connections, will be provided at the silo towers. These manual dry standpipes shall be configured in such a way so as to provide coverage at each row to meet or exceed local standards. Access and egress shall be in accordance with NFPA 101.

### **3.5 Outbound conveyors**

Outbound systems will consist of incline conveyors, enclosed transfers with dust collection points. A tramp metal magnet will be included in the cargo flow to reduce spark potential. Fire-fly spark detection at transfer points, bearing temperature monitoring and sprinkler systems will all serve for early detection and prevention. Field stops and system interlocks will also prevent the spreading of fires. Access and egress to the various building areas will be in accordance with NFPA 101.

### **3.6 Ship Loading**

Ship loading fire protection includes manual dry connections at the berth as well as a semi-automated deluge system. System interlocks and early detection add further protection. The shiploader structure will be constructed of non-combustible materials primarily structural steel. All lubricants will adhere to strict environmental standards with spill prevention measures in place.

### **3.7 Other Buildings**

Rail operations and lunchrooms will contain fire protection systems provided by the building subcontractor. Electrical rooms will be equipped with fire protection systems compliant with the BC Electrical Code, NFPA and Canada Labour Code part II.

### **3.8 Maintenance Building**

The Maintenance Building fire protection systems shall be provided by the building subcontractor. The Maintenance Building shall be provided with all fire protection features required to meet or exceed all codes regarding occupied buildings of this nature.

## **4.0 Equipment**

### **4.1 Bucket Elevators**

All bucket elevators are located outside for passive isolation purposes and shall include full hazard monitoring systems and manual deluge fire protection systems with dry standpipe. Pressure relief venting shall be provided on all bucket elevators, and they shall also be located on the exterior of buildings.

#### **4.2 Conveyors**

All belt conveyors involved in the main transfer of materials throughout the facility shall utilize rubber belting and which shall be oil-resistant, fire retardant, and non-conductive. Fire protection shall be in accordance with NFPA requirements.

#### **4.3 Dust Filters and Cyclones**

Dust filters and cyclones shall be located outside of buildings. Dust filters shall be provided with deflagration venting. All dust filters shall include manual deluge systems and heat sensors. Electrical Interlocking shall be provided in between the material handling process machinery and dust filters to prevent the equipment from starting unless the associated dust filter is operating. Passive mechanical explosion isolation equipment shall be provided on dust filters located at the Cleaning Building.

### **5.0 Miscellaneous Fire Protection Items**

#### **5.1 Fire Protection Water Supply**

Automatic Sprinkler systems shall be designed to current (less than 12 months old) local water supply flow test results.

#### **5.2 Fire Water Supply Main**

A looped fire water main (minimum 10 inch diameter) with isolation or sectional control valves and post indicators shall be provided. Post indicators shall not have tamper switches. 20 psi residual pressure will be maintained in the system at all times for pumper fire trucks. Pumps will be provided as necessary for the sprinklers.

#### **5.3 Fire Hydrants**

Hydrants shall be fed by minimum 6 inch connections coming from the fire main loop. Isolation and/or sectional control valves shall be provided for each individual fire hydrant. Hydrants shall be spaced within 100ft of Fire Department Connections, and spaced within 300ft maximum between other structures (or as required).

#### **5.4 Fire Pumps**

Fire booster pumps shall be provided at any and all locations requiring pressure higher than that available in the fire water loop. The pumps shall have a power supply reliable per NFPA standards if electric, otherwise the pumps provided shall be diesel-powered per NFPA standards.

### **5.5 Sprinkler System Protection**

Automatic sprinkler system protection shall be provided for all enclosed buildings and structures of or containing appreciable values or vital to continuation of terminal operations.

### **5.6 Fire Detection Alarm Systems**

Smoke detectors shall be installed inside main electrical/MCC rooms. Other sensors and switches shall be provided on equipment which will detect issues before heat detection devices, therefore negating the need to install heat detecting devices at these locations. All fire detection systems shall be monitored at the Pre-action monitoring panel and/or the main fire detection system monitoring panel located in the control room, which shall be a constantly attended location. Additionally, monitoring of manual valves shall be handled by the main monitoring system.

### **5.7 Portable Fire Extinguishers**

One minimum "2A" rated multi-purpose "ABC" type extinguisher should be provided per 1,500 ft<sup>2</sup> building area or within maximum 75 ft. travel distances, whichever is more stringent. Carbon Dioxide or other clean agent type extinguishers shall be provided in electrical and control rooms. The control room is located within the administration building.

### **5.8 Fire Hose Standpipes**

The local fire department shall be contacted for standpipe connection size, type, and location requirements. Standpipe systems shall be sized based upon local fire department pumper truck pump ratings and dry pipe requirements. All standpipes exposed to freezing shall be dry type or appropriately heat traced.

### **5.9 Electrical/MCC Rooms**

Electrical rooms shall be maintained under positive pressure. Local smoke detectors shall be installed inside of all main electrical/MCC rooms and PDC's.

### **5.10 Electrical System and Equipment**

Class II, Group G, Division I rated areas only apply to areas on the interior certain pieces of equipment/hoppers/silos/etc. Class II, Group G, Division II rated fixtures and equipment shall be provided in all areas exposed to combustible dusts.

## **6.0 Emergency Vehicle Access**

Emergency vehicle access to the site shall be provided per all regulations and industry standards. The District of North Vancouver Fire Department will be consulted regarding access and shall be consulted throughout the design life of the project.

**Attached:** Fibreco Fire Safety Plan (2013)



# FIRE SAFETY PLAN

for

# Fibreco Export Ltd.

**1209 McKeen Avenue  
District of North Vancouver, BC  
V7P 3H9**



Prepared by:

Orso Loss Control Consulting Inc. (OLCC)  
6381 Beechwood Street  
Delta, BC V4E 3J2  
604 590-0704  
OLCC@DCCNET.COM

*"OLCC Fire Safety Plans are prepared in compliance with Provincial Fire Code Regulations, local Fire Bylaws, Fire Department policies and commonly accepted loss prevention standards existing at the time services are rendered. The Fire Safety Plan is developed from an inspection of the premises and from data supplied by or on behalf of the Customer. OLCC does not purport to list or identify all hazards. Recommendations and actions referred to in the Fire Safety Plan are designed to reduce the likelihood of fire, improve supervisory staff and occupant response to a fire or alarm, minimize the impact of a fire, improve fire prevention and protection practices and general loss prevention behaviours within the construction site. OLCC assumes no responsibility for the management or implementations of this Fire Safety Plan and control of the identified activities. OLCC will not be responsible to the Customer for any losses or damages, whether consequential or otherwise, however caused, incurred or suffered, as a result of or arising out of the services being provided. All content of this document and related information herein is the property of OLCC Inc. It is not to be used or copied without written permission from OLCC Inc."*

## FIRE SAFETY DIRECTORS CHECKLIST

The Fire Safety Director and other designated staff have certain responsibilities as required by the BC Fire Code Regulations. This checklist highlights such responsibilities, but should not be considered as complete list. The Fire Safety Plan is to be used for reference and details.

- Fire Safety Director is appointed and has reviewed the Fire Safety Plan
- Fire Safety Director completes Emergency Contact page.
- Fire Safety Director has appointed Deputy Fire Safety Director's or alternates
- Fire Safety Director, Deputy Fire Safety Director(s) and alternates have read and understand the Fire Emergency Procedures
- Fire Safety Director, Deputy Fire Safety Director(s) and alternates have reviewed and understand the Responsibilities for Fire Safety
- Supervisory and other appointed staff are trained in the proper use, dispensing and handling of hazardous materials, flammable and combustible liquids normally present in the facility.
- Supervisory and other appointed staff are trained in the proper spill management procedures for hazardous materials, flammable and combustible liquids normally present in the facility.
- All employees concerned with storage and handling of products are trained in the:
  - Operating procedures
  - Importance of constant attendance during all loading or unloading operations,
  - Extinguishing procedures for fires
  - Location, function and operation of valves and switches used for normal operation and emergency shut-down.

Fire Safety Director confirms:

- A complete Fire Drill will be conducted within 60-days of receipt of the Fire Safety Plan. The fire drill will confirm emergency evacuation and response procedures, demonstrate the sound of audible fire alarm signal and evaluate staff response to an alarm.
- Fire Drills will be conducted at least annually.
- Documentation of location and content of storage silos, tanks, conveyor transport systems, valves, pumps and protective equipment/systems are readily available to the fire department upon request.
- Above document(s) are kept at 2 separate locations so that one copy remains readily available in the event the other is inaccessible due to fire.
- Staff understands and are trained in "Hot Works" safety procedures
- Maintenance shop and other location(s) where cleaning procedures occur will use non-flammable solvents only, except when used by staff specifically trained in the safe use, handling and storage of flammable liquids.

**EMERGENCY CONTACTS**

|                                       |                                 |  |
|---------------------------------------|---------------------------------|--|
| FIRE EXTINGUISHER                     | SIMPLEX-GRINNELL                | 604 515-8872   |
| EMERGENCY LIGHTING                    | SIMPLEX-GRINNELL                | 604 515-8872   |
| SPRINKLER SYSTEMS                     | SIMPLEX-GRINNELL                | 604 515-8872   |
| VESDA SYSTEM                          | SIMPLEX-GRINNELL                | 604 515-8872   |
| STANDPIPE/FIRE HOSE                   | SIMPLEX-GRINNELL                | 604 515-8872   |
| FIRE HYDRANTS<br>WALL HYDRANTS        | SIMPLEX-GRINNELL                | 604 515-8872   |
| FIRE PUMP                             | SIMPLEX-GRINNELL                | 604 515-8872   |
| PROPANE                               |                                 |  |
| ABOVEGROUND FUEL TANK<br>CONDITIONING | PACIFIC RIM FILTRATION          | 604 990-9797   |
| DUST COLLECTION SYSTEM                |                                 |  |
| DUTY MANAGER                          |                                 | 604 998-4111   |
| SECURITY                              |                                 | Office 604 983-7913<br>Cell 604 690-1141   |
| TRANSPORT CANADA<br>SECURITY          |                                 | 604 666-4765   |
| FIRE SAFETY DIRECTOR                  |                                 |  |
| DEPUTY FIRE SAFETY<br>DIRECTORS       |                                 |  |
| FACILITY CONTACTS                     | <u>TERMINAL MANAGER</u>         | MIKE SULLIVAN 604 690-1132   |
|                                       | <u>ASSISTANT TERMINAL MGRS.</u> | HENRY ZEA 604 841-1129<br>DAN WILLIAMSON 604 240-2817<br>GLEN DEMPSTER 604 350-1057<br>AARON CRAWFORD 604 841-1126 |
| FIRE SAFETY PLANNING                  |                                 | OLCC INC (604) 590-0704  |

**Note:**

The Fire Safety Director should complete and maintain a current list of the above noted emergency contact fields to facilitate quick contact should the need arise. Blank forms are in Part 10.

## EMERGENCY NUMBERS

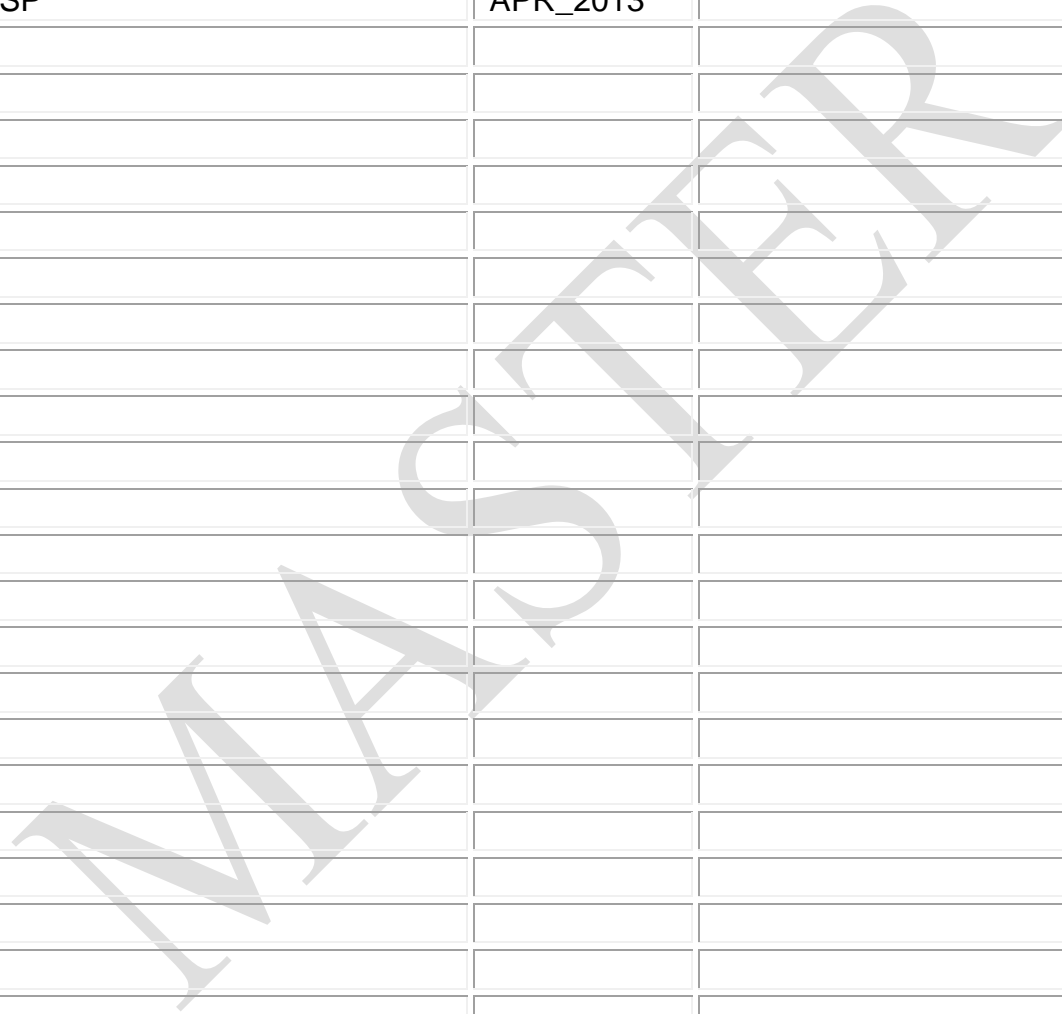
|   |  |
|---|--|
| FIRE EMERGENCY  | 911  |
| FIRE NON EMERGENCY  | (604) 980-7575   |
| POLICE EMERGENCY  | 911  |
| POLICE NON EMERGENCY  | (604) 985-1311   |
| AMBULANCE   | 911  |
| NON EMERGENCY   | (604) 872-5151   |
| <p><b>For Police, Ambulance and Fire dial 9-1-1. Have the following information ready when calling 9-1-1:</b></p> <ul style="list-style-type: none"> <li>• Who you need - Police, Ambulance and/or Fire</li> <li>• What the emergency is? Be as specific as possible.</li> <li>• Location of emergency ... Exact address and nearest street intersection (McKeen Avenue and Pemberton Avenue)</li> <li>• Your name ...</li> </ul> |  |
| GAS LEAKS & ODOURS  | 1(800) 663-9911  |
| CRISIS CENTRE   | (604) 951-8855   |
| POISON CONTROL CENTRE   | (604) 682-5050   |
| POWER OUTAGES & EMERGENCIES   | 1 (866) 436-7847   |
| PROVINCIAL EMERGENCY PROGRAM  | (604) 586-4390   |
| SPILLS  | Environment Canada (604) 666-6100<br>Provincial Emergency Program<br>1-(800)663-3456 |
| AIR OR MARINE EMERGENCY   | 1 (800) 567-5111<br>or Cellular *311   |
| Marine Emergency-Canadian Coast Guard   | *16  |
| EARTHQUAKE, FLOOD, SPILLS   | 1 (800) 663-3456   |
| MINISTRY OF ENVIRONMENT (MOE)   | (604) 582-5200   |
| CANUTEC   | (613) 996-6666 or Cell *666  |
| Health Guide Nurse Line   | 1 (866) 215-4700<br>or 811   |
| Lions Gate Hospital<br>231 15 <sup>th</sup> Street East, North Vancouver  | (604) 988-3131   |

## REVISION/REVIEW CONTROL RECORD

**Plan Holder's Name:** \_\_\_\_\_

**Copy No:** \_\_\_\_\_ **Location:** \_\_\_\_\_

| Revision/Review | Date     | Plan Holder's Signature |
|-----------------|----------|-------------------------|
| New FSP         | APR_2013 |                         |
|                 |          |                         |
|                 |          |                         |
|                 |          |                         |
|                 |          |                         |
|                 |          |                         |
|                 |          |                         |
|                 |          |                         |
|                 |          |                         |
|                 |          |                         |
|                 |          |                         |
|                 |          |                         |
|                 |          |                         |
|                 |          |                         |
|                 |          |                         |
|                 |          |                         |
|                 |          |                         |
|                 |          |                         |
|                 |          |                         |
|                 |          |                         |
|                 |          |                         |
|                 |          |                         |
|                 |          |                         |
|                 |          |                         |
|                 |          |                         |
|                 |          |                         |



Blank Page

MASTER

|                          |
|--------------------------|
| <b>TABLE OF CONTENTS</b> |
|--------------------------|

|  |           |
|--|-----------|
| <b>EMERGENCY CONTACTS</b>                                      | <b>3</b>  |
| <b>EMERGENCY NUMBERS</b>                                       | <b>4</b>  |
| <b>REVISION/REVIEW CONTROL RECORD</b>                          | <b>5</b>  |
| <b>ABSTRACT</b>  | <b>11</b> |
| <b>PART 1 DEFINITIONS AND TERMS</b>                            | <b>13</b> |
| ABBREVIATIONS  | 16        |
| <b>PART 2 - OBJECTIVES</b>                                     | <b>17</b> |
| <b>GENERAL</b>   | <b>17</b> |
| FIRE EMERGENCY EVACUATION SEQUENCE - GENERAL                   | 17        |
| SUPERVISORY STAFF REQUIREMENTS - GENERAL                       | 18        |
| <b>B.C. FIRE CODE REGULATIONS 2012</b>                         | <b>19</b> |
| SECTION 2.8. EMERGENCY PLANNING (Applicable excerpts provided) | 19        |
| GENERAL  | 19        |
| DISTRICT OF NORTH VANCOUVER FIRE BYLAW                         | 20        |
| <b>PART 3 - RESPONSIBILITIES</b>                               | <b>21</b> |
| <b>FIRE SAFETY DIRECTOR RESPONSIBILITIES</b>                   | <b>21</b> |
| GENERAL RESPONSIBILITIES                                       | 21        |
| <b>FIRE DRILL PROCEDURES AND FIRE DRILL FREQUENCY</b>          | <b>24</b> |
| PLANNING A FIRE DRILL  | 24        |
| RESPONSIBILITIES OF SUPERVISORY STAFF – FIRE DRILL             | 25        |
| <b>APPOINTMENT OF THE FIRE SAFETY DIRECTOR</b>                 | <b>26</b> |
| <b>APPOINTMENT OF THE DEPUTY FIRE SAFETY DIRECTORS</b>         | <b>27</b> |
| <b>PART 4 – FIRE PREVENTION, EVACUATION &amp; CONTROL</b>      | <b>29</b> |
| FIRE HAZARDS - GENERAL   | 29        |
| <b>FIRE PREVENTION - FIRE HAZARDS AND THEIR ELIMINATION</b>    | <b>31</b> |
| EXITING  | 31        |
| SMOKING  | 32        |
| NON-GAS TORCH AND OTHER CUTTING                                | 33        |
| ELECTRICAL WIRING AND EQUIPMENT                                | 33        |
| HOUSEKEEPING   | 34        |
| ACCESS TO ELECTRICAL PANELS                                    | 34        |
| ACCESS TO FIRE PROTECTION EQUIPMENT                            | 34        |
| AISLES PROVIDING ACCESS TO EXITS                               | 35        |
| <b>INDUSTRIAL TRUCKS</b>                                       | <b>36</b> |
| BATTERY - POWERED INDUSTRIAL TRUCKS                            | 36        |
| FUEL- FIRED (PROPANE) INDUSTRIAL TRUCKS                        | 37        |
| PROPANE (LPG)  | 38        |
| <b>HOT WORK</b>  | <b>39</b> |
| FIRE WATCH FOR HOT WORK AREAS                                  | 42        |

|   |                  |
|---|------------------|
| FIRE EXTINGUISHING EQUIPMENT IN A HOT WORK AREA _____             | 43               |
| <b>LOCK OUT PROCEDURES _____</b>                                  | <b>44</b>        |
| <b>SHIPS's CREW "WELCOME PACKAGE" _____</b>                       | <b>47</b>        |
| <b>INDOOR STORAGE REGULATIONS _____</b>                           | <b>48</b>        |
| STORAGE ARRANGEMENTS WHICH CONTRIBUTE TO FIRE SPREAD _____        | 48               |
| PROPER STORAGE ARRANGEMENTS _____                                 | 48               |
| ACCESS AISLES - INDOOR STORAGE AREAS _____                        | 48               |
| CLEARANCES IN STORAGE AREAS _____                                 | 48               |
| <b>PELLET SHED SAFETY _____</b>                                   | <b>49</b>        |
| <b>OUTDOOR STORAGE REGULATIONS _____</b>                          | <b>50</b>        |
| <b>WOOD CHIP STORAGE _____</b>                                    | <b>51</b>        |
| <b>FIRE PREPAREDNESS _____</b>                                    | <b>57</b>        |
| <b>FIRE EVACUATION _____</b>                                      | <b>57</b>        |
| FIRE EMERGENCY PROCEDURES - GENERAL _____                         | 58               |
| FIRE or SPILL EMERGENCY– During Business hours _____              | 59               |
| FIRE or SPILL EMERGENCY– After Business hours _____               | 59               |
| MUSTER AREA _____   | 59               |
| PORTABLE FIRE EXTINGUISHERS _____                                 | 60               |
| <b>FLAMMABLE OR COMBUSTIBLE LIQUID SPILLS _____</b>               | <b>62</b>        |
| SPILL CLEAN-UP PROCEDURES _____                                   | 62               |
| <b><i>PART 5 – PROPERTY INFORMATION _____</i></b>                 | <b><i>65</i></b> |
| <b>PROPERTY and OPERATION DESCRIPTION _____</b>                   | <b>65</b>        |
| OVERVIEW _____  | 65               |
| <b>FIRE DEPARTMENT ACCESS _____</b>                               | <b>66</b>        |
| <b>SITE DRAINAGE _____</b>  | <b>66</b>        |
| <b>WATER SUPPLY _____</b>   | <b>66</b>        |
| <b>FIRE HYDRANTS _____</b>  | <b>66</b>        |
| <b>SPRINKLER PROTECTION _____</b>                                 | <b>67</b>        |
| DRY SPRINKLER SYSTEM DESIGN CRITERIA – EAST DRY PELLET SHED _____ | 67               |
| DRY SPRINKLER SYSTEM DESIGN CRITERIA – SHIP LOADER CONVEYOR _____ | 69               |
| <b>SIMPLEX 4010 CONTROL PANEL OPERATING INSTRUCTIONS _____</b>    | <b>70</b>        |
| <b>MIRCOM FX-2000 OPERATING INSTRUCTIONS _____</b>                | <b>71</b>        |
| <b>FIREFLY- AB SYSTEM _____</b>                                   | <b>73</b>        |
| <b>MISTERS _____</b>  | <b>78</b>        |
| TOWER DELUGE VALVES _____   | 79               |
| <b>FIRE PUMP _____</b>  | <b>80</b>        |
| HOW TO USE A FIRE HOSE _____                                      | 81               |
| <b>FIRE DEPARTMENT CONNECTION TO SPRINKLER SYSTEMS _____</b>      | <b>81</b>        |
| <b>HAZARDOUS MATERIALS _____</b>                                  | <b>82</b>        |
| WASTE MOTOR OIL: _____  | 82               |
| LEAK DETECTION TESTING AND MONITORING OF WASTE OIL TANK _____     | 82               |



|  |                  |
|--|------------------|
| DISPENSING WASTE OIL _____   | 83               |
| <b>OUTDOOR STORAGE OF COMPRESSED GASES _____</b>                               | <b>84</b>        |
| <b>TANK STORAGE (Marked fuel) _____</b>  | <b>84</b>        |
| RECORDS _____  | 84               |
| <b>TANK AND PIPING SPILLS _____</b>  | <b>84</b>        |
| CONTAINMENT _____  | 85               |
| <b>FREQUENCY OF TANK MONITORING _____</b>                                      | <b>86</b>        |
| REMEDIAL ACTION _____  | 87               |
| <b>LEAK DETECTION TESTING AND MONITORING METHODS _____</b>                     | <b>87</b>        |
| INVENTORY RECONCILIATION _____   | 87               |
| VISUAL INSPECTION _____  | 87               |
| <b>LEAK DETECTION TESTS _____</b>  | <b>88</b>        |
| PROTOCOLS FOR PNEUMATIC LEAK DETECTION TESTING OF STORAGE TANKS _____          | 88               |
| PROTOCOLS FOR PNEUMATIC LEAK DETECTION TESTING OF PIPING SYSTEMS _____         | 88               |
| PROTOCOLS FOR LIQUID MEDIA LEAK DETECTION TESTING OF PIPING SYSTEMS _____      | 89               |
| PROTOCOLS FOR LEAK DETECTION TESTING OF SUMPS _____                            | 89               |
| <b>FIRE EXTINGUISHERS _____</b>  | <b>89</b>        |
| <b>ELECTRICAL _____</b>  | <b>90</b>        |
| <b>EMERGENCY LIGHTING _____</b>  | <b>90</b>        |
| <b>EVACUATION MUSTERING ASSEMBLY AREA _____</b>                                | <b>90</b>        |
| <b>PHOTOS _____</b>  | <b>91</b>        |
| <b><i>PART 6 – PROTECTIVE EQUIPMENT _____</i></b>                              | <b><i>93</i></b> |
| <b>INSPECTION MAINTENANCE &amp; TESTING OF FIRE PROTECTION EQUIPMENT _____</b> | <b>93</b>        |
| GENERAL _____  | 93               |
| ASTTBC CERTIFIED TECHNICIANS _____   | 94               |
| FRAUDULENT USE OF TECHNICIAN CERTIFICATION _____                               | 94               |
| FIRE CODE REQUIREMENTS FOR INSPECTION AND TESTING OF EQUIPMENT _____           | 94               |
| MEANS OF EGRESS & BUILDING _____   | 96               |
| PORTABLE FIRE EXTINGUISHERS _____  | 97               |
| EMERGENCY LIGHTING _____   | 101              |
| <b>FIRE DETECTION &amp; ALARM SYSTEM _____</b>                                 | <b>103</b>       |
| <b>FIRE DEPARTMENT ACCESS ROUTE _____</b>                                      | <b>104</b>       |
| <b>HEATING, VENTILATING &amp; AIR CONDITIONING _____</b>                       | <b>104</b>       |
| <b>WATER-BASED FIRE PROTECTION EQUIPMENT _____</b>                             | <b>105</b>       |
| IMPAIRMENTS _____  | 105              |
| PREPLANNED IMPAIRMENT PROGRAMS _____   | 105              |
| EMERGENCY IMPAIRMENTS _____  | 106              |
| OBSTRUCTION INVESTIGATION _____  | 106              |
| VALVES, VALVE COMPONENTS AND TRIM _____  | 107              |
| CONTROL VALVES IN WATER-BASED FIRE PROTECTION SYSTEMS. _____                   | 109              |
| SYSTEM VALVES _____  | 111              |
| FIRE HOSE VALVES _____   | 114              |
| BACKFLOW PREVENTION ASSEMBLIES _____   | 115              |

|  |                   |
|--|-------------------|
| FIRE DEPARTMENT CONNECTION _____                             | 116               |
| STANDPIPE FIRE HOSE SYSTEMS _____                            | 117               |
| SPRINKLER SYSTEMS _____                                      | 119               |
| FIRE PUMP _____  | 123               |
| <b>PRIVATE FIRE SERVICE MAINS AND FIRE HYDRANTS _____</b>    | <b>126</b>        |
| <b>MISCELLANEOUS PROTECTIVE EQUIPMENT _____</b>              | <b>129</b>        |
| INSPECTION, TESTING and MAINTENANCE _____                    | 129               |
| <b><i>PART 7 - MISCELLANEOUS _____</i></b>                   | <b><i>131</i></b> |
| <b><i>PART 8 – BLANK FORMS _____</i></b>                     | <b><i>133</i></b> |
| <b>BLANK FORMS AND REPORTS _____</b>                         | <b>133</b>        |
| APPOINTMENT OF THE FIRE SAFETY DIRECTOR _____                | 134               |
| APPOINTMENT OF THE DEPUTY FIRE SAFETY DIRECTOR _____         | 135               |
| FIRE WATCH LOG _____   | 136               |
| EMERGENCY CONTACTS _____                                     | 137               |
| INCIDENT / ACTIVITY REPORT _____                             | 138               |
| DAILY INSPECTION REPORT _____                                | 139               |
| MONTHLY INSPECTION & TESTING REPORT _____                    | 140               |
| YEARLY TESTING REPORT _____                                  | 141               |
| DUST COLLECTOR CHECKLIST _____                               | 142               |
| COMBUSTIBLE DUST RISK ASSESSMENT - CHECKLIST _____           | 143               |
| DUST COLLECTION SYSTEM DUCT AND HANGERS CHECKLIST _____      | 146               |
| DUST COLLECTION SYSTEM SAFETY DEVICES CHECKLIST _____        | 147               |
| DUST COLLECTION SYSTEM EXPLOSION VENTING CHECKLIST _____     | 148               |
| DUST COLLECTION SYSTEM BONDING AND GROUNDING CHECKLIST _____ | 149               |
| <b>LOCKOUT / TAGOUT PROGRAM AUDIT CHECKLIST _____</b>        | <b>150</b>        |
| LOCKOUT / TAGOUT PROCEDURES _____                            | 151               |
| <b><i>LOCKOUT/TAGOUT _____</i></b>                           | <b><i>151</i></b> |
| <b><i>LOCKOUT/TAGOUT PROCEDURE _____</i></b>                 | <b><i>152</i></b> |
| <b>LOCKOUT/TAGOUT PERIODIC AUDIT FORM _____</b>              | <b>153</b>        |
| HAZARD ASSESSEMENT FORM (Contractors) _____                  | 155               |
| HOT WORK PERMIT _____  | 156               |
| FIXED AREA/LOCATION HOT WORK PERMIT _____                    | 157               |
| <b><i>PART 9 – ADDITIONAL INFORMATION _____</i></b>          | <b><i>159</i></b> |
| FIRE PROTECTION TECHNICIAN STAMP - PRACTICE GUIDELINE _____  | 159               |
| <b><i>PART 10 – PLANS _____</i></b>                          | <b><i>161</i></b> |

## **ABSTRACT**

Adequately trained supervisory staff can be of great value in directing people to move in an orderly fashion in the event of a fire and in carrying out appropriate fire control measures until the public fire department arrives. These measures are, as described in the Fire Safety Plan, developed in cooperation with the Fire Department. The supervisory staff referred to in this Plan is assigned their responsibilities by the Fire Safety Director and should be available to fulfill their obligations as described in the Fire Safety Plan on notification of a fire emergency. The Fire Safety Plan provides important information to the Fire Department for use in the preparation of plans for firefighting procedures in this specific building.

The training and education of staff are crucial elements in clearly notifying and instructing others on site during an emergency. Some occupants of the buildings and site may require special assistance during evacuation because mobility limitations make them unable to proceed independently to a place of safety. Fire safety for these persons will depend to a large extent on preplanning and on their awareness of the fire protection measures incorporated into the building and site. In some buildings, it may be appropriate to advise such occupants of these provisions by posted notices, handouts or other suitable means.

A Fire Safety Plan is of little value if it is not reviewed periodically so that all supervisory staff remains familiar with their responsibilities. A fire drill is at the very least a periodic (minimum annual) review of the Fire Safety Plan by supervisory staff. The extent to which non-supervisory staff participates in a fire drill should be worked out in cooperation with the fire department.

It may be necessary to hold additional fire drills outside normal working hours for the benefit of employees on afternoon or night shifts, who should be as familiar with fire drill procedures as those who work during the day. If full scale fire drills are not possible during non-regular working hours, arrangements should be made so that night-shift supervisory staff can participate in fire drills conducted during the daytime.

This Fire Safety Plan will need to be modified from time to time, to reflect changes and improvements.

Blank Page

MASTER

## PART 1 DEFINITIONS AND TERMS

**Access to exit** means that part of a means of egress within a floor area that provides access to an exit serving the floor area.

**Appliance** means a device to convert fuel into energy and includes all components, controls, wiring and piping required to be part of the device by the applicable standard referred to in this Code.

**Authority having jurisdiction (AHJ)**, for the purposes of this Fire Safety Plan, the AHJ is the Fire Chief or the Fire Chief's Inspector(s).

**Building** means any structure used or intended for supporting or sheltering any use or occupancy.

**Class A fire** means a fire involving combustible materials such as wood, cloth and paper.

**Class B fire** means a fire involving a flammable liquid or combustible liquid, fat or grease.

**Class C fire** means a fire involving energized electrical equipment.

**Class D fire** means a fire involving a combustible metal.

**Closed container** means a container sealed by means of a lid or other device such that neither liquid nor vapour will escape from it at ordinary temperatures.

**Combustible construction** means that type of construction that does not meet the requirements for non-combustible construction.

**Combustible liquid** means a liquid having a flash point at or above 37.8°C and below 93.3°C.

**Dangerous goods** means those products or substances that are regulated by the Transportation of Dangerous Goods Act and its Regulations.

**Deputy Fire Safety Director (DFSD)** means the appointed supervisory staff member who assumes the duties of the Fire Safety Director during his/her absence.

**Dry Sprinkler System** means an automatic fire sprinkler system which has sprinkler supply piping containing air. Such a system can be installed in areas subjected to freezing conditions as water does not enter the sprinkler piping until a sprinkler activates.

**Electrical service room** means a room or space provided in a building to accommodate building electrical service equipment and constructed in accordance with the British Columbia Building Code.

**Electrical equipment vault** means an isolated enclosure, either above or below ground, with fire resisting walls, ceilings and floors for the purpose of housing transformers and other electrical equipment.

**Electrically supervised** means wiring circuits associated with the fire detection and alarm system are normally closed so that in the event of breakage the circuit will indicate trouble on the fire alarm control panel.

**Exit** means that part of a means of egress, including doorways, that leads from the floor area it serves to a separate building, an open public thoroughfare, or an exterior open space protected from fire exposure from the building and having access to an open public thoroughfare.

**Fire detector** means a device which detects a fire condition and automatically initiates an electrical signal to actuate an alert signal or an alarm signal, and includes heat detectors and smoke detectors.

**Fire Protection Equipment** means, but is not limited to fire alarm systems, automatic sprinkler systems, special extinguisher systems, portable fire extinguishers, standpipe and hose systems and fixed pipe fire suppression systems.

**Fire Protection Technician** means a person who has provided the **Fire Department** with acceptable documentation from the agency known as the Applied Science Technologist and Technicians of British Columbia that qualifies him/her to perform inspections and testing on **Fire Protection Equipment**;

**Fire-resistance rating** means the time in hours or fraction thereof that a material or assembly of materials will withstand the passage of flame and the transmission of heat when exposed to fire under specified conditions of test and performance criteria, or as determined by extension or interpretation of information derived there from as prescribed in the British Columbia Building Code.

**Fire Safety Director (FSD)** means the appointed supervisory staff member who has responsibility for the administration and maintenance of the Fire Safety Plan. This position is typically performed by the senior manager

**Fire separation** means a construction assembly that acts as a barrier against the spread of fire.

**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, "Vapour Pressure of Petroleum Products (Reid Method)."

**Flash point** means the minimum temperature at which a liquid within a container gives off vapour in sufficient concentration to form an ignitable mixture with air near the surface of the liquid.

**Floor area** means the space on any storey of a building between exterior walls and required firewalls, including the space occupied by interior walls and partitions, but not including exits, vertical service spaces, and their enclosing assemblies.

**Heat detector** means a fire detector designed to operate at a predetermined temperature or rate of temperature rise.

**Inspector** means an inspector with the District of North Vancouver Fire Department.

**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 the development of this Fire Safety Plan are as follows:

- D** Business services (offices) occupancies
- F1** High-hazard industrial occupancies
- F2** Medium-hazard industrial occupancies
- F3** Low-hazard industrial occupancies

**Means of egress** means a continuous path of travel provided for the escape of persons from any point in a building or contained open space to a separate building, an open public thoroughfare, or an exterior open space protected from fire exposure from the building and having access to an open public thoroughfare. Means of egress includes exits and access to exits.

**Non-combustible construction** means that type of construction in which a degree of fire safety is attained by the use of non-combustible materials for structural members and other building assemblies.

**Occupancy** means the use or intended use of a building or part thereof for the shelter or support of persons, animals or property.

**Qualified Contractor** (see Fire Protection Technician)

**Service room** means a room provided in a building to contain equipment associated with building services.

**Service space** means space provided in a building to facilitate or conceal the installation of building service facilities such as chutes, ducts, pipes, shafts or wires.

**Smoke detector** means a fire detector designed to operate when the concentration of airborne combustion products exceeds a pre-determined level.

**Sprinklered** means that the building or part thereof is equipped with a system of automatic sprinklers that are designed and installed in accordance with the appropriate Standard as referenced by the BC Building and Fire Codes.

**Street** means any highway, road, boulevard, square or other improved thoroughfare 9 m or more in width, that has been dedicated or deeded for public use and is designed to be accessible to fire department vehicles and equipment.

**Supervisory staff** means those occupants of a building who have some delegated responsibility for the fire safety of other occupants under the fire safety plan

**Unstable liquid** means a liquid, including flammable liquids and combustible liquids that are chemically reactive to the extent that it will vigorously react or decompose at or near normal temperature and pressure conditions or that is chemically unstable when subject to impact.

**Wet Sprinkler System** means an automatic fire sprinkler system which has piping containing water. Such a system cannot be installed in areas subjected to freezing conditions.

**Vertical service space** means a shaft oriented essentially vertically that is provided in a building to facilitate the installation of building services including mechanical, electrical and plumbing installations and facilities such as elevators, refuse chutes and linen chutes.

## ABBREVIATIONS

Abbreviations as may be used in this Fire Safety Plan are as follows:

|     |                       |
|-----|-----------------------|
| cm  | centimetre(s)         |
| °C  | degree(s) Celsius     |
| kg  | kilogram(s)           |
| kPa | kilopascal(s)         |
| l   | litre(s)              |
| mm  | millimetre(s)         |
| n/a | not applicable        |
| >   | greater than          |
| ≤   | less than or equal to |
| %   | per cent              |



## PART 2 - OBJECTIVES

### GENERAL

Fire Safety Plans are required in accordance with the BC Fire Code (2012) Regulations. Subsection 2.8 of the BC Fire Code (2012) has been provided for reference purposes only. In addition to merely meeting a Fire Code (2012) requirement by having a Fire Safety Plan developed, there are significant benefits to implementing the Fire Safety Plan:

- Reduces the incidence of fire
- Promotes fire hazard identification and elimination
- Promotes employee safety and awareness
- Increases employee morale by allaying safety concerns
- Coordinates business and fire department resources during a fire emergency
- Reduces the potential impact of a fire on the business and community (injuries, dollar losses, liability, etc.)
- Enhances Fire Code compliance

#### Fire safety planning has 3 primary objectives:

- FIRE HAZARD CONTROL
- FIRE PROTECTION SYSTEM MAINTENANCE
- EMERGENCY EVACUATION

Fire Safety Planning prevents the occurrence of fire by the control of fire hazards in the building, ensures operation of fire protection systems by establishing maintenance procedures, and provides a systematic method of safe and orderly evacuation of the building in the event of fire.

Fire Safety Plans also provide information for:

- Fire fighters before and during an emergency incident.
- Fire inspectors
- Fire and life safety system contractors performing inspections and testing

### FIRE EMERGENCY EVACUATION SEQUENCE - GENERAL

During a fire emergency, a fire alarm (or fire alarm announcement) will sound throughout the property, and all occupants should evacuate buildings, equipment, and property via the nearest safe exit route and assemble at the pre-determined Muster Station.

The Fire Safety Director may not be on the property, but will be available to respond to the premises after being contacted.

## **SUPERVISORY STAFF REQUIREMENTS - GENERAL**

The Fire Safety Director (FSD) is appointed in writing by the business owner. The FSD may not be on the property on a continuous basis; however, he/she must be available to respond to the property on notification of a fire emergency, in order to fulfil his or her obligations as described in this Plan. In the event that the FSD is unavailable, a trained Deputy Fire Safety Director must be available to perform the obligations of the absent director. Appointment and training of several Deputy Fire Safety Directors may be necessary in order that one Fire Safety Director is always available.

The Fire Code requires that fire protection and life safety systems receive a variety of regular inspections, service, and maintenance. The majority of inspections are generally “quick checks” to ensure that the particular system is operational and not in need of service. Inspections do not require a high degree of technical knowledge of the particular system, but rather the ability to check for a specific problem, and have it corrected.

Such inspections will be adequately performed by Supervisory Staff who will be on the property on a “daily” basis. Service and maintenance procedures generally involve technical procedures and will be performed by qualified private contractors specializing in the particular field.

MASTERS

## B.C. FIRE CODE REGULATIONS 2012

### SECTION 2.8. EMERGENCY PLANNING (Applicable excerpts provided)

#### GENERAL

##### 2.8.1.1. Application

- 1) Fire emergency procedures conforming to this Section shall be provided for
  - a) *not applicable*,
  - b) every *building* required by the British Columbia Building Code to have a fire alarm system,
  - c) *not applicable*,
  - d) storage areas required to have a fire safety plan,
  - e) areas where *flammable liquids* or *combustible liquids* are stored or handled and
  - f) areas where hazardous processes or operations occur.

##### 2.8.1.2. Training of Supervisory Staff

- 1) *Supervisory staff* shall be trained in the fire emergency procedures described in the fire safety plan before they are given any responsibility for fire safety.

##### 2.8.1.3. Keys and Special Devices

- 1) Any keys or special devices needed to operate the fire alarm system or provide access to any fire protection systems or equipment shall be readily available to on-duty *supervisory staff*.

#### 2.8.2. Fire Safety Plan

##### 2.8.2.1. Measures in a Fire Safety Plan

- 1) In *buildings* or areas described in Article 2.8.1.1., a fire safety plan conforming to this Section shall be prepared in cooperation with the fire department and other applicable regulatory authorities and shall include
  - a) the emergency procedures to be used in case of fire, including
    - i) sounding the fire alarm,
    - ii) notifying the fire department,
    - iii) instructing occupants on procedures to be followed when the fire alarm sounds,
    - iv) evacuating occupants, including special provisions for persons requiring assistance,
    - v) confining, controlling and extinguishing the fire,
  - b) the appointment and organization of designated *supervisory staff* to carry out fire safety duties,
  - c) the training of *supervisory staff* and other occupants in their responsibilities for fire safety,
  - d) documents, including diagrams, showing the type, location and operation of the *building* fire emergency systems,

- e) the holding of fire drills,
  - f) the control of fire hazards in the *building*,
  - g) the inspection and maintenance of *building* facilities provided for the safety of occupants, and
  - h) a copy of the records of inspections, maintenance procedures or tests as required in 2.2.1.2. of Division C Part 2.
- 2) The fire safety plan shall be reviewed at intervals not greater than 12 months to ensure that it takes account of changes in the use and other characteristics of the *building*.

#### **2.8.2.5. Retention of Fire Safety Plans**

- 1) The fire safety plan shall be kept in a location, designated by the *authority having jurisdiction* within the *building*, for reference by the fire department, *supervisory staff* and other personnel.

#### **2.8.2.6. Distribution**

- 1) A copy of the fire emergency procedures and other duties for *supervisory staff*, as laid down in the fire safety plan, shall be given to all *supervisory staff*.

#### **2.8.2.7. Posting of Fire Emergency Procedures**

- 1) At least one copy of the fire emergency procedures shall be prominently posted on each *floor area*.

### **2.8.3. Fire Drills**

#### **2.8.3.1. Fire Drill Procedures**

- 1) The procedure for conducting fire drills shall be determined by the person in responsible charge of the *building*, taking into consideration
  - a) the *building occupancy* and its fire hazards,
  - b) the safety features provided in the *building*,
  - c) the desirable degree of participation of occupants other than *supervisory staff*,
  - d) the number and degree of experience of participating *supervisory staff*,
  - e) *not applicable*, and
  - f) the requirements of the fire department.

#### **2.8.3.2. Fire Drill Frequency**

- 1) Fire drills as described in Sentence 2.8.3.1.(1) shall be held at intervals not greater than 12 months for the *supervisory staff*.

### **DISTRICT OF NORTH VANCOUVER FIRE BYLAW**

The current edition of the District of North Vancouver Fire Bylaw and attachments may be viewed or downloaded at the following site:

<http://www.dnv.org/article.asp?c=74>

## PART 3 - RESPONSIBILITIES

### FIRE SAFETY DIRECTOR RESPONSIBILITIES

For the purpose of this Fire Safety Plan the term Fire Safety Director will apply to the Fibreco Export Ltd. person(s) designated and assigned in writing by the business owner, to implement this Fire Safety Plan.

In the absence of a specifically designated person assigned to implement this Plan, the senior management person on site is deemed to be responsible for such implementation.

The business owner and the person appointed by the owner, as the Fire Safety Director and alternates, need to be very clear on the legislated responsibilities as follows in this excerpt from the BC Fire Code Regulation Division C Part 2 – Administrative Provisions. The business owner or designate may not opt out of these responsibilities.

#### **2.2.1. General**

##### **2.2.1.1. Responsibility**

- 1) *Unless otherwise specified, the owner or the owner's authorized agent shall be responsible for carrying out the provisions of this Code.*

##### **2.2.1.2. Records**

- 1) *Where this Code requires that tests, inspections, maintenance or operational procedures be performed on a fire safety system, records shall be made and the original or a copy shall be retained at the premises for examination by the authority having jurisdiction.*
- 2) *The initial verification or test reports for each system shall be retained throughout the life of the systems.*
- 3) *Records of tests, inspections, maintenance or operational procedures undertaken after the initial tests referred to in Sentence (2) shall be retained so that at least the current and the immediately preceding records are available.*

### GENERAL RESPONSIBILITIES

Administering and maintaining the Fire Safety Plan. This should include:

- Reviewing the Fire Safety Plan at least every 12 months and after alterations are made to the building to ensure that it is amended to take into account the changes in use or other characteristics of the building. Record the review or amendments in the Revision/Review Control Record on Page 4.
- Note that the following copies of the Plan exist:
  - 1) Fire Safety Director
  - 2) Deputy Fire Safety Director
  - 3) Fire Department, and
  - 4) As deemed necessary by the Fire Safety Director

- The maintenance records in at least the Fire Safety Director's copy of the plan are updated
- Training of Supervisory Staff before being given the responsibility of supervision.
- Recording information on the following:
  - Fire incidents.
  - Fire drills.
  - Discharge or operation of fire equipment.
  - Training periods.
  - Minutes of fire safety meetings.
  - Emergency Contacts.
- Ensuring that fire protection systems are inspected maintained and serviced in accordance with the Fire Safety Plan, Fire Code, and manufacturer's requirements. Where an inspection, maintenance or testing procedure is beyond in-house capabilities, it is the Fire Safety Director's responsibility to have qualified personnel complete the procedure.
- Making necessary copies of the blank forms in Part 10. This ensures that blank forms and reports will be readily available.
- Ensuring that additional precautions are taken to offset the hazard to occupants where fire protection systems are inoperable. This should include:
  - Checking the Fire Safety Plan and Fire Code when fire protection systems or equipment are in need of repair.
  - Advising the fire department of the fire protection system status if not operationally ready.
  - Ensuring that building maintenance, alteration, renovation, or change of use does not expose the building or occupants to undue fire hazards, and precautions acceptable to the Fire Department are taken to ensure building and occupant safety.
  - Checking the Fire Safety Plan and the BC Fire Code to ensure that such activities meet life and property safety regulations.
- Ensuring that supervisory staff is available to respond to the premises or fulfill their duties as outlined in the Plan.
- Providing occupants with the necessary information in Part 4, and include information from Part 6 on maintenance of fire protection equipment that may be under their control.
- Maintaining familiarity with fire protection systems and fire protection equipment.
- Familiarity with fire regulations. This should include:
  - Obtaining and reviewing a copy of the current edition of the BC Fire Code.
  - Resolving any fire hazards which are observed or reported.
  - Ensuring that the storage in the building conforms to the BC Fire Code.
  - Ensuring that "*FIRE EMERGENCY PROCEDURES*" signs remain posted.
  - Ensuring that "*ALARM NOTICES*" are above each air horn, as provided. (air horn alarm signal is recommended in the absence of fire alarm system in any building)
- Considering other emergency situations which could affect the building such as:
  - Earthquakes
  - Natural Gas Leaks
  - Hazardous Material Spills

## **EMERGENCY PROCEDURES IF ON PREMISES**

Follow the Fire Emergency Procedures specified in Part 4 but in all cases report to the Fire Department Officer to act as a resource person.

## **REPAIRS, ALTERATIONS & RENOVATIONS BUILDING**

During alterations, maintenance or building repairs ensure that the building and its occupants are not exposed to undue fire hazards created by contractor's equipment, actions or supplies which are brought into the building. Check the Fire Safety Plan and the Fire Code (Fire Department) to ensure that procedures meet with the Fire Safety Plan and the Fire Code regulations.

Frequent inspections of the affected area and additional precautions to offset the hazard are suggested in order to ensure at least the following safety measures:

- Access to exits and the path of travel to a safe open area are free of obstructions.
- Work areas are inaccessible to unauthorized persons.
- Contractors have obtained necessary Building and Fire Bylaw Permits and Fibreco Export Ltd. operational/policy permits.
- Flammable and combustible liquids are handled and stored in a safe manner.
- Heat producing equipment such as portable heaters, are used safely.
- Hot work policies and requirements within this Fire Safety Plan are implemented.

Where a problem is suspected the Fire Department should be contacted in order to provide advice or perform a fire or risk/hazard inspection or analysis.

## **PORTABLE FIRE EXTINGUISHERS**

Where a service company needs to remove a fire extinguisher for an extended length of time, a fire extinguisher of the same type and performance capacity should be provided temporarily in its place.

When a portable fire extinguisher has been used, even if only for a short time, or the pressure gauge reads outside of normal range (above or below the gauge's green indicator), or the extinguisher appears to be damaged they need to be inspected and serviced by qualified personnel.

## FIRE DRILL PROCEDURES AND FIRE DRILL FREQUENCY

The Fire Safety Director (FSD) shall conduct a fire drill at least annually in accordance with the Fire Code. A review of the Fire Safety Plan fire drill procedures by Supervisory Staff shall be done at least every 12 months.

### PLANNING A FIRE DRILL

A fire drill for staff may be conducted as a “table-top” exercise at safety meeting. The table-top exercise will be used to discuss supervisory staff and worker’s actions and responsibilities should someone see a fire condition, hear the fire alarm, hear an air horn signal (as per recommendation in buildings or area without a fire alarm system) or upon hearing someone yell “*FIRE!*”

For the purpose of this section, the term “fire drill” is intended to mean “table-top” exercise.

Use the following guideline when planning a supervisory staff review of an evacuation fire drill:

- Notify expected participants of the date and time of the fire drill.
- Discuss evacuation procedures with staff.
- Establish a scenario that may simulate a realistic situation for your property, such as:
  - A blocked route to the Muster Station.
  - There is a fire and the power goes out
  - Identify different staffing levels, possible site visitor locations or conditions at various times of the day
- Trade roles and perform the “*If You Discover a Fire*” scenario in the “Fire Emergency Procedures” for occupants (don’t call the Fire Department emergency phone number).
- Participants should follow (walk and talk-through) the Fire Emergency Procedures as detailed in the Plan.
- Discuss the fire drill with participants in an attempt to identify and resolve problems.
- Complete the “*Incident/Activity Report*” as a record of the fire drill (your due diligence!)
- Relax

### DEPUTY FIRE SAFETY DIRECTOR (ALTERNATE) RESPONSIBILITIES

- Assist the Fire Safety Director in implementing the fire safety plan.
- Assume the position of Fire Safety Director in the absence of the appointed FSD.



## **RESPONSIBILITIES OF SUPERVISORY STAFF – FIRE DRILL**

The Fire Safety Director or designate shall instruct all staff members in the fire drill procedure. The person in charge of coordinating the fire drill shall also ensure that all staff members have a copy of the fire drill procedure in their possession.

Each supervisor, as directed by the Fire Safety Director, shall instruct the staff in the approved fire drill procedure and also make provision for the special care of any persons who may be mobility impaired and incapable of proceeding to the muster station.

The Fire Safety Director shall have all exits, access pathways to exits and interior/exterior stairs checked daily to verify availability and that no obstruction or impairment exists.

MAUSTER

## APPOINTMENT OF THE FIRE SAFETY DIRECTOR

### ANNOUNCEMENT

DATE:

NAME:

WORK ADDRESS: 1209 McKeen Avenue, District of North Vancouver BC

CONTACT:

TEL:

CELL:

EMAIL:

\_\_\_\_\_ is appointed as Fire Safety Director, authorized to fulfil the duties outlined in the Fire Safety Plan for Fibreco Export Ltd., District of North Vancouver, BC.

Note:

The Deputy Fire Safety Director (DFSD) is normally appointed in writing by the owner of the business or the owner's designated representative.

**This form is to be completed and kept up to date in this manual.**

## APPOINTMENT OF THE DEPUTY FIRE SAFETY DIRECTORS

### ANNOUNCEMENT

DATE:

NAME:

CONTACT:

TEL:  
CELL:  
EMAIL:

NAME:

CONTACT:  
TEL:  
CELL:  
EMAIL:

NAME:

CONTACT:  
TEL:  
CELL:  
EMAIL:

\_\_\_\_\_ are appointed as Deputy Fire Safety Directors, authorized to fulfil the duties outlined in the Fire Safety Plan for Fibreco Export Ltd, District of North Vancouver, BC.

Note:

A Deputy Fire Safety Director (DFSD) is normally appointed in writing by the owner of the business or the owner's designated representative (Fire Safety Director).

**This form is to be completed and kept up to date in this manual.**

Blank page.

MASTER

## PART 4 – FIRE PREVENTION, EVACUATION & CONTROL

### FIRE HAZARDS - GENERAL

Hazards to the workers and property come in many shapes and forms. The hazard may be from fire, weather, electrical, chemical, poison, radiation, lightning, corrosives, heating equipment, bad habits and behaviours, to name a few. Where hazards are probable to occur, we as a society, enact laws, create and adopt standards of performance and practice, to control, reduce, eliminate, mitigate (lessen or reduce) or be prepared for the hazard to actually come into effect. Where legislation is enabled, a system of regulation is set in place; specially trained persons are given powers of enforcement and discretion, to weigh the evidence of the nature within the risk.

The BC Building and Fire Codes (2012) provide significant direction to many hazards. The Fire Department, in cooperation with the business management, inspect for hazards, alert the owner to initiate corrective actions or mitigation programs, educate and respond to emergencies where needed. The extent of application of the BC Building Code and the BC Fire Code (2012) to the upgrading of buildings and operations to remove an unacceptable fire hazard should be based on the judgement of the authority having jurisdiction, who must deal with each case on its own merits.

Fire hazards typically come in two types, common and special. The two types could be described as follows:

- Common fire hazards can be anywhere. These hazards are not limited to any particular building use or occupancy classification. An example of a common hazard might be storage of combustible materials near a heat producing piece of equipment which is likely too close to the source of ignition. Acceptable solutions might be as simple as removing the combustibles from the area, or moving to a safe distance away from the source of ignition.
- Special fire hazards are those that are governed by codes and standards. These hazards are evaluated by measuring basic components or conditions of the hazard location and elements of the special hazard itself. There may be many acceptable solutions to the special hazard. An example of a special hazard might be the storage or use of a flammable liquid; depending on the nature of the flammable liquid, its flash point, upper and lower explosive limits, whether the liquid is being stored, poured or sprayed, may prompt special ventilation systems, electrical systems/devices and spill containment measures, to name a few.

In each case, a site specific evaluation of the risk needs to be conducted. The evaluation may include the normal and anticipated conditions of the site/building or location, the type, orientation and state of the normally available combustible fuels, sources of ignition whether normally or potentially present, ignition source location, intensity and the ease of ignition of the fuel needs to be conducted. Other often neglected factors may include economic impact, maintenance of a condition.

What is a fire hazard? A reasonable definition might be:

*A situation, process, material, or condition that, on the basis of applicable data and evaluation, can cause a fire or explosion or provide a ready fuel supply to increase the spread or intensity of the fire or explosion and that poses a threat to life or property. A fire hazard may be considered as cause-effect phenomena resulting in incident-loss consequences*

The remainder of this chapter highlights the **POTENTIAL FIRE HAZARDS SPECIFIC TO YOUR OPERATION.** The potential fire hazards and risks are not presented in any particular order.

\*\*\*\* **Report all fire hazards to the Fire Safety Director.**

MASTER

## **FIRE PREVENTION - FIRE HAZARDS AND THEIR ELIMINATION**

The principal hazards present in Fibreco Export Ltd. property are:

- Combustible dust build up
- Fire in the conveyor delivery system
- Fire within the outside storage yard
- Confined space entry
- Chemical spill
- Shipboard fire (outside the scope of this Fire Safety Plan)

The FSD, DSFD, supervisory staff and designates should review product MSDS periodically (at least annually) to confirm appropriate measures are being implemented.

The high-risk areas for fires are the combustible dust conveyance systems, various wood fiber/pellet storage areas.

All emergency responders must wear appropriate personal protective equipment. In addition, all fire residues must be considered to be contaminated and contained for analysis and disposal as appropriate.

The principal sources of ignition are:

- Retorts
- Smoking materials.
- Heat of cutting.
- Spontaneous oxidization.
- Hot particles from grinding, welding, and cutting.
- Hot surfaces, such as torches or heat of friction.
- Electrical sparking or arcing.

## **EXITING**

Exits doors inside buildings are best identified by illuminated exit signs. Where such illuminated signs are not installed or readily visible from main floor areas due to obstructions, or when there is any possible doubt as to the means of egress, access paths to the exit doors should be provided with additional supplementary exit signs (cardboard or painted) with suitable arrow or pointer indicating the direction of egress should be installed.

## **SMOKING**

Smoking should be prohibited on the property. 'NO SMOKING' signs or pictogram should be posted in a conspicuous location. The Fire Safety Director may deem specific "safe areas" where smoking is acceptable. The "acceptable" smoking areas are to be identified by appropriate signs and large/plentiful ashtrays. Smoking may occur in the designated areas only.

## **GAS TORCH CUTTING/WELDING**

One of the most common tools used to break apart metal pieces is the gas cutting torch, often used for cutting steel. Classic cutting torches use gas, while other torches use plasma or powder, or even water (although water torches are rarely used for metal scrap). Thermal (gas) torches expose employees to sprays of sparks and metal dust particles, to high temperatures, to bright light that could damage eyes (light both inside and outside of the visible spectrum), and to various gases. Old cutting torches used pure hydrogen and oxygen, while newer torches often use acetylene, propane, gasoline-oxygen or other mixtures.

Compressed gases may be flammable and/or explosive or may present toxic or asphyxiant hazards if leaks occur. Compressed gas cylinders can also present explosion or missile hazards if exposed to excessive heat or physical damage. The Fire Safety Director must establish general and selected substance-specific requirements for proper storage, handling, and use of compressed gasses. The use of torches presents an obvious fire hazard. This hazard is of particular concern when working on materials that have combustible or explosive components such as vehicles with fuel tanks, or objects with wooden interiors or plastic coatings.

Disc-cutting is sometimes used to cut metal objects, particularly where the heat and high temperatures of a gas torch would pose increased fire safety hazards. Gas torches also involve storage of flammable and explosive gases on site. Gases must be stored in safe locations and ensure that all equipment is in good working condition (i.e. detached or punctured hoses can create a safety hazard for nearby employees). The Fire Safety Director or designate must ensure that compressed gas tanks are inspected, tested, and appropriately labeled while in storage and prior to movement and use. Employees must use appropriate eye and face protection such as a welder's helmet and heatproof and or aluminum lined clothing to protect their bodies from the output of these cutting operations, which have similar hazards to welding.

WorkSafeBC has established product exposure limits (PELs) for many hazardous substances. WorkSafeBC requires employers to provide engineering controls or work practices to the extent feasible when employee exposure exceeds these PELs for any metal or other hazardous substances. Appropriate engineering controls such as ventilation may include a local exhaust hood or booth or portable local exhaust, such as a "snorkel" exhaust system.



Where ventilation or other engineering solutions are not completely effective or are not feasible, employees must wear PPE (e.g., respiratory protection) to reduce their exposures to below the PEL.

Eye protection, such as safety goggles or a welder's mask with appropriate shaded lenses must also be worn by employees that perform welding or cutting activities.

Employers should ensure that a competent person inspects all work areas where hot work will be done and should also ensure that employees are capable of recognizing and avoiding hazardous situations.

Note, a competent person is an individual who through training or experience is capable of recognizing hazards in the surroundings or working conditions and of identifying appropriate controls.

### **NON-GAS TORCH AND OTHER CUTTING**

Materials that require higher temperatures to cut, such as pig iron and heat-resistant alloys, or materials that conduct heat too well to be cut with thermal torches, such as copper and bronze, may be cut with non-thermal methods such as plasma torches or powder cutting torches. These tools are used where a gas torch could pose a safety hazard. Plasma torches are often used for superconductors of heat or heat-resistant metals, such as alloy steels containing nickel and/or chromium.

Plasma torches generate a large amount of smoke and noise, as well as ultraviolet (UV) and infrared (IR) light. Depending on the metal, this smoke could contain toxic fumes or dusts.

### **ELECTRICAL WIRING AND EQUIPMENT**

Most fires of electrical origin are from defective or inadequate wiring and equipment, overloaded circuits or substandard repairs or alterations. Electrical installations should be inspected periodically and kept in good repair, and routine visual inspections should be made of portable equipment.

Observance of the following rules will control this hazard:

- Never condone overloading of circuits. Remember a tripped circuit breaker is a warning. If the total current demand (amps) of connected equipment is greater than that which wiring or socket outlets are designed to supply there is potential for an electrical fire.
- Do not use faulty equipment or misuse equipment.
- Repair loose wire connections or cables which are kinked, frayed or otherwise damaged. Broken strands may pierce the insulated covering and become a shock or short circuit hazard.
- Poorly fitting plugs in socket connections should be changed. Use a standard receptacle and plug.

- Shut off the power on any electrical machine such as computers, photocopiers, and calculators when the machine is not in use.
- Extension cords are intended as a temporary solution for power supply. If required, choose an extension cord that is tested and approved by a recognized testing laboratory. (e.g. CSA, ULC, UL)
- Treat extension cords with care. Broken insulation can start fires. Replace extension cords if they are damaged or show wear. Cords should not be strung around door jambs or placed under rugs as the use of nails, tacks or other fasteners and the friction wear will lead to insulation failure. Wherever practicable they should be replaced by fixed wiring.
- Be sure the extension cords being used are approved by a recognized testing laboratory (CSA, ULC, UL,) and inspect them regularly.
- When using self-coiling extension cords, fully draw out the cord.
- Keep lamps well clear of drapes, papers, and other combustible materials.
- Report unsafe conditions without delay. Check to ensure that the condition is remedied as soon as possible.

## **HOUSEKEEPING**

Poor housekeeping is another factor that contributes to fires. All employees have a responsibility to maintain 'good housekeeping' in their own work area. The following general rules should be observed:

- Minimize the amount of combustible waste or process material kept in an area.
- Place all waste materials in the proper waste containers.
- Store flammable liquids within proper approved safety containers.
- Minimize the amount of flammable liquids in use to a one-day supply.
- Dispense flammable liquids only in areas that are well-ventilated and at least 20-feet from any source of ignition.
- See that electrical equipment is switched off after use.
- See that aisles and pathways providing personal access to a safe area are not obstructed in any way.

Housekeeping should be carried out on a regular basis to ensure that no hazards or unnecessary combustible materials or flammable liquids accumulate in the area.

## **ACCESS TO ELECTRICAL PANELS**

- Provide and maintain at least 1 metre clear path of access to all electrical panels.

## **ACCESS TO FIRE PROTECTION EQUIPMENT**

- Provide and maintain at least a 1 metre clear access path to and fire or life safety system controls or equipment (e.g. portable fire extinguishers, fire hose stations, sprinkler system valves, fire protection system manual releases, etc.).

- Maintain a clear operational space of at least 16 feet to the sides and front of any fire hydrant and at least 3-feet clear working space behind.

## **AISLES PROVIDING ACCESS TO EXITS**

A vital necessity in facility layout planning is to provide a safe and easily identifiable means of egress for all the building occupants by means of aisles to the exit stairs and/or doors in case of fire or other emergency. It is absolutely vital that all aisles form naturally flowing paths and that they be continuously maintained free of all impediments and impairments. Materials or equipment which may be upset under emergency conditions are to be kept out of the path of exit travel in the aisles.

Aisles are to conform to the following requirements:

- Main aisles are to be provided on all floor areas to provide access to at least 2 exits, and arranged to minimize any possibility that both exit routes may be blocked by fire or other emergency conditions.
- Subsidiary aisles from working areas are to be provided to give access to main aisles.
- The travel distance from any point on a floor area to an exit, measured along the path of travel, including subsidiary and main aisles should not exceed 45 m.
- The maximum permissible length of a dead end aisle is 7.5 m. (24.6 feet)
- Every individual work area is to be located adjacent to an aisle or subsidiary aisle.
- Main aisles and subsidiary aisles are to be located to facilitate access to emergency paging telephones, first aid and firefighting equipment.
- Main aisles and subsidiary aisles are to be continuously maintained and kept free from all obstructions.
- All aisles are to be equipped with an illumination level of not less than 50 lx.
- Walking surfaces are to be kept in good repair and free from tripping hazards.

## INDUSTRIAL TRUCKS

Industrial trucks include fork trucks, tractors, platform lift trucks, motorized hand trucks, and other specialized industrial trucks powered by electric motors or internal combustion engines.

The designation, use, maintenance and operation of industrial trucks shall be compatible with ambient conditions, taking into account the flammability, corrosiveness and explosive nature of normally, occasional and possible atmospheres.

### BATTERY - POWERED INDUSTRIAL TRUCKS

Battery-charging installations for battery-powered industrial trucks are to be located:

- Securely mounted on a non-combustible platform (not wood – see photo)
- At least 1.5 m from combustible materials,
- When serving more than 2 trucks, in well ventilated areas,
- In areas where flammable gases or vapours, *combustible dusts* or *combustible fibres* are not present in hazardous quantities, and
- In areas where precautions are taken to prevent ignition sources, such as open flames, sparks or electric arcs.
- Battery-charging installations for battery-powered industrial trucks are to be equipped with at least one portable extinguisher having a minimum rating of 2-A: 30-BC.

### TRAINING

Only trained and authorized personnel shall be permitted to operate and charge battery operated industrial trucks,

### WHY IS THERE A DANGER OF EXPLODING BATTERIES?

The charging of lead-acid batteries can be hazardous. When batteries are being recharged, they generate hydrogen gas that is explosive in certain concentrations in air (the flammability or explosive limits are 4.1% to 72% hydrogen in air). The spark-retarding vents help slow the rate of release of hydrogen, but the escaping hydrogen may form an explosive atmosphere around the battery if ventilation is poor. The ventilation system should be designed to provide an adequate amount of fresh air for the number of batteries being charged. This is essential to prevent an explosion.

- Always keep sparks, flames, burning cigarettes, and other sources of ignition away from the battery recharging area.
- Wear protective eye wear when working near batteries.
- Do not break "live" circuits at the terminals of batteries.

## WHAT SHOULD I DO WHEN CHARGING BATTERIES?

- Check the electrolyte level before recharging. If the battery has been outside in cold weather, make sure that the battery is not frozen before recharging it.
- If the electrolyte is covering the top of the plates, do not add more water. Recheck the fluid level after the battery has been recharged. If water is added, use distilled water, not tap water.
- When vent plugs may need adjustment, follow manufacturers' instructions carefully.
- If the battery has sealed vents, do not recharge the battery with a current greater than 25 amps.
- To reduce the possibility of explosions, follow the recommendations of the recharger manufacturer for attaching and removing cables and for operating the equipment properly. Generally, this includes unplugging or turning off the charger before connecting or disconnecting the clamp connections. Carefully attach the clamps to the battery with the proper polarity (positive [+] clamp, usually red, to the positive terminal and negative (-) clamp, usually black, to the negative terminal).
- Ensure that area is ventilated when the batteries are being charged.
- If the battery becomes hot or if the electrolyte spits out from the vent, turn off the recharger temporarily. Resume recharging using a lower current or charging rate.

## FUEL- FIRED (PROPANE) INDUSTRIAL TRUCKS

- Each fuel-fired industrial truck needs to be equipped with at least one portable extinguisher having a minimum rating of 2-A:30-B:C.
- Fuel-fired industrial trucks needs to be stored:
  - in detached buildings,
  - in areas separated from the remainder of the storage area by a fire separation having a fire-resistance rating of not less than 1 h, or
  - in areas where the vehicles will not create a fire hazard to the storage area.
- Fuel-fired industrial trucks need to be refuelled only at designated locations outside buildings.
- Fuel-fired industrial trucks that are fuelled by replaceable propane cylinders are permitted to have their cylinders replaced indoors provided cylinder replacement is:
  - done at a safe location that is at least 7.5 m from ignition sources, open pits and underground entrances,
  - the cylinders' valves are closed,
  - when an automatic quick-closing coupling that closes in both directions when uncoupled is not provided, the engine is operated until the fuel in the system is consumed, and spare propane cylinders are stored outdoors supported on raised concrete or other non-combustible platforms, and
  - located in an enclosure fenced acceptable to the Fire Department located:
    - not less than 1.5 m from any building opening, if the aggregate capacity of expanded gas is not more than 170 m<sup>3</sup>,
    - 7.5 m from any building opening, if the aggregate capacity of expanded gas is more than 170 m<sup>3</sup> but less than 500 m<sup>3</sup>, and
    - 15 m from any building opening, if the aggregate capacity of expanded gas is 500 m<sup>3</sup> or more.

## PROPANE (LPG)

- Spare cylinders not connected to an appliance (forklift) are to be stored outdoors in a secure cage.
- Cylinders are to be free of corrosion and physical damage. Replace corroded or damaged cylinders.
- Cylinders connected to an appliance are to be connected in accordance with the appliance manufacturer's requirements.
- All equipment shall be installed in accordance with the latest edition of CAN/CGA B149.2 Standard for the Handling and Installation of Propane Gas Equipment.
- Depending on the time and volume of gas required, it may be advantageous to install a larger cylinder instead of several small cylinders. The larger cylinders are more stable and have less chance of being knocked over.
- Always maintain clearances to any combustible materials in accordance with CAN/CGA B149.2.
- Position cylinders so that the pressure relief valve is pointed away from areas the people may gather or where there may be another source of ignition. Never point the relief opening towards a tent or other combustible material.
- Cylinders shall be in an upright position.
- Entrances or exits shall not be blocked.
- Maintain all required clearances as established by the Provincial Gas Safety Branch inspector.
- Protect propane cylinders from any heat source within 6 feet.
- Protect and secure all gas piping and/or hoses
- Use only fittings and fixtures approved by the Gas Inspector.
- Connect cylinders only to LP gas approved appliances.

## TRAINING

### **Only trained and authorized personnel shall be permitted to:**

- Operate industrial trucks,
- Replace or refuel propane cylinders for fuel-fired industrial trucks,
- Refuel fuel-fired industrial trucks, or

## HOT WORK

This section is applicable to staff and contractors that may be doing work in your unit. Should hot works be conducted in your unit, this section provides information to promote an ongoing fire safe environment.

**Hot works hazards involve open flames or production of heat or sparks, including, without being limited to, cutting, welding, soldering, brazing, grinding, adhesive bonding, thermal spraying & thawing pipes.** All of these actions proved a source of ignition to adjacent combustible materials. Due care and attention is required. Assigning responsibility to those persons performing, supervising and allowing hot work in the building is part of this Fire Safety Plan.

A Hot Work Permit system is encouraged! A sample Hot Work Permit form is included in Part 10 of this Manual.

Fibreco Export Ltd. Document FP- 003 “*Hot Work Procedures*” includes the following information:

*The following procedure shall be used whenever a person is cutting with a torch, welding, torching (cold weather ops.) or cutting with anything that produces sparks.*

### 1) Communicate Your Intentions

- *Advise your foreman of the intended work.*
- *The foreman will then advise **security**, other maintenance employees, and operating employees working in the area.*

### 2) Prepare the Area for Work

- *All hot work being performed requires the use of a hot work permit*
- *Complete the checklist on the hot work permit, and follow the instructions.*
- *Remove debris, wood chips, pellet dust and other flammable materials as much as possible from the area.*
- *Hose down the area to make it wet. Ensure that a hose and/or a fire extinguisher are/is in the immediate work area and ready for use.*
- *Use flame retardant blankets where necessary.*
- *Wear proper PPE.*
- *Ensure to lock out all equipment as necessary. Refer to the 'Lock Out Procedure' if unfamiliar.*
- *In some circumstances (very dry days, welding over silos, high winds), Management will instruct the Maintenance Foreman not to allow any hot work to be conducted past 12:00 (noon).*

### 3) Have a Fire Watch

- *While conducting the work, ensure that another person is available to keep an eye on sparks.*

- *In some instances, the fire watch may be required to continually hose the area while the cutting and welding is being carried out.*
- *Fire watch is required for **240-minutes** after the hot work has been completed. Security will perform this task through their rounds.*

#### **4) Communicate that the Work has been completed**

- *Advise your foreman and the security guard that the work has been completed.*
- *The foreman must give security a copy of the welding permit so the guard can check the area for anything smoldering after the crew has left the site.*
- *Ensure all lock out locks have been removed.*

The BC Fire Code (2012) includes the following for hot work:

### **Training**

Hot works shall be performed only by personnel trained in the safe use of necessary equipment and implementing safety precautions in conformance with the following:

### **Hot Work Equipment**

- Hot work equipment shall be maintained in good operating condition.
- Hot work equipment shall be examined for leakage or defects prior to each use.
- Leaks or defects found in hot work equipment shall be repaired prior to use.
- All valves shall be closed and gas lines bled when Class 2 gas hot work equipment is not in use.
- Electric hot work equipment shall be de-energized when not in use.

### **Location of Hot Works Operations**

Hot work shall be carried out in an area free of combustible and flammable contents, with walls, ceilings and floors of *non-combustible construction* or lined with non-combustible materials.

When it is not practicable to undertake hot work in an area free of combustible and flammable contents, with walls, ceilings and floors of *combustible construction* or lined with combustible materials,

### **OR**

When there is a possibility of sparks leaking onto combustible materials in areas adjacent to the area where hot work is carried out, openings in walls, floors or ceilings shall be covered or closed to prevent the passage of sparks to such adjacent areas,

The following shall apply to protect such areas.

- Combustible and flammable materials within a 15 foot (4.6 m) distance from the hot work shall be protected against ignition in a manner acceptable to the authority having jurisdiction,



- a fire watch shall be provided during the hot work and for a period of not less than 60 minutes after its completion, and
- A final inspection of the hot work area shall be conducted 4 hours after completion of work.

The following safety precautions are to be taken to isolate combustible materials or fuel from sparks:

- Sweep the floors clean, removing grease and oils. Do not soak with sawdust.
- Remove flammable liquids like paints, oils and lacquers from the work area. Do not just seal them.
- Protect combustibles that cannot be moved, with fire-resistive tarpaulins or metal shields. This includes all storage or machinery with grease or lint deposits.
- Either eliminate explosive atmospheres, or prohibit the hot work. Halt processes that generate explosive atmospheres, and continually monitor the area for accumulations of flammable vapours before, during and after hot work.
- Cover all wall and floor openings. Plug floor openings with an approved fire stop material. Seal duct work and duct openings with metal coverings built for the vents or cover with fire resistive tarpaulins. Ductwork is invariably dusty and can circulate fire through a facility as easily as it circulates air. Duct works can also have combustible coverings and/or insulation.
- Close all doors and fire doors to prevent sparks from escaping.

### **Protection of Combustible and Flammable Materials**

Any combustible and flammable material, dust or residue shall be:

- Removed from the area where hot work is carried out, or
- Protected against ignition by the use of non-combustible materials.

Combustible materials or *building* surfaces that cannot be removed or protected against ignition shall be thoroughly wetted and maintained wet, where hot work is carried out.

Any process or activity creating flammable gases or vapours, *combustible dusts or combustible fibres* in quantities sufficient to create a fire or explosion hazard shall be Interrupted where hot work is carried out.

## FIRE WATCH FOR HOT WORK AREAS

\*\* See additional details for Fire Watch Program in Part 5 of this Manual

Where hot work is to be performed the exposed areas shall:

- Be examined for ignition of combustible materials,
- Be examined by personnel equipped with fire extinguishing equipment, and
- Be examined by personnel trained in the use of fire extinguishing equipment.

While the hot work proceeds, the fire watch maintains a constant vigil (even during employee breaks and meal times) for stray sparks, ignition or other fire hazards, and is ready to provide initial fire response.

Once work is done, the fire watch remains in the area for one hour, and carefully inspects the work and adjacent areas for smoldering fires. The inspection extends to floors above and below the work and adjacent rooms.

The hot work areas should be monitored for an additional three (3) hours. Acceptable methods of monitoring include video, routine rounds, operations in the area, etc. The appropriate method will depend on local conditions.

When the monitoring period has ended the supervisor or equivalently trained person or designate, conducts a final inspection (at 4 hours).

### Hot Work on Containers, Equipment or Piping

Hot work **shall not be performed** on containers, equipment, or piping containing *flammable liquids or combustible liquids* or Class 2.1 flammable gases unless they have been cleaned, and are:

- Tested with a gas detector to ascertain that they are free of explosive vapours.
- Hot work **shall not be performed** on a totally enclosed container.
- Hot work **shall not be performed** on metal objects that are in contact with combustible materials unless safety precautions are taken to prevent their ignition by conduction.

### Hot Work Adjacent to Piping

When hot work is to be carried out near piping containing Class 2.1 flammable gas, the piping shall be cleaned, and

- Tested with a gas detector to ascertain that they are free of explosive vapours, or
- Be protected by a thermal barrier against the passage of heat.

## **FIRE EXTINGUISHING EQUIPMENT IN A HOT WORK AREA**

**At least one operationally ready portable fire extinguisher** having a 4A-40B:C rating needs to be provided in the hot work area. At least one person in the hot works area needs to be trained in the use of portable fire extinguishers.

### **Confirmation:**

Have the following personnel confirm that precautions have been made:

- Supervisor
- Employee/contractor
- Fire Watch

### **Other Considerations:**

- Is there a method or process to determine compliance?
- Management and close supervision of contractors is VERY important.

MASTER

## LOCK OUT PROCEDURES

Fibreco Export Ltd. Procedure Number FP-009 “Lock out Procedure” is to be followed as noted below:

### Fibreco’s Safety Policy

*Fibreco is committed to establishing, promoting and maintaining health and safety in the workplace. The goal of occupational health and safety in our workplace is to create an environment where people demonstrate a strong commitment to the safety, health and well-being of themselves and others.*

*Striving to achieve this goal is a shared responsibility calling for a cooperative effort on the part of all concerned. Management, supervisors, and individual workers all have a responsibility and are accountable for setting a good example with regards to safety.*

*To this end, every level of management and supervision has the prime responsibility:*

- *To take all reasonable steps to protect the safety of all employees against work accidents and occupational health hazards;*
- *To comply with all relevant regulations and standards of governments, agencies and other authorities respecting occupational health and safety;*
- *To formulate and carry out continuing effective safety initiatives suited to the conditions and hazards of the operation.*

*It is the responsibility of every employee:*

- *To comply with health and safety regulations, policies and directives;*
- *To work positively and cooperatively toward the prevention of accidents.*

### **FIBRECO’S SAFETY LOCK-OUT PROCEDURE – GENERAL**

*Unlocked equipment can start up at any time. If an activity such as maintenance or clean-up puts a WORKER in harm’s way of equipment, then that equipment must first be properly locked out. Each WORKER on a job must ensure the proper lock-out of that equipment.*

*A WORKER is not protected by somebody else’s LOCK.*

*The following is a general procedure for locking out equipment:*

- *Consult with your FOREMAN of equipment to be locked out – The FOREMAN will advise the operator to shut down the equipment.*
- *Obtain YELLOW coloured LOCK(S) as required for the job from the MCC room – WORKERS shall print relevant information in the log book.*
- *With the electrician, locate the disconnect switch and ensure that it is in the “open” position – The FOREMAN or the electrician can assist in locating the appropriate disconnect. The lever on the disconnect switch must be operated by a qualified individual.*

*NOTE: When throwing non-load-break switches, the downstream load must first be shed.*

- For “PRODUCTION” operations, both the FOREMAN and WORKERS will place a LOCK on the disconnect switch and retain their keys respectively.
- For “MAINTENANCE” operations, the WORKERS will place a LOCK on the disconnect switch and retain their keys respectively.
- Test correctly to ensure that the equipment is locked out – Activate the local or remote start/stop switch and check that the equipment will not start.
- Carry out the necessary work with equipment locked out.
- Remove LOCK(S) after completion of the job or at the end of a shift – If a WORKER intends to return to the same job on the next day, the WORKER must still remove his or her LOCK before leaving the site and complete the “cleared” columns in the log book. A LOCK must be removed by the individual who placed it and return the LOCK to allocated hook with its key.
- If applicable, the FOREMAN will be the last to remove their lock(s).

### **LOCK REMOVAL BY OTHERS:**

Lock removal can only be conducted by a FOREMAN, and if all the below exist:

- ALL viable means of contacting and removing the LOCK in a reasonable time frame by the individual who placed the LOCK on the system have failed.
- The system is deemed to be safe by the FOREMEN.

Then can the LOCK be removed by a FOREMAN with a cutting device or master key kept in the MANAGER’S office. A “Lock Removal Occurrence Report” is to be completed.

Removal of a LOCK can only be done by a FOREMAN and is not to be delegated to an EMPLOYEE or CONTRACTOR.

If the WORKER or CONTRACTOR Leaves the site with LOCK(S) on the disconnect, it’s their responsibility to make every reasonable effort, on his or her time, to immediately return to the work site and remove their LOCK.

In an extraordinary circumstance, a Site Terminal Manager or Assistant Terminal Manager may, in the absence of a FOREMAN, substitute as a FOREMAN to remove a Lock.

### **INAPPROPRIATE LOCKS:**

“Inappropriate Locks” are such Locks not provided by Fibreco Export [With the noted exception below]. They may be PERSONAL LOCKS, twist-ties, string, wire, or the like.

“Inappropriate locks” are to be replaced by appropriate Locks and can only be removed by:

- Placing an appropriate LOCK and TAG, as per proper procedure, on the disconnect by the same WORKER or CONTRACTOR who placed the “inappropriate lock”, or;
- As per “Lock Removal by Others” procedure.

#### Exceptions regarding Inappropriate Locks:

CONTRACTORS with a company policy that mandates the use of PERSONAL LOCKS (i.e. not permitting the use of Locks provided by Fibreco Export) will be exempt. Their Locks will be considered appropriate.

**LOCK-OUT PROCEDURE FOR BLACK LOCKS**

*BLACK LOCKS – A lock that is used to protect equipment, and is not intended to provide safety for the WORKER. It is only to be used by FOREMEN, and is stored in the Maintenance FOREMAN'S Office and the Operation FOREMAN'S Office.*

*BLACK LOCKS are equipment LOCKS, not safety LOCKS. The general purpose is to protect equipment [not WORKER(S) or FOREMEN] from accidental start-up. Such instances, for example, would include locking out a system due to bad weather.*

*FOREMEN are to use the safety LOCKS and TAGS (not BLACK LOCKS) as per the "Safety Lock-Out Procedure" above if he or she is exposed to the dangers of a system that requires to be locked out. Note that all Black Locks can be opened with the same key. Black Lock keys are issued to Foremen and Fibreco Management only – these keys are numbered and inventoried.*

*The following is the lock-out procedure to protect property:*

- *FOREMAN is to place BLACK LOCK(S) and TAG(S) on the disconnect(s). BLACK LOCKS and Tags are kept in the MCC Rooms and the FOREMEN'S offices.*
- *Fill out the lock out Tag, and explain in detail the reason that the Black Lock has been installed. Fasten the Tag to the Lock.*
- *Complete the log book entry in the respective MCC.*
- *Once the hazard to equipment has been removed: FOREMEN are to unlock, complete the log, and return BLACK LOCK(S) to its key on board.*

*Unlike safety locks, BLACK LOCK(S) can remain on a 'disconnect' after the completion of the shift.*

*The installation and removal of weatherizing equipment (such as conveyor tie downs) on systems requires the employment of the "Safety LOCK(S)" by the respective workers.*

*\*\*\* A Lock Removal Occurrence Report is to be completed by the Foreman who removed the lock. The completed form is to be returned to the facility Manager's Office.*

## **SHIPS's CREW "WELCOME PACKAGE"**

Upon arrival, the *Ship's Crew "Welcome Package"* and communication radio will be provided to vessel supervisory staff/officers. The package provides contact names and numbers for normal and emergency communications.

The package also provides Emergency procedures for Shipboard Alarm or Alert conditions as follows: (see Welcome Package for complete details)

- Vessel Security Officer (VSO) to contact FSO on call, or Operations Foreman.

### **MARSEC LEVEL INCREASE**

- FSO will notify VSO in person and initiate Declaration of Security.

### **SECURITY THREAT, INCIDENT OR BREACH**

- FSO to notify VSO in person and contact appropriate authorities.

### **EVACUATION PROCEDURE**

- Refer to Site Evacuation Procedures as per comprehensive site contingency plan.

### **ACCESS CONTROL (Ship's Crew)**

- The ship's crew will report to security when leaving and re-entering the facility.
- Valid Seaman's ID must be presented to Fibreco Security upon exiting and returning to the dock.
- Foot traffic through the terminal must follow designated walkways and **must wear a high visibility vest** – see site map.

### **ACCESS CONTROL (Chandlers, Shipping Agents, Seamen's Organizations)**

- All visitors must report to security and produce a valid TSC Port Pass. Access will be denied to anyone that does not have a TSC Security Pass and/or is not a ship's visitor's list.

They are required to show security:

- hard hats (must be worn anywhere where overhead structures exist)
  - high visibility vests
  - steel-toed footwear, and
  - these must be worn when visitors are out of their vehicles and within the Terminal.
- Chandlers and Shipping Agents will be issued parking permits by security when required.

---

## INDOOR STORAGE REGULATIONS

### STORAGE ARRANGEMENTS WHICH CONTRIBUTE TO FIRE SPREAD

- Vertical arrangement of storage (fuel) promotes rapid fire growth. If possible, minimize storage height (fuel).
- Solid pile or palletized storage may be prone to collapse in a fire situation, blocking access to an exit or falling on an occupant. Ensure that stock piles are as stable as possible and not obstructing access to any exit door or access to the exit door.

### PROPER STORAGE ARRANGEMENTS

- Storage is to be arranged to provide a clear and unobstructed path of travel to any exit; the width of the path of travel needs to be at least as wide as the door(s) approached. Temporary obstruction of the access to the exit is not permitted at any time.

### ACCESS AISLES - INDOOR STORAGE AREAS

- Adequate access for firefighting purposes needs to be provided and maintained to all portions of the indoor storage area.
- Access aisles not less than 1.0 m wide need to be provided to fire department access doors and to fire protection equipment such as fire extinguishers, manual fire alarm pull stations and fire hose stations.
- Aisles need to be maintained free of obstruction.
- Main access aisles need to have a **minimum width** of:
  - 2.4 m (7' – 10") where storage heights are not more than 6 m, and
  - 3.6 m where storage heights are more than 6 m.
- Main access aisles need to extend
  - the length of the storage area where only one main access aisle is provided, or
  - the length or width of the storage area where 2 or more main access aisles are provided.
- Main access aisles need to be accessible from at least 2 fire department access points, which are to be located such that, in the event one becomes unusable due to fire, the other will still allow emergency responders to access the building.

### CLEARANCES IN STORAGE AREAS

- Clearance between stored products and ducts or heat discharge outlets of exhaust ventilation systems shall be 36 inches minimum



---

## PELLET SHED SAFETY

To ensure safe entry and work within the Pellet Shed, the following applies to:

- Foreman, Front End Loader Operator, Labourer

Equipment required:

- Intrinsically-safe two-way radio/flashlight, CO monitors (Loader Operator/Labourers), Dust Mask, Safety Locks

Before Shift:

- Bump CO monitors
- Lock-out CV18
- Prep Front End Loader
- Ensure Shed fans are running
- Review procedures with Foreman and front end loader operator

Front End Loader Operator:

- Pre-shift inspection of machine
- Confirm flashlight works
- Radio Check with Foreman and Safety Watch
- Have machine blown out at breaks
- In the event of fire, STOP the machine, pull the suppression system, don escape hood, evacuate and notify Foreman immediately.

Safety Watch:

- Radio check with Foreman and Front End Loader Operator
- Ensure charged fire hose is available
- Ensure roll-up door is open all the way and pinned/secured in place

Watch for:

- Loader Operator does not intentionally drive on pile
- Loader as it enters/exits door and does not hit anything
- Blade does not contact the concrete blocks

**IMMEDIATELY REPORT ANY PROBLEMS OR FIRES TO THE FOREMAN!**

---

## **OUTDOOR STORAGE REGULATIONS**

Fire loss experience in outside storage of wood chips/pellets indicates that the following are the principal factors that allow log pile fires to reach serious proportions:

- Large undivided piles
- Congested storage conditions
- Delayed fire detection
- Inadequate fire protection
- Ineffective fire-fighting tactics

As such, outdoor storage is regulated by the BC Fire Code (2012). The following summarizes the requirements and limitations applicable:

The maximum permitted height of any individual storage area shall:

- be determined to ensure the physical stability of the stored products under normal circumstances as well as under fire conditions,
- be determined according to its base area and shape, and the type of packaging, combustibility and chemical reactivity of the stored products

An outdoor storage area shall be arranged such that there is a clear space of not less than:

- 30-meters between stored products and brush or forested areas, and
- 6-meters between stored products and uncontrolled grass or weeds.
- Alleyways between storage piles shall be maintained to allow fire hose laying operations.

Storage beneath power lines is not permitted.

Fire Department Vehicle Access is to be provided such that:

- clear width of 1.5 times the storage pile height, but not less than a minimum clear width of 6-meters (20-feet)
  - is maintained, including gates and clear spaces
  - kept free of obstructions including snow
- the weight of the fire department vehicles is supported
- the turning radius is not less than 12 meters to the centreline of the turn
- permits the approach of fire department vehicles to within 60 m travelling distance of any part of an individual storage area.
- where the total storage area exceeds 6 000 m<sup>2</sup>, the access route is to be connected with a public thoroughfare in at least 2 locations.

Private hydrants, fire department connections and private valves controlling water supplies to fire protection systems are:

- maintained and
- kept accessible to firefighters and their equipment at all times.

For basic fire protection, the hydrant system should be capable of supplying at least 1000 gpm at 80 psi residual for single or multiple piles up to 15,000 units each. For single or multiple piles up to 50,000 units each, water supplies should

---

be at least 2000 gpm at 80 psi residual. Water supplies should be available for a minimum of six hours.

The current firefighting water supply provides the following:

- Static pressure 110 psi
- Residual pressure 82 psi at a flow rate of 1000 usgpm
- Residual pressure 65 psi at a flow rate of 1500 usgpm
- **Residual pressure 20 psi at a flow rate of 2100 usgpm**

A hydrant hose-house with not less than 60 meters (200-feet) of fire hose and auxiliary equipment (adjustable pattern spray nozzles, fire hose wrenches, ...) should be provided and maintained at each fire hydrant.

Portable fire extinguishers are to be provided in any building located in the outdoor storage area. Minimum rating of 2-A:30-B:C

Each motorized vehicle operating in the outdoor storage area shall be equipped with at least one portable extinguisher having a minimum rating of 2-A:30-B:C.

## WOOD CHIP STORAGE

Generally, outdoor wood chip piles contain a high moisture content and are not usually susceptible to surface fire ignition. On the few occasions where surface fires have occurred, it has usually been caused by exposure to another fire or from equipment working on the piles. Once a surface fire has been initiated the fire could produce tremendous heat especially during dry weather conditions with winds in excess of 30 km/h.

Internal fires are much more common than surface fires and are difficult to detect and extinguish. Such fires are capable of burning for extended periods before any obvious indications of a fire are observed. Spontaneous heating is caused when heat produced by the microbial decay of wood is not readily dissipated. Pile temperatures can reach a temperature of 66°C after two weeks. In some piles, the temperatures continue to rise due a number of factors. These factors include the pile height, a low surface-area-to-volume ratio, the age of the wood chips (older and more compacted), low air flow, and the presence of impurities such as bark, decayed wood, and sawdust. Fires frequently occur while attempts are made to separate heated from non-heated chips. When heated chips are exposed to sufficient air, combustion may occur.

Blown wood chips or pneumatically conveyed wood chip piles are more vulnerable to spontaneous combustion since the fines are separated and stratified in such a manner that hampers heat dissipation

- Outdoor sites for wood chip storage should be level and either graded with clean soil or preferably paved.
- Keep storage sites free of combustibles such as grass, brush and rubbish.

- Prohibit smoking near or within wood chip storage sites.
- Buildup and reclaiming of good quality wood chip storage piles should be based on a maximum turnover time of one year. Buildup and reclaiming of wood chip storage piles containing appreciable quantities of sawdust or other wood waste material should be based on a maximum turnover period of three months.
- If wood chip storage piles become exceptionally dry from prolonged hot, dry weather, periodically wet down the surface of the piles to minimize the possibility of a surface fire.
- Limit outdoor storage piles of good quality wood chips to 50 ft. (15 m) in height, 300 ft. (91 m) in width and 800 ft. (244 m) in length, with no pile exceeding 50,000 units capacity. Long narrow piles facilitate manual firefighting if necessary. Limit sawdust or other wood waste piles to 25 ft. (7.5 m) in height.
- Provide at least 50 ft. (15 m) separation between outdoor wood chip storage piles and any important plant buildings.
- Provide at least 50 ft. (15 m) separation between outdoor wood chip storage piles of 15,000 units or larger for firefighting access and inter-exposure control.
  - Chips are measured in "units;" one unit being equal to 200 ft<sup>3</sup> (5.7 m<sup>3</sup>) of compacted chips

When hot spots or areas are detected within outdoor wood chip storage piles, provide water spray or fog coverage while uncovering the pile, or flood the affected area with water through perforated piping prior to digging out the pile. Mobile equipment may be used to dig out and isolate heated areas within wood chip storage piles.

For removal, chips are usually pushed by bulldozers or withdrawn by screw conveyors into pits, which are frequently located beneath the piles. From there they are carried by pneumatic or belt conveyors to the marine loading terminal.

## HAZARDS - OUTDOOR WOOD CHIP STORAGE PILES

Two types of incidents occur in outdoor wood chip storage piles:

- Surface fires
  - Surface fires occur infrequently due to the normally high moisture content of outdoor wood chip storage piles. Tests have shown that wood chips with 50% or greater moisture content (by weight) are too wet for easy surface ignition. However, surface chips may have low moisture content as a result of prolonged dry weather conditions. Surface fires occasionally occur from external exposure fires. Surface fires also originate from mobile equipment working on wood chip storage piles. Under dry weather conditions, a surface fire, once initiated, could spread rapidly and radiate considerable heat, especially if exposed to winds over 20 mph (9 m/s). Tests and limited fire experience also indicate slow penetration of a surface fire into a pile.

- Internal heating, which may result in subsequent fires.
  - Internal heating fires are usually attributed to spontaneous heating and subsequent ignition when the chips were exposed to sufficient air. The subsequent fires frequently occur while attempting to separate the “good” chips from the heated chips after discovering spontaneous heating within the storage pile. Wood chips are normally subject to decay, and spontaneous heating can occur if the heat generated successively by normal respiration, bacterial activity and oxidation is not readily dissipated.
  - Immediately after storage, wood chip piles begin to heat due to cell breathing, biological activity (microbial oxidation). Wood chip piles can reach a maximum temperature of approximately 150°F (66°C) after two weeks; however, temperatures within the wood chip piles occasionally continue to climb and spontaneous heating results.
- Spontaneous heating also can occur in contained or confined wood chip storage. However, most fires involving such storage have resulted from improper cutting and welding procedures or malfunctioning wood chip handling equipment, particularly conveyor systems.
- Contained or confined wood chip storage also may have a dust explosion hazard. That is, if dried wood chips are stored or dry wood dust can accumulate on horizontal structural members within silos, bins, sheds or other enclosures, a dust explosion hazard may exist. Where moist or green wood chips are stored, the dust explosion hazard is significantly reduced. Treat all equipment that handles combustible dusts, as well as any rooms or buildings where combustible dusts can be present and might be put into suspension, as having a dust explosion hazard.

## MANAGEMENT-OF-CHANGE-PROCESS

Implement a management-of-change process to be certain that no changes occur that could increase the severity or consequence of an existing combustible dust hazard or introduce a dust hazard where none previously existed. Examples of such changes include the following:

- Adding new equipment such as blenders, grinders, cutting tools, dust collectors, cyclones, etc.
- Increasing temperatures in the process that could result in drier material being handled
- Adding new materials
- Changing product formulation by adding combustible materials or reducing the proportion of inert materials
- Making process changes that reduce the particle size of in-process materials
- Where process, equipment, raw material, or product changes are planned that could significantly change the dust properties, retest the dust for its explosibility.

A management-of-change process should have the following minimum characteristics:

- Provides a method for identification of changes that should be subject to the management-of-change process
- Provides documentation of the proposed change
- Provides a formal analysis of the loss prevention considerations involved in the proposed change
- Identifies the need for updated personnel training
- Provides for communication of the change and the loss prevention consequences to appropriate personnel such as maintenance, operators, safety, and emergency responders
- Establishes any administrative procedures needed (documentation, checklists that cover hazards, training, etc.)
- Identifies any required authorizations

Where potential for a dust explosion exists, eliminate the potential or minimize the consequences using one of the following methods:

- Control fugitive dust releases using enclosures, collection systems and equipment design.
- Locate dust producing operations in areas separated from different hazard occupancies by construction (dust-tight and explosion-resistant barriers) or distance.
- Minimize chances for dust accumulation by arranging building elements and equipment to reduce the likelihood of dust accumulations. Employ features such as smooth, easily cleaned walls, boxed in or covered horizontal surfaces (beams, joists, etc.), and surfaces sloped a minimum of 60° from the horizontal.
- Where fugitive dust release and accumulation exist in buildings, design the structure to safely vent the potential explosion using damage-limiting construction.
- Locate dust collection and transfer equipment outside, away from important buildings and utilities. Construct equipment that processes or transfers combustible particles to contain or safely vent a potential explosion.
- Where explosion venting or containment in equipment is not possible, eliminate the oxygen in the system by inerting, or install an explosion-suppression system.

An effective maintenance program will:

- Identify and eliminate fugitive dust sources continually.
- Test and maintain spark detection and extinguishing systems, explosion isolation devices, and relief vents to ensure they are in working order per manufacturer's guidelines, or at least monthly.
- Test and maintain metal and non-metal detection and extraction equipment to ensure they are in working order, at least quarterly.
- Check belts and rotating equipment for alignment at least quarterly to prevent these becoming a source of friction heating.

- Lubricate bearings and rotating equipment (fans, blowers, size-reduction equipment) in accordance with manufacturer's guidelines, or at least quarterly
- Remove accumulated dust on rotating equipment bearings and components to insure free movement and prevent friction heating, at least quarterly.
- Assign accountability and keep accurate records.

Ensure a comprehensive dust fire and explosion awareness program exists at all sites where combustible dust exists either within closed processing systems or as fugitive dust within buildings. Include the following:

- Basic education to promote awareness and understanding of the hazards of combustible dusts
- Instruction of new employees on the particular hazards and on precautions relevant to their departments
- A minimum of annual instruction, drill, and familiarization of the local public fire service and/or internal firefighting teams
- Periodic refresher training for all facility personnel

Strictly control potential dust ignition sources where combustible dusts may be present.

- Ensure all electrical equipment is rated Class II, Division 1 or 2, or Zone 20, 21, or 22
- Use a hot work permit system to manage all hot work operations.
- Prohibit smoking and open flames.
- Provide grounding and bonding of metal components with a resistance of less than  $1 \times 10^6$  ohms to ground. Check for continuity of the metal components and security of any bonding connections.
- Subject all electrical equipment to an initial infrared (IR) scan and then at a frequency as dictated by results.

### **Operation and Maintenance**

In buildings where fugitive dust is released despite process design and equipment upkeep, incorporate the following actions into a fugitive-dust-control program:

- Assign accountability and keep records.
- Commit time and resources regularly.
- Create a maintenance schedule and review it periodically to ensure it is adequate.
- Pay particular attention to eliminating accumulations above floor level, such as equipment tops and building structural members because this dust is more likely to become suspended (airborne) and create an explosible cloud if it is disturbed.
- Use vacuum removal wherever possible using a central, portable, or truck mounted vacuum system as appropriate.
- Where vacuuming is impractical, sweeping or water wash-down are other acceptable options.

- Where compressed air blow-down is the only practical method for cleanup, use the following precautions:
  - Perform air blown-down frequently enough to prevent hazardous accumulations of dust.
  - Limit the extent of blow-down to small areas at a time with as low a volume and pressure of air as possible.
  - Shut down electrical equipment not suitable for Class II, Division 2 hazardous locations.
  - Prohibit open flames and hot work, and ensure no hot surfaces exist

### **Explosion Hazard Elimination**

- Where equipment handles coarse material, prevent dust from being generated during material handling by suitable methods or pre-clean the coarse material to remove all fines from most of the process equipment.
- Where equipment handles coarse material, prevent dust from being generated during material handling by eliminating airborne dust inside the processing equipment using a liquid mist (water or other compatible liquid) as follows:
  - Apply the liquid suppressant at a point in the process that involves substantial turbulence, e.g., at a discharge spout, to ensure the suppressant is thoroughly mixed in with the material stream.
  - Install an interlock that will shut down the solid process stream on suppressant spray-system malfunction if this system is being relied upon as the sole means of hazard control.
  - Confirm the effectiveness of the system to eliminate dust in the equipment by visually checking equipment while it is running, for example, by opening access or inspection ports.
  - Develop a maintenance and inspection program with written procedures and records of completion to ensure the dust-suppressant spray system is functioning properly whenever the solid process stream is being handled.

### **SILOS**

Silos can also have a dust explosion hazard, even when they are used with granular material having a very small portion of fines. As the coarse material continually transfers into the silo, it will fall to the bottom of the silo, but the finest, most explosible material will remain in suspension. If transfer operations continue long enough, the airborne combustible dust concentration will exceed the Minimum Explosive Concentration (MEC) and create an explosion hazard.

When a dust collector is mounted directly onto a silo (i.e., with a short connecting pipe of sufficiently large diameter), any explosion igniting in the dust collector will create the same silo explosion effects as if the explosion had originated within the silo, so the dust collector can be considered part of the silo. As long as any explosion venting provided on the silo and dust collector assembly are sized on the basis of the sum of both volumes, explosion venting should be adequate, regardless of whether the explosion originates in the silo or the attached dust collector.



When the dust collector is separated from the silo via a small or elongated pipe, the silo and dust collector no longer act as a single volume during an explosion. If an explosion originates in a dust collector that has no explosion venting of its own, the jet flame will propagate down the connecting pipe, igniting any combustible dust cloud within the silo. This would cause a much more violent explosion in the silo than if the silo explosion was ignited by a conventional (weaker) ignition source.

## **FIRE PREPAREDNESS**

### **General**

- Know the location of the two exits routes closest to your area that lead to the Muster Area.
- Learn what the alarm signal sounds like and how to activate it.
- Learn means and methods of sound an alarm in the various inside and outside work areas. This may include use of air horns or vehicle horns.
- Know the Fire Department Emergency Number (911) and how to access it.
- Prior to a fire drill, do the following:
  - Review the Fire Emergency Procedures in the Fire Safety Plan.
  - Ensure you know who the Fire Safety Director, Deputy Fire Safety Director and trained supervisory staff are and how to identify or contact them.
  - Ensure that equipment and appliances are turned-off when you leave your area.

## **FIRE EVACUATION**

Use the following guidelines when an evacuation is required due to a fire or fire alarm within the site:

- Use a building telephone only if you are safe from the fire.
- While exiting, Walk, Do Not Run. If you are in a building, shut all doors behind you as you leave and alert those who have difficulty hearing that an emergency evacuation is under-way.
- Assist any persons who need help to reach a safe exit and the Muster Area.
- If you must use an escape route where there is smoke, stay as low as possible. The air nearer the floor or ground is cleaner as you move toward the exit.
- Before you open a closed door, if you cannot see through a viewing glass to check conditions on the other side, feel the door with the back of your hand. If it is hot, leave it closed and use your alternate escape route. If it feels normal, brace your body against the door and open it a crack - be prepared to slam it shut if heat or smoke starts to rush in.
- When you have reached the outside of the building, move away from the building allowing others behind you to emerge.
- Do not attempt to drive your vehicle from the parking area.
- Do not enter the work area again until permitted by a fire department officer or the Fire Safety Director.

In addition to the aforementioned guidelines, if you are working in a remote location outdoors you should:

- Remain Calm.
- Shut down all hazardous operations within your control., if it is safe to do so.
- Look for signs of smoke and wind direction.
- Determine the safest evacuation route to the Muster Station.
- Move towards the Muster Station avoiding smoke, flames, hazards and vehicles.
- Try to stay up-wind from smoke and fire.

## FIRE EMERGENCY PROCEDURES - GENERAL

### IF YOU DISCOVER A FIRE . . .

- ◆ **REMOVE** people from immediate danger.
- ◆ **IMMEDIATELY** announce the fire over the plant radio system or activate the building fire alarm system.
- ◆ **PHONE 9-1-1** from a safe location, to report a fire at: **1209 McKeen Avenue, District of North Vancouver, B.C.**
- ◆ **FIGHT** the fire ONLY if you are trained in the use of portable fire extinguishers, and fire hoses, the fire is **SMALL** AND you are **NOT** alone.
- ◆ **EVACUATE** via the nearest safe exit route.
- ◆ **PROCEED** to the designated Muster Station/Evacuation Assembly Area.

### AT THE SOUND OF HEARING THE FIRE ALARM SIGNAL OR ANNOUNCEMENT ...

- ◆ **IF IN DANGER, EVACUATE** via the nearest safe exit route.
- ◆ Mobile vehicle operators who hear the alarm or announcement are to **SOUND VEHICLE HORN with constant short honks to ensure all personnel are aware of the alarm.** Discontinue honking until advised to stop.
- ◆ **ASSIST** persons requiring assistance.
- ◆ **EMPLOYEES WILL DIRECT truckers, contractors and other visitors** to proceed to the Muster Area on foot, leaving vehicles parked as is with engines turned off.
- ◆ **ASSEMBLE** at the pre-designated Muster Station.
- ◆ **PHONE 9-1-1** from a safe area, to report a fire alarm at: **1209 McKeen Avenue, District of North Vancouver, B.C.**
- ◆ **DO NOT** re-enter the building or site until the fire department declares an “**ALL CLEAR**”.

**MUSTER POINT** – Parking lot in front of main office.

**FIRE or SPILL EMERGENCY– During Business hours**

- Any person discovering a fire should immediately make an announcement over the plant radio system and/or pull the fire alarm.
- Any person discovering a spill should immediately stop the source of the spill and then make an announcement on the plant radio system and/or pull the fire alarm.
- All mobile vehicle operators who hear the emergency announcement on the radio will begin to sound their horns.
- Anyone hearing the announcement on the radio should then pull the fire alarm (short bursts until advised to stop), if not already done, to ensure all personnel are aware of the situation and then proceed to the staging area (parking lot front office).
- Radio silence will be maintained by all personnel except for essential communications.

**FIRE or SPILL EMERGENCY– After Business hours**

- During off-hours, anyone discovering a fire shall phone-911 from a safe area.
- Anyone discovering a spill should immediately stop the source of the spill, if safe to do so and call for help using the Emergency Contact List.

**MUSTER AREA**

Located at the parking lot in front of main office.

- A Muster Area co-ordinator or designate will conduct a head count of all personnel in the Muster Area. The visitor sign-in sheet from the main office will be used to account for all visitors.
- The Muster Area co-ordinator or designate will check with all supervisors to account for all employees. The Muster Area co-ordinator or designate will contact the Fire Safety Director/Deputy Fire Safety Director by radio and report the results of the head count.
- Muster Area co-ordinator or designate will meet emergency responders at the main gate, provide status as known and direct emergency responders accordingly.
- No person shall leave the Muster Area without first reporting to the Muster Area co-ordinator or designate

## FIRE CONTROL

**NOTE:** A quick initial response is required to prevent small fires from becoming large fires.

Workers are limited to “initial first aid” response only. They are not to enter burning buildings and are only expected to try to keep fires from spreading by closing affected building doors (as applicable and safe to do), or by using portable fire extinguishers or fire hose lines “if” trained to do so.

## PORTABLE FIRE EXTINGUISHERS

Portable fire extinguishers are useful only if you know how to use them, if they are right for the type of fire you are fighting, and if the fire is discovered at an early stage.

You should not attempt to fight even a small fire until people have been evacuated from the area and the Fire Department has been called. Never attempt to fight a fire if any of the following is true:

- You are uncertain about how to use the extinguisher.
- The fire is spreading beyond the immediate area where it started.
- The fire could block your escape route.
- You are alone.

## HOW TO USE A DRY-CHEMICAL TYPE FIRE EXTINGUISHER - BASIC

Most fire extinguishers work according to the following directions, but some do not. Read and follow the directions on the fire extinguishers within your building ahead of time.

Remember the word: **PASS**

- **PULL** the pin
- **AIM** low...pointing the extinguisher nozzle at the base of the fire
- **SQUEEZE** the handle...This releases the extinguishing agent
- **SWEEP** from side to side... at the base of the fire until it appears to be out again – repeat as needed.



**Fires are classified into five (5) classes. They are described below:****Class A**

A fire extinguisher labeled with **letter "A"** is for use on Class A fires. Class A fires are fires that involve ordinary combustible materials such as cloth, wood, paper, rubber, and many plastics.

**Class B**

A fire extinguisher labeled with **letter "B"** is for use on Class B fires. Class B fires are fires that involve flammable and combustible liquids such as gasoline, alcohol, diesel oil, oil-based paints, lacquers, etc., and flammable gases.

**Class C**

A fire extinguisher labeled with **letter "C"** is for use on Class C fires. Class C fires are fires that involve energized electrical equipment.

**Class D**

A fire extinguisher labeled with **letter "D"** is for use on Class D fires. Class D fires are fires that involve combustible metals such as magnesium, titanium and sodium.

**REMEMBER**

- **A typical portable fire extinguisher has a limited time duration lasting from less than 10 to 30 seconds of continuous discharge!**
- **If you have the slightest doubt about your ability to fight a fire - EVACUATE IMMEDIATELY!**
- **Report your actions and observations to a fire department officer upon arrival.**

## FLAMMABLE OR COMBUSTIBLE LIQUID SPILLS

A spill of flammable or combustible liquids is to be prevented from flowing outside the spill area and from reaching waterways, sewer systems and potable water sources, adjacent properties, means of egress, air intakes and firefighting equipment, by:

- Using products, materials and methods identified on manufacturer's product material safety data sheets (MSDS).

**Minor Spill:** A minor spill is small enough that it can be safely cleaned up using the spill kit.

**Major Spill:** A major spill is one that cannot be contained safely with the materials on the site and/or threatens to enter the sewer system or travel beyond the boundaries of the work area to endanger the environment.

The Fire Safety Director shall ensure that persons handling flammable or combustible liquids are adequately trained. At least one person is to be in responsible charge during operating hours, and available to respond to a day or night emergency.

The person in responsible charge of using a flammable liquid is to be trained in the correct procedures for the handling, storing and offering for transport of dangerous goods in accordance with:

- the appropriate federal, provincial, or territorial occupational safety and health regulations, or
- in the absence of such regulations,
  - the "Transportation of Dangerous Goods Regulations," or
  - the "Workplace Hazardous Materials Information System" (WHMIS) available from WorkSafeBC.

## SPILL CLEAN-UP PROCEDURES

The staff member who is in charge at the time of the spill is responsible for ensuring clean-up procedures are followed and any reporting completed.

## PRELIMINARY PROCEDURES

- Ensure own personal safety and that of other personnel in the vicinity of the spill.
- Can the spill be controlled or cleaned up by on-site personnel (i.e., the appropriate equipment, personal protective equipment and trained personnel are available)?
  - If **NO, EVACUATE and CALL 911.**
  - If **YES**, Control any risk of injuries before taking action
- The “responsible person” (person who had possession, charge or control of a substance immediately before its spilled) must act quickly to:
  - CONTAIN
  - CONTROL
  - CLEAN UP the spill
  - DECONTAMINATE the spill area
  - DETERMINE whether spill is reportable to an external agency

## GENERAL PROCEDURES

### NOTIFICATION/EVACUATION

- Notify other people in the vicinity of the spill.
- Inform the supervisor.
- Evacuate and post warnings in the area if necessary.

### REPORTABLE SPILL?

- Report ALL spills of flammable or corrosive liquids to the Fire Department.

### HAZARDS OF SPILLED MATERIAL

- Before responding to the spill, obtain
  - Name of the chemical(s)
  - Quantity spilled, and
  - Hazards of the chemical (review Material Safety Data Sheets (MSDS)).

### CLEAN-UP PROCEDURES

- Perform clean-up procedures *only* if:
  - All hazards have been identified and assessed;
  - the appropriate spill control material, equipment and protective clothing are available
  - personnel are familiar with equipment and clean-up procedures;
  - more than one person is in the lab and available to participate; and
  - no ignition sources are present.
- Put on the appropriate protective clothing, obtain spill kit and cautiously enter the spill area.
- Turn off any device, instrument, or machine that could exacerbate the spill.

**SOLVENT OR SOLVENT BASED PRODUCT**

- Turn off all sources of ignition such as any operating electrical equipment
- Open doors and windows to provide as much ventilation as possible
- Keep the public away from the spill area
- If ventilation is not adequate, wear a respirator fitted with organic vapour cartridges for protection against fumes.
- If necessary, dyke the spill with non-combustible absorbent to prevent the spill from spreading
- Using a plastic dust pan, cardboard or other suitable utensil, scoop up as much of the spill as possible into a suitable sized metal container; seal the container with a tight fitting lid.
- Apply solvent absorbent (Spill X-S, Solu-sorb, equivalent product or as directed in product MSDS information) from the perimeter inward, covering the total spill area.
- Mix thoroughly with *plastic* scoops until material is dry and free flowing, and no evidence of free liquid remains
- Spread absorbent over remaining product and scoop all waste absorbent into a metal container; seal the container with a tight fitting lid.
- Dispose of recovered product and waste absorbent through a local waste disposal company

**WATER BASED PRODUCTS**

- Open doors and windows to provide as much ventilation as possible
- Keep the public away from the spill area
- If necessary, dyke the spill with absorbent to prevent the spill from spreading
- Using a dust pan, cardboard or other suitable utensil, scoop up as much of the spill as possible into a suitable sized metal container; seal the container with a tight fitting lid.
- Spread absorbent over remaining product. Waste absorbent can be spread out to dry and then disposed of with normal garbage. If this is not practical, place in a container and dispose of through a local waste disposal company

**SPILL OUTSIDE**

- The procedures noted above should be followed, EXCEPT that care must be taken to ensure that no product enters the storm sewer openings.
- Ensure that all staff are aware of the location of the storm sewer openings
- If a spill has the potential to reach the drain, dyke around the drain with absorbent materials.
- If the drain is in a particularly vulnerable location, such as the base of a loading dock, purchase a magnetic drain cover and have readily available long with absorbent materials.



## PART 5 – PROPERTY INFORMATION

### PROPERTY and OPERATION DESCRIPTION

#### OVERVIEW

Fibreco Export Ltd. operates a wood chip and wood pellet storage and loading facility at 1209 McKeen Avenue, District of North Vancouver BC. The property is located south and east of the intersection of McKeen Avenue and Pemberton Avenue.

This large property consists of several small one and two-storey (shops, lunchroom, office) structures constructed primarily of concrete block or wood cladding on wood frame, and includes a small two-storey wood frame office building at the property main entrance gate.

A large fabric over metal frame pellet storage shed is located in the centre of the property, with access from the west side only.

A paved service driveway runs along the north edge and west side of the property. An internal service lane offers limited access to the east side of the property area. Access from Pemberton Avenue to the east side of the property is limited. Foot access from Pemberton Avenue is provided through chain link gates up to and including the storage silo area. Access from Pemberton Avenue to the east side of the property south of the storage silos is impeded by a tidal waterway.

Access to the property is from McKeen Avenue to the internal driveway system leading:

- East to the service and north end of the storage silos line.
- West parallel to the rail lines within the property, the west sides of the wood chip piles, pellet storage shed and waterfront loading terminals.



## **FIRE DEPARTMENT ACCESS**

The site is located in District of North Vancouver and an access driveway is provided from McKeen Avenue as the principal public access roadway to the property.

There is a limited predefined roadway system on the west side of the property. The large open concept of the operation allows for the structured build-up of material in large piles prior to loading. (See Site Plan)

The site is secured by chain link fencing on the north, east and west sides of the property. Vehicle access gates are on the north and partway down the east side along Pemberton Avenue.

- Vehicle access is from McKeen Avenue to the north to the west side of the property via an internal private roadway system connecting the north and south ends of the property and internal buildings, operations and product storage areas.
- During regular hours the north gate remains open to vehicular traffic.
- After regular business hours the gate is locked closed.
- Roadways (paved) are not marked and can vary based on the amount of product storage pile.
- Roadways shown on the Site Plan are designed to accept heavy vehicles.
- Existing private hydrants meet the intent of the BC Fire Code and relevant NFPA standards.

## **SITE DRAINAGE**

A vegetated area and tidal waterway runs parallel to the perimeter fence along the east side of the property. Fire fighting water flow within the property will most likely discharge into Burrard Inlet at the south and east sides of the property.

Most of the remaining internal property surface is covered with pavement or gravel. The surface to the east side of the storage silos is predominantly dirt.

## **WATER SUPPLY**

The current on site firefighting water supply provides the following:

- Static pressure 110 psi
- Residual pressure 82 psi at a flow rate of 1000 usgpm
- Residual pressure 65 psi at a flow rate of 1500 usgpm
- Residual pressure 20 psi at a flow rate of 2100 usgpm

## **FIRE HYDRANTS**

Public – The nearest public owned and maintained fire hydrants are located on the west side of McKeen Avenue.

Private – 11 fire hydrants owned and maintained by Fibreco Export Ltd. area located within the property. (See the Site Plan)

## SPRINKLER PROTECTION

The Pellet Shed is protected by a single dry pipe sprinkler system. Upon activation of a sprinkler(s) system air pressure will drop. The controlling panel in the sprinkler valve enclosure will display a visible and audible trouble signal indicating "Low Air".

The dry system air compressor will attempt to replace the loss of system air pressure, but will not be able to compensate. The dry pipe valves are equipped with a quick open device intended to reduce system trip/fill times. The quick open devices are designed to direct system air pressure into the intermediate chamber of the dry pipe valve. The pressurized intermediate chamber neutralizes the differential pressure holding the dry pipe valve closed and permits the dry pipe valve to trip and flow water into the system piping and flow from any open sprinklers. The quick open devices used are a:

- Standard accelerator which senses a rapid drop in dry system air pressure and reroutes system air pressure to the intermediate chamber below the valve clapper, or
- VIZOR "Electronic Dry Pipe Valve Accelerator" - The Vizor accelerator is designed to operate upon detection of a steady decay in air pressure of 0.1 psi per second or greater, or if the pressure drops to 5.5 psi. When the VIZOR accelerator detects a sustained drop in air pressure, the accelerator energizes its internal solenoid valve. The energized solenoid valve then opens to permit system air pressure into the intermediate chamber.

When the dry pipe valve trips, the water flow through the piping system will activate a water flow switch (pressure switch) which will in turn activate the audible alarm signal.

## DRY SPRINKLER SYSTEM DESIGN CRITERIA – EAST DRY PELLET SHED

|                              |   |
|------------------------------|---|
| • 6-inch TYCO Dry Pipe Valve |   |
| Design Standard:             | NFPA-13 "Standard for Sprinkler Systems" (1999)                   |
| Hazard Classification:       | Ordinary Hazard Group 2   |
| Design Density:              | 0.20 gpm/ft <sup>2</sup>  |
| Design Area:                 | 4000 ft <sup>2</sup>  |
| Total System Demand:         | 1062.2 usgpm @ 57.2 psi at the base of the sprinkler system riser |

The Pellet Shed dry sprinkler system is electrically supervised by a Simplex 4100U Fire Control Panel. The 4100U has 3 general functions: (see also next page)

- Monitor fire alarm initiating points (fire detection & pull stations)
- Activates fire alarm signalling devices (bell/strobe)
- Monitor and control building auxiliary equipment (fans)

## SIMPLEX 4100U OPERATION



| LED/KEY                                      | DESCRIPTION   |
|--|---|
| <b>Fire Alarm LED and Fire Alarm ACK Key</b> | The Fire Alarm LED flashes to indicate the presence of an unacknowledged alarm condition. Other components of the system, such as the horns and strobes, also activate to indicate the presence of an alarm. The FIRE ALARM ACK key allows you to indicate that you have observed the presence of an alarm. |
| <b>Alarm Silenced LED/Alarm Key</b>          | Pressing the ALARM SILENCE key provides a means of silencing the audible notification appliances (horns). The LED indicates when this key has been used.  |
| <b>System Warning Keys and LEDs</b>          | The System Warning LEDs – Supervisory and Trouble – indicate when abnormal, non-fire conditions occur to the fire alarm’s wiring or devices. The System Warning keys – SUPV ACK and TROUBLE ACK – allow an operator to acknowledge the presence of the abnormal condition.                                  |
| <b>System Reset Key</b>                      | Pressing this key directs the panel to reset all attached devices and clear all acknowledged alarms, troubles, and supervisory conditions.  |
| <b>AC Power LED</b>                          | Indicates presence of AC power.   |
| <b>Enable/Disable Keys</b>                   | Pressing these keys allows you to enable or disable devices attached to the panel.  |
| <b>On/Off/Auto Keys</b>                      | Pressing these keys allows you to force a device (such as a relay) ON or OFF. The Auto key returns control of the device to the panel.  |

\*\*\* The first step in managing an alarm condition is to *ACKNOWLEDGE* the alarm.

### HOW TO ACKNOWLEDGE AND VIEW EVENTS

- Unlock and open the enclosure door AND read the alphanumeric display in the interface panel. The display will indicate the number of Fire, Supervisory and Trouble conditions
- Press ACK located under flashing indicator and read the display for location/description.
- Press ACK until all conditions have been reviewed.
- Once all conditions have been reviewed, the flashing lights turns to a steady on.

### HOW TO SILENCE THE ALARM

- Press the ALARM SILENCE key and read the display

## **HOW TO RESET THE SYSTEM**

If an alarm condition remains active, Pressing the SYSTEM REST key will have no effect. Alarm conditions must be cleared before attempting a system reset (I.e. – stop sprinkler system water flow, clear conditions which activated fire detectors, reset manual pull station)

- When ready, press SYSTEM RESET key.

\* \* Sprinkler system design criteria has been extracted from design data placards attached at the sprinkler system valve stations. Some data placards are not legible and information of design is not provided below.

## **DRY SPRINKLER SYSTEM DESIGN CRITERIA – SHIP LOADER CONVEYOR**

Design Standard: NFPA-13  
Sprinklers calculated: 15  
Total System Demand: 831 usgpm at 87.4 psi at the base of the sprinkler system riser without the fire pump

## **DRY VALVE (3-inch)/DELUGE VALVE (4-inch) – VALVE HOUSE #3 SOUTH END OF LOADING PIER**

- Serves loading pier sprinkler system

## **DRY PIPE SRINKLER VALVE FAR EAST SIDE MID CONVEYOR**

- 6-inch TYCO Dry Pipe Valve

## **DRY PIPE VALVE - Valve HOUSE #6 SOUTH WEST BY LOADER CONVEYOR**

- 4-inch CENTRAL Dry Pipe Valve
- System demand – 855.9 usgpm at 75.9 psi at the base of the sprinkler system riser

## **DRY PIPE VALVE – VALVE HOUSE #2 SOUTH WEST BY BARGE LOADER**

- 3-inch Viking Dry Pipe Valve

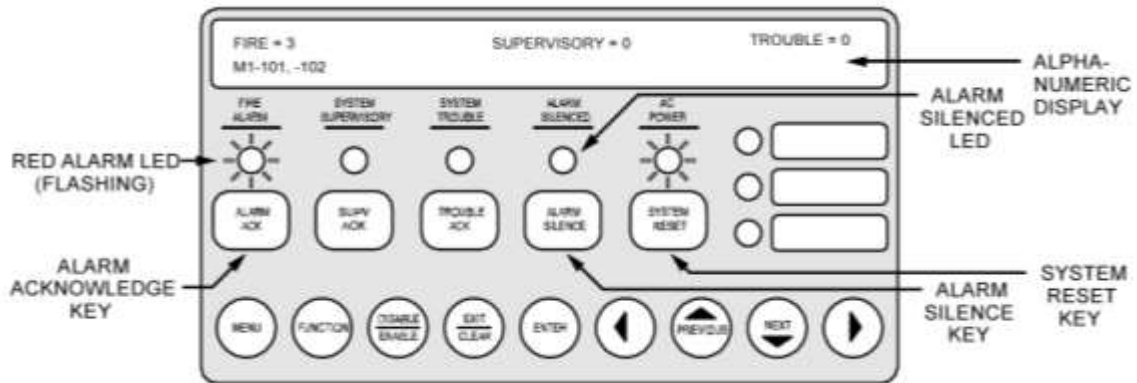
## **VALVE HOUSE MID EAST BY SILO**

Shelters 3 sprinkler valve stations as noted below.

- 4-inch TYCO Dry Pipe Valve - Conveyor 17
- 4-Inch CENTRAL Dry Pipe Valve – Tunnel Conveyor
- 3-Inch Deluge Valve (shut-off to prevent accidental trip) – Silos 2 & 3

The above noted sprinkler valves and associated equipment are electrically supervised by a Simplex 4010 Fire Alarm Control Panel. A Mircom FX-2000 Fire Alarm Control Panel electrically supervises the smoke detection devices adjacent to Silos 1 to 6. The smoke detectors detect the presence of airborne particulate conditions that is consistent with a fire. The detection will sound an audible alarm signal.

## SIMPLEX 4010 CONTROL PANEL OPERATING INSTRUCTIONS



### HOW TO ACKNOWLEDGE AND VIEW EVENTS

- Unlock and open the enclosure door AND read the alphanumeric display in the interface panel. The display will indicate the number of Fire, Supervisory and Trouble conditions
- Press ACK located under flashing indicator and read the display for location/description.
- Press ACK until all conditions have been reviewed.
- Once all conditions have been reviewed, the flashing lights turns to a steady on.

### HOW TO SILENCE THE ALARM

- Press the ALARM SILENCE key and read the display

### HOW TO RESET THE SYSTEM

- If an alarm condition remains active, Pressing the SYSTEM REST key will have no effect. Alarm conditions must be cleared before attempting a system reset (i.e. – stop sprinkler system water flow, clear conditions which activated fire detectors, reset manual pull station)
- When ready, press SYSTEM RESET key.

## MIRCOM FX-2000 OPERATING INSTRUCTIONS

### INDICATORS

#### Queue Buttons:

These are used to select a particular Queue to review using the cursor buttons and LCD Display.

##### Alarm Queue LED:

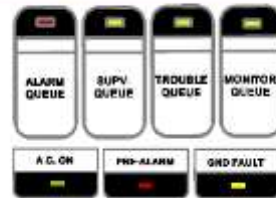
The Alarm LED flashes red whenever the Panel is in Alarm. The Alarm Queue LED will go steady, once all alarms in the queue have been reviewed using the Alarm Queue button. The Indicator will remain on until the panel is reset.

The **Trouble Queue button** is used to view all trouble conditions, press this button and LCD will display the last trouble condition in the queue. Use the cursor keys to view any previous troubles.

The **Supervisory Queue Button** is used to view all supervisory conditions and pressing this button will show the latest supervisory information on the LCD display. Use the cursor buttons to view all previous supervisory conditions on the LCD display

The **Monitor Queue Button** is used to show all monitor conditions and displays this information on the LCD display. Use the cursor keys to view all queued monitor conditions

Mircom FX-2000  
Fire Alarm Control Panel  
Normal Condition  
April 24, 2002



### NORMAL

- All indicators are normally **OFF** except for the green AC power on lamp

### SILENCING OF ALARMS

- Press **SIGNAL SILENCE** button momentarily to silence all audible signals. The associated amber lamp indicator will illuminate. **NOTE:** the signal silence feature will be inhibited for one minute. The signal silence button will not work in that one minute period.

### SYSTEM RESET

- Press the **RESET** Button momentarily to restore normal operation. All alarm indicators will extinguish and all latched functions will be restored.

### TROUBLE

- Any system trouble will sound the buzzer intermittently and the **COMMON TROUBLE** indicator will flash amber until the fault is corrected

### LAMP TEST

- Press button momentarily to test lamps

# CONTROLS

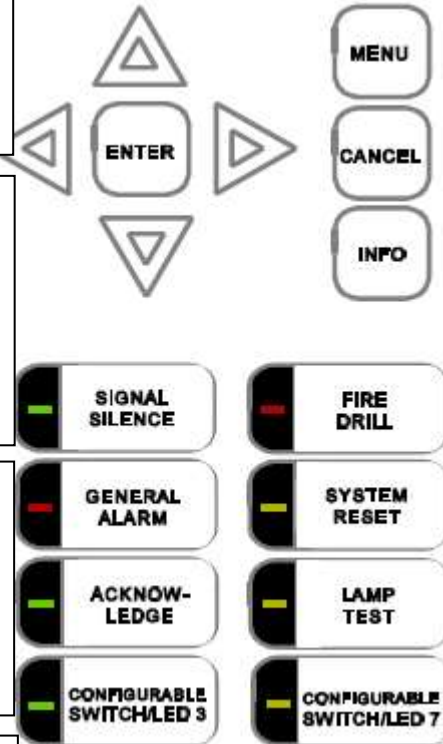
**Cursor Buttons:**  
 These four buttons around the Enter Button are used for up (previous), down (latest), left, and right selection of items on the LCD Display. The up and down button scroll in a continuous circle.

**Enter Button:**  
 Used to select a displayed item on the LCD Display.  
**Cancel Button:**  
 Used to cancel an operation.  
**Menu Button:**  
 Used to initiate the FX-2000 Menu System programming.  
**Info Button:**  
 Used (by pushing and holding) to get more detailed information about any displayed item.

**Signal Silence Button:**  
 Activation when the Panel is in Alarm, turns on the Signal Silence Indicator and deactivates any Silenceable Indicating Circuits. Non-Silenceable Circuits are unaffected. Signals will resound upon any subsequent Alarm. This button does not function during the Signal Silence Inhibit Timer period of 1-minute. It also does not function if the Indicating Circuits are active as the result of a Fire Drill.

**Fire Drill Button:**  
 Activates all programmed and non-Disconnected Indicating Circuits, but does not transmit any Alarms via the City Tie, or Common Alarm Relay. Fire Drill is cancelled by pressing the button again (toggle switch), or if the Panel goes into a real Alarm.

**System Reset Button:**  
 Pressing the System Reset button (for at least 3-seconds) causes the Fire Alarm Control Panel, and all Circuits, to be reset





## FIREFLY- AB SYSTEM

A Firefly AB Fire Prevention System is installed at the following locations:

- Conveyor 2, 15 and 17 (Detection and stoppage of convey of operation only)
- Head End of Conveyor 15 (Detection Only)
- Silos 1 and 6 (Detection Only)
- Silos 2, 3, 4 and 5 and Conveyor 18 inside Pellet Shed (Detection, Suppression and Stoppage of conveyor operation)
- New dust collection bag-house for Pellet Shed (Detection, by-pass and stoppage of conveyor operation)

The infra-red heat signature of a hot (or glowing) body causes the Firefly detection device to sound and audible alarm and cause operation of a water spray into the affected area (where such spray protection is provided).

The FireFly-AB control unit receives and evaluates information from each detector and activates appropriate output according to the system programming, such procedures as activation of relays, solenoid valves, explosive outputs and/or text messages. The control unit stores events and alarms in the electronic memory, which can be recalled by the system operator on demand.

| FIREFLY STATUS  |              |                          |                    |                 |               |                                      |
|---|--------------|--------------------------|--------------------|-----------------|---------------|--------------------------------------|
| Last reset 10/30/2012 - 08:55 (mm/dd/yyyy - hr:mm)  |              |                          |                    |                 |               |                                      |
| Location  | Fault Status | Three Spark Event Status | Spark Event Status | Ack Spark Event | Spark Count   | 3 Spark Event Count                  |
| Conveyor 2 Tripper  | Faulted      | 3 Spark Occured          | Good               | Acknowledge     | 38            | 39                                   |
| Conveyor 15 Head  | Good         | Good                     | Good               | Acknowledge     | 5             | 12                                   |
| Conveyor 17 Head  | Good         | Good                     | Good               | Acknowledge     | 4             | 2                                    |
| Conveyor 18 Head  | Good         | Good                     | Good               | Acknowledge     | 3             | 3                                    |
| Pellet Shed Bag House   | Good         | Good                     | Good               | Acknowledge     | 3             | 3                                    |
| Silo 2  | Good         | Good                     | Good               | Acknowledge     | 0             | 0                                    |
| Silo 3  | Good         | Good                     | Good               | Acknowledge     | 0             | 0                                    |
| Silo 4  | Good         | Good                     | Good               | Acknowledge     | 4             | 0                                    |
| Silo 5  | Good         | Good                     | Good               | Acknowledge     | 4             | 0                                    |
|   |              |                          |                    |                 | <b>Total:</b> | 59                                   |
| <b>Note: If a three spark event or system fault occurs, the firefly must be manually reset.</b> |              |                          |                    |                 |               | <input type="button" value="Close"/> |

If a firefly system is faulted:

1. Send electrician to location to read error messages from Firefly controller (CUE)
2. If error message indicates problem with faulty sensor or solenoid replace with spare
3. If there is no power to the firefly panel, inform management/maintenance that the system is not powered.
4. The full manual is available in maintenance or from management for troubleshooting.

If there is a “Single Spark” event:

1. The associated conveyors will shutdown.
2. If any spark is detected it may be a fire, the detector can sense a hot particle that is not hot enough to glow. All events must be treated seriously.
3. Send millwright to investigate source of the spark with a heat gun.
4. If the spark occurred on a silo, ask the security guard if there was water flow detected on the silo. This indicates that the device attempted to distinguish a spark.
5. If the area of the spark detectors has been investigated and proves to be ok, reset the system on the HMI using the “Acknowledge” button.
6. Ensure a millwright remains in the area with a heat gun to watch and listen for a failed component until you are comfortable there is not a problem causing sparks.
7. Restart the conveyors and continue loading if safe to do so.

| FIREFLY STATUS  |              |                          |                    |                 |             |                                      |
|---|--------------|--------------------------|--------------------|-----------------|-------------|--------------------------------------|
| Last reset 10/30/2012 - 08:55 (mm/dd/yyyy - h:mm)   |              |                          |                    |                 |             |                                      |
| Location  | Fault Status | Three Spark Event Status | Spark Event Status | Ack Spark Event | Spark Count | 3 Spark Event Count                  |
| Conveyor 2 Tripper  | Failed       | 3 Spark Occurred         | Good               | Acknowledge     | 38          | 39                                   |
| Conveyor 15 Head  | Good         | Good                     | Good               | Acknowledge     | 5           | 12                                   |
| Conveyor 17 Head  | Good         | Good                     | Good               | Acknowledge     | 4           | 2                                    |
| Conveyor 18 Head  | Good         | Good                     | Good               | Acknowledge     | 3           | 3                                    |
| Pellet Shed Bag House   | Good         | Good                     | Good               | Acknowledge     | 3           | 3                                    |
| Silo 2  | Good         | Good                     | Good               | Acknowledge     | 0           | 0                                    |
| Silo 3  | Good         | Good                     | Good               | Acknowledge     | 0           | 0                                    |
| Silo 4  | Good         | Good                     | Good               | Acknowledge     | 1           | 0                                    |
| Silo 5  | Good         | Good                     | Good               | Acknowledge     | 4           | 11                                   |
| <b>Total:</b>   |              |                          |                    |                 |             | 59                                   |
| <p>Note: If a three spark event or system fault occurs, the firefly must be manually reset.</p> |              |                          |                    |                 |             | <input type="button" value="Close"/> |

If there is a “3 Spark” event:

1. The associated conveyors will shutdown.
2. If any spark is detected it may be a fire, the detector can sense a hot particle that is not hot enough to glow. All events must be treated seriously.
3. Send millwright to investigate source of the spark with a heat gun.
4. If the spark occurred on a silo, ask the security guard if there was water flow detected on the silo. This indicates that the device attempted to distinguish a spark.
5. After the system has been inspected and proves to be ok.
6. The firefly panel will be in PROCESS STOP condition, and must be reset at the panel using the instructions below. (next page)

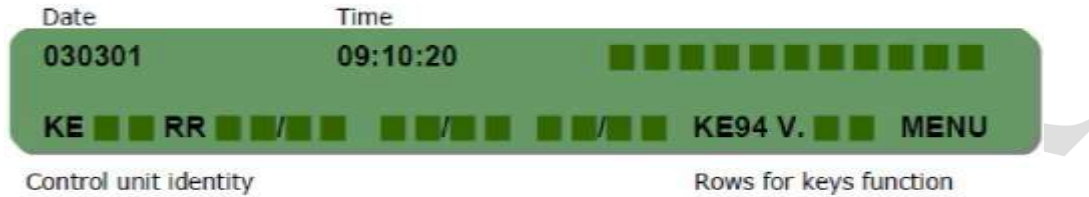
The display shows:



6. Acknowledge the message by pressing "ACK." X2. The display will automatically return show the current status of the system..

**Purpose:** *To reset the system after a process stop.*

1. The display shows the current status of the system.



2. Press "MENU" to enter "MENU SELECTION".

3. Step backwards or forwards by pressing "PREV." or "NEXT" until the display shows.



4. Press "ENTER". The display will show:

Blocking time in seconds



The system can not be restarted before the countdown timer as reached **0000**.

5. Press "ENTER" to deactivate the process stop.



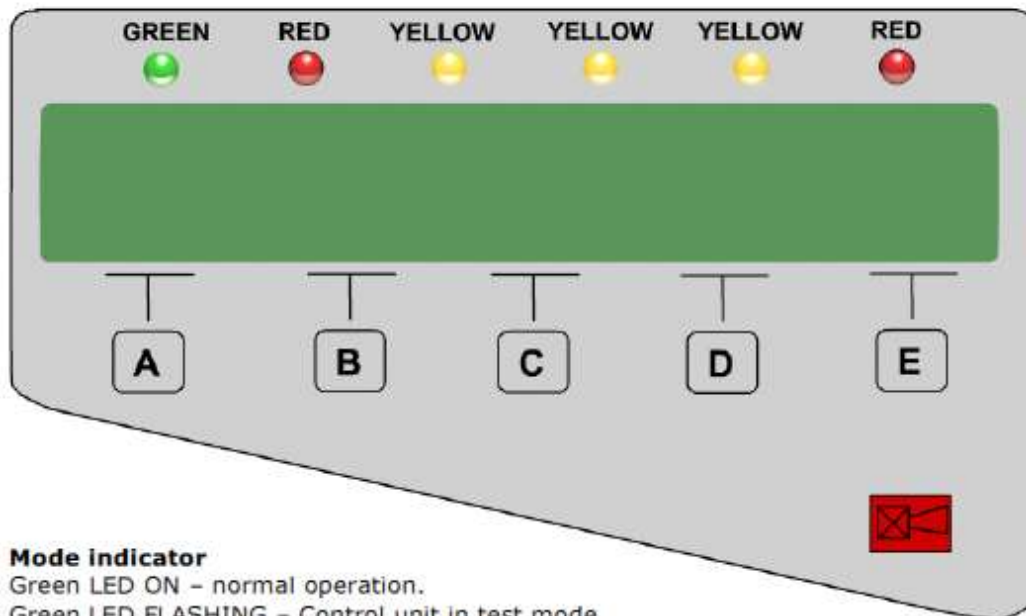
**All necessary arrangements after a process stop must be finalised before the process stop is deactivated.**

6. Acknowledge the message by pressing ACK. The display will automatically return to show the current status of the system.

7. Ensure that a Millwright remains in the area with a heat gun to watch and listen for a failed component until you are comfortable there is not a problem causing sparks.

8. Restart the conveyors and continue loading if it is safe to do so

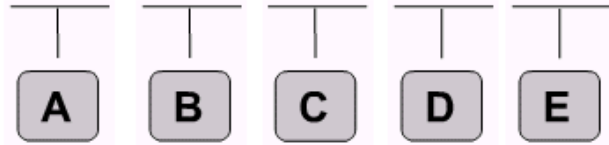
## Control unit indicators:



- 1. Mode indicator**  
Green LED ON - normal operation.  
Green LED FLASHING - Control unit in test mode.  
Green LED OFF - power failure.
- 2. Malfunction indicator**  
Red LED normally OFF.  
Red LED FLASHING - Malfunction are registered.  
Red LED goes out when malfunction have been corrected and a reset is made.
- 3. "Spare"**
- 4. Glow indicator**  
Yellow LED normally OFF.  
Yellow LED FLASHING momentary - glow indication.
- 5. Output indication**  
Yellow LED normally OFF.  
Yellow LED ON an output is active.
- 6. Process stop indication**  
Red LED normally OFF.  
Red LED FLASHING - system in process|stop mode.  
Red LED goes out when process stop has been deactivated and alarm has been reset.

### Menus

The control units has 6 keys to operate the unit. Five are located under the display. This are as follows:



All functions keys are menu controlled.

The function for each key is displayed above respective key. The sixth key is used to reset audible and visual alarms.



#### **STANDARD MENU**

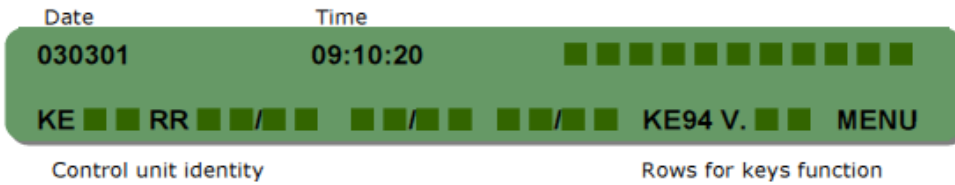
- DISPLAY EVENT LOG
- SET DATE AND TIME
- SELECT LANGUAGE
- CHANGE SYSTEM STATE

#### **MENU SELECTION: DISPLAY EVENT LOG**

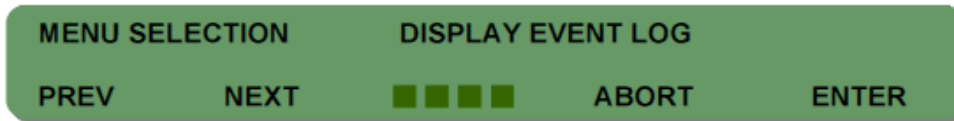
**Purpose: The log-book registers events reported by the control units.**

It will log events sequentially as they happen i.e the last event will be the first to be displayed.

1. The display will show the current status of the system.



2. Press **"MENU"** to enter "MENU SELECTION".
3. Step backwards or forwards by pressing **"PREV."** or **"NEXT"** until the display shows:



4. Press **"ENTER"**. The display shows now the latest message in the log-book.
5. Step backwards or forwards by pressing **"PREV."** or **"NEXT"**.
6. To finish press **"ABORT"** and the display will return to show the current information. If none of the keys has been pressed within 60 seconds, the display will automatically return to show the current status of the system.

## MISTERS

The misting and deluge system is provided to improve dust control on running conveyors and to aid in fire extinguishing. The misting system is meant to run in automatic mode unless performing maintenance or cleaning. The deluge is a manually activated system. Each deluge has two valves associated with it, a deluge valve, and a drain valve. These valves fire in unison off the same output. This is to allow the valve to drain out after being used for winterizing. This also ensures the valve has enough pressure to close.

In automatic mode, the misters turn on and off automatically. The misters behave as follows:

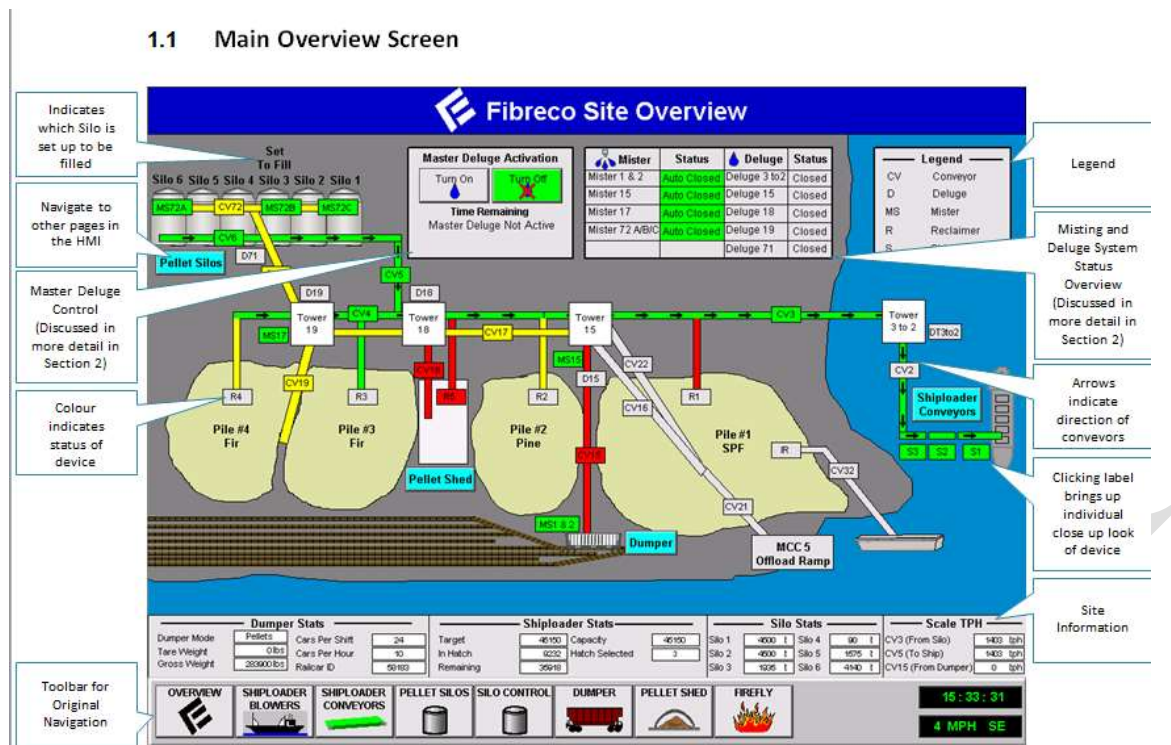
- Misters 1 and 2, located in the dumper area, runs one minute for every 10 minutes conveyor 15 is running. It closes when the timer is done or when conveyor 15 stops running.
- Mister 15, located halfway up conveyor 15, runs while Conveyor 15 is running. It closes when conveyor 15 stops running.
- Mister 17, is a washbox located in tower 19, it will run while conveyor 17 is running. It closes one minute after conveyor 17 stops running.
- Mister 72A, located at the top of silo 5 and 6, runs while Conveyor 72 is running. It closes when conveyor 72 stops running.
- Mister 72B, located at the top of silo 3 and 4, runs while Conveyor 72 is running. It closes when conveyor 72 stops running.
- Mister 72C, located at the top of silo 1 and 2, runs while Conveyor 72 is running. It closes when conveyor 72 stops running.

In manual mode, the misters will turn on and off, depending on the operators' command.

- Misters in the Rail Dumper run for 1-minute every 10-minutes the dumper is running
- Misters on conveyor 15 and 72 run while the respective conveyor is running, and turn off when the conveyor shuts down
- Mister 17 (the wash box) runs while conveyor 17 is running and shuts down one minute after the conveyor stops

The status of conveyors, loading belts, reclaimers, misters and deluge valves may be viewed by site managers on a centralized screen.

Refer to the "*Overview Screen and Misting/Deluge System Manual*" for details.



## TOWER DELUGE VALVES

If a fire is observed/detected/reported in a specific conveyor/tower, the tower deluge valve shall be activated to douse combustible materials involved and prevent transport of fire or hot product further along conveyor network system.

The deluge valves do not have an auto/manual mode. They act as follows:

- When a deluge valve is turned on, it will run for 15 minutes and then turn off
- If the reset button is pushed part way through the deluge, the timer will reset and the deluge will turn off after the timer expires
- If the close button is pressed before the timer is done timing, the deluge valve will close
- The Master Deluge controls the outputs to all the deluge valves
- If the Master Deluge is opened, a confirmation is asked, after verifying all the deluge valves are open and the timers are set to 15 minutes
- Any deluges that were partway through deluge are reset after the master deluge is activated
- If a single valve is reset or closed during a master deluge cycle, that valve will be reset/closed and the remaining valves will continue to countdown unaffected
- Closing the master deluge will close any open deluge valves, regardless of the time left on the timer

## **FIRE PUMP**

Located in the PUMP HOUSE enclosure at the north foot of the ship loading pier roadway (causeway). The electric drive fire pump provides 1500 USGPM at 100 psi pressure boost through a dry pipe valve within the pump house enclosure. The dry pipe valve serves wall hydrants and fire hose valves for manual firefighting operations along the pier roadway. The piping also serves a deluge valve at the south end of the pier which protects the underside of the loading pier.

The fire pump is engaged into operation upon:

- Manual tripping of the system by strategically located release stations
- A drop in system water pressure between the fire pump and dry pipe valve.
- A drop in dry pipe sprinkler system piping caused by the operation of the pier deluge system, opening of a wall hydrant valve or fire hose valve on the pier roadway or upon any loss of system air pressure that is not adequately compensated by the system air pressure.



## HOW TO USE A FIRE HOSE

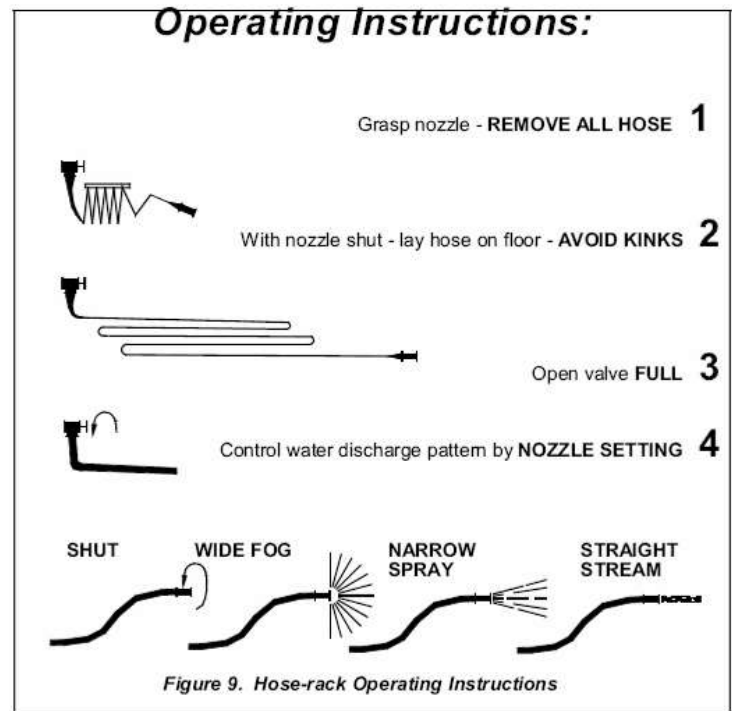
The fire hose stations are intended for staff use. Fire hoses are useful only if you know how to use them. You should not attempt to fight even a small fire until people have been evacuated from the area and the Fire Department has been called.

### Never attempt to fight a fire if any of the following is true:

- You are uncertain about how to use the hose.
- The fire is spreading beyond the immediate area where it started.
- The fire could block your escape route.

### How to Use a Fire Hose

- REMOVE the fire hose cover
- PULL all hose out of rack/cabinet and remove kinks
- ACTIVATE the AFFF system at a manual trip station
- OPEN hose valve FULLY and ensure water is flowing into hose
- OPEN nozzle and ADJUST to use
- APPROACH the fire area
- APPLY water to the seat/base of the fire



## FIRE DEPARTMENT CONNECTION TO SPRINKLER SYSTEMS

- A sign should be posted above each fire department connection advising the fire department the specific sprinkler system type and area served, the maximum pumping discharge pressure (150 psi).

## HAZARDOUS MATERIALS

### WASTE MOTOR OIL:

**Used Lubricating oil drained from motor vehicles is normally classified as a Class IIIA liquid.** When Class I or II liquids are added to the used oils, the resulting mixture shall be classified through tests conforming to BC Fire Code Subsection 4.1.3., or in the absence of the tests, as a Class IC liquid if Class I liquids are added, or as a Class II liquid if only Class II liquids are added.

### LEAK DETECTION TESTING AND MONITORING OF WASTE OIL TANK

BC Fire Code (2012) requires periodic inspection, testing and monitoring of the waste oil tank. The Table below is applicable. All testing should be conducted by individuals or companies trained in the proper care and use of the testing equipment. The choice of test methodology should be appropriate for the application. See below for “visual inspection” requirements.

#### **BC Fire Code requirement for Visual Inspection**

##### Visual Inspections

- 1) *A visual inspection routine for the prompt detection of obviously abnormal conditions shall be established and shall be performed at least once each shift.*
- 2) *A visual inspection shall be made at least once during each day of operation of all aboveground piping systems, pumps and other ancillary equipment, to detect leakage, and any leakage shall be repaired as quickly as practicable.*
- 3) *Where necessary, flammable vapour indicators shall be used to detect leakage.*
- 4) *Open flames and spark-producing devices shall not be used for leakage detection referred to in Sentence (2)*

##### Procedures

Standard procedures for normal operation and for emergencies shall be given in printed form to all employees engaged in the operation of equipment for the transfer of flammable liquids or combustible liquids and shall be posted for convenient reference.

**Table 4.4.1.2.B.**  
**Leak Detection Testing and Monitoring of Aboveground Storage Tanks**  
Forming Part of Sentence 4.4.1.2.(1)

| Type of Containment <sup>(1)</sup>            | Commissioning Test  | In-Service Monitoring   |   | Leak Suspected                   |
|---|---|---|---|----------------------------------|
|   |   | Continuous  | Periodic  |                                  |
| Contained open <sup>(2)</sup> vertical tank   | Visual inspection <sup>(3)</sup> during Liquid Media Test | Inventory Reconciliation and Secondary Containment Monitoring | API 653 or Tank floor inspection every 10 years | API 653 or Tank floor inspection |
| Contained open <sup>(2)</sup> horizontal tank | Visual inspection <sup>(3)</sup> during Liquid Media Test |   | None required                                   | Visual inspection <sup>(3)</sup> |
| Double-walled <sup>(4)</sup>                  | Visual inspection <sup>(3)</sup>                          | Secondary Containment Monitoring                              | None required                                   | Secondary Containment Monitoring |

**Notes to Table**

(1) See Subsection 4.3.7.

(2) Applies to tanks contained in an open arrangement that do not meet the requirements for double-walled tanks and do not conform to Subsection 4.3.7.

(3) Visual leak detection may apply to single- or double-walled storage tanks and piping. See Sentence 4.4.2.1.(8).

(4) Applies to double-walled tanks, which have an interstitial space that allows for monitoring using high- or low-tech methods.

**RESPONSIBILITIES**

It is the primary responsibility of the Fire Safety Director or designated area Supervisor(s) to ensure that all waste oil handling, dispensing, and storage is done in a safe and proper manner.

**ENVIRONMENTAL PROTECTION PROCEDURES**

The accidental release of waste oil during handling or dispensing may adversely affect the environment. The following protection procedures are intended to prevent a loss or escape of product and, in the event of a spill, to minimize the impact of the spill on the environment.

**DISPENSING WASTE OIL**

- Waste oil collection is to be performed by a trained person.
- All transferring of waste oil will be attended for the duration of the operation. The attendant must be aware of proper procedures to minimize the risk of a spill and shall continuously scan the area adjacent to the operation for possible leaks or spills.
- Ensure that a site-appropriate spill containment kit is readily available.
- The transfer of waste oil must be stopped prior to overflowing, leaving room for expansion.
- Welding and/or burning operations within 3 metres must be stopped while transfer is in progress.
- Maintain regular inspections of waste oil tank, area and components. Check for leakage, deterioration, or damage.

**Posting of Procedure**

This procedure shall be posted or available on site and a copy shall be incorporated in the company safety policies and procedures. All records of employee training must be kept.

## OUTDOOR STORAGE OF COMPRESSED GASES

Compressed gas cylinder storage is located on the south side of the building, at a distance greater than 15 metres from the building face.

BC Fire Code (2012) requires the tanks to be supported on raised concrete or other non-combustible platforms.

Cylinders that are stored directly on the ground should be provided with a similar raised area. The cylinders are to be located in an acceptable fenced enclosure. The site fencing complies with BC Fire Code requirements.

## TANK STORAGE (Marked fuel)

### RECORDS

The Fire Safety Director or designate shall maintain records for at least seven years of all:

- inventory control and reconciliation
- inspections and maintenance
- cathodic protection monitoring
- precision leak detection tests
- maintenance and repairs
- monitoring well results
- construction, alterations, or upgrades
- as-built drawings and
- excavation or nearby construction that could affect the integrity of the storage tank system.

## TANK AND PIPING SPILLS

The BC Fire Code (2012) requires measures to be taken to direct the overflow of spilled liquids and firefighting water away from:

- Buildings
- Adjoining properties
- Means of egress
- Air intakes or openings that could permit vapour entry to building
- Fire alarm control panels
- Fire department access routes
- Valves controlling water supply fire firefighting and fire protection systems
- Fire department connections
- Isolation valves controlling processes
- Valves controlling the flow of flammable or combustible liquids

## EMERGENCY VALVES

Signs indicating the location of valves used for the operation of fire protection equipment and manual emergency shut-off valves shall be posted in conspicuous locations.

## CONTAINMENT

\*The present dyke and secondary containment areas need to be evaluated to determine “*if*” they provide the required secondary containment of spilled liquids and firefighting water used within tank areas as required by BC Fire Code (2006) Division B Part 4 Section 4.3. Subsection 4.3.7. “*Secondary Containment for Aboveground Storage Tanks*”.

Secondary containment capacity requirement of the BC Fire Code (2006):

### 4.3.7.3. Capacity

- 1) *Except as permitted in Sentence (3), a secondary containment for a single storage tank shall have a volumetric capacity of not less than 110% of the capacity of the tank.*
- 2) *Except as permitted in Sentence (3), a secondary containment for more than one storage tank shall have a volumetric capacity of not less than the sum of:
  - a. *the capacity of the largest storage tank located in the contained space, and*
  - b. *10% of the greater of
    - i. *the capacity specified in Clause (a), or*
    - ii. *the aggregate capacity of all other storage tanks located in the contained space.***
- 3) *When the secondary containment is designed to prevent the entry of precipitation and water used for firefighting purposes into the contained space, it shall have a volumetric capacity of not less than the capacity of the largest storage tank located in the contained space.*

\*\*\* A secondary containment space shall NOT be used for storage purposes, which will reduce available capacity.

The BC Fire Code requires an on-going program of leak detection from flammable or combustible liquid storage tanks and piping systems to be implemented.

Every flammable or combustible liquid storage tank, piping system or sump is to be tested and monitored in conformance with the BC Fire Code (2006) Division B Part 4 Section 4.4. “*Leak Detection*”.

For the purpose of this Fire Safety Plan, it is assumed that the subject tanks complied with all initial commissioning tests at the time of installation. The frequency of the in-service monitoring tests is calculated from and to be routinely scheduled from the date of tank installation.

**NOTE:** The minimum requirements described shall not preclude the appropriate use of “alternate solutions” (acceptable to the Fire Department), innovative new technologies or methods capable of achieving the same BC Fire Code Objectives.

## FREQUENCY OF TANK MONITORING

### ABOVEGROUND STORAGE TANKS

**Table 4.4.1.2.B.**  
**Leak Detection Testing and Monitoring of Aboveground Storage Tanks**  
 Forming Part of [Sentence 4.4.1.2.\(1\)](#)

| Type of Containment                           | Commissioning Test  | In-Service Monitoring   |   | Leak Suspected                   |
|---|---|---|---|----------------------------------|
|   |   | Continuous  | Periodic  |                                  |
| Contained open <sup>(2)</sup> vertical tank   | Visual inspection <sup>(3)</sup> during Liquid Media Test | Inventory Reconciliation and Secondary Containment Monitoring | API 653 or Tank floor inspection every 10 years | API 653 or Tank floor inspection |
| Contained open <sup>(2)</sup> horizontal tank | Visual inspection <sup>(3)</sup> during Liquid Media Test |   | None required                                   | Visual inspection <sup>(3)</sup> |
| Double-walled                                 | Visual inspection <sup>(3)</sup>                          | Secondary Containment Monitoring                              | None required                                   | Secondary Containment Monitoring |

#### Notes to Table

- <sup>(2)</sup> Applies to tanks contained in an open arrangement that do not meet the requirements for double-walled tanks and do not conform to [Subsection 4.3.7.](#) (for secondary containment)
- <sup>(3)</sup> Visual leak detection may apply to single- or double-walled [storage tanks](#) and piping. See [Sentence 4.4.2.1.\(8\)](#).

### EXPOSED PIPING SYSTEMS

**Table 4.4.1.2.D.**  
**Leak Detection Testing and Monitoring of Exposed Piping Systems**  
 Forming Part of [Sentence 4.4.1.2.\(1\)](#)

| Type of Containment            | Commissioning Test       | In-Service Monitoring            |  | Leak Suspected           |
|--------------------------------|--------------------------|----------------------------------|--|--------------------------|
|                                |                          | Continuous                       | Periodic                                 |                          |
| Single-walled <sup>(1)</sup>   | Pipe Leak Detection Test | Visual inspection                | None required                            | Identify and repair      |
| Flexible hose lines over water |                          |                                  | Pipe Leak Detection Test every 12 months |                          |
| Double-walled <sup>(2)</sup>   |                          | Secondary Containment Monitoring | None required                            | Pipe Leak Detection Test |
| Contained open <sup>(3)</sup>  |                          | Visual inspection                | None required                            | Identify and repair      |

#### Notes to Table

- <sup>(1)</sup> Applies to single-walled piping systems of typical construction, including piping systems that do not meet the requirements for double-walled or contained open piping systems.
- <sup>(2)</sup> Applies to double-walled piping systems with an interstitial space contiguous to the primary containment that can be monitored using high- or low-tech methods.
- <sup>(3)</sup> Applies to piping systems contained in an open arrangement that do not meet the requirements for double-walled piping systems and do not conform to [Subsection 4.3.7.](#)

### TURBINE, TRANSITION, PUMP AND DISPENSER SUMPS

**Table 4.4.1.2.E.**  
**Leak Detection Testing and Monitoring of Turbine, Transition, Pump and Dispenser Sumps**  
 Forming Part of [Sentence 4.4.1.2.\(1\)](#)

| Commissioning Test                                     | Periodic In-Service Monitoring    | Leak Suspected      |
|--|-----------------------------------|---------------------|
| Static Liquid Media Leak Detection Test <sup>(1)</sup> | Visual inspection every 12 months | Identify and repair |

#### Notes to Table

- <sup>(1)</sup> See [Article 4.4.3.6.](#)

## REMEDIAL ACTION

When a leak detection test detects a leak in a storage tank, piping system or sump, the leaking components or system shall be:

- repaired and tested,
- replaced, or removed, and
- the escaped liquid shall be removed in a safe manner to an approved location.

## LEAK DETECTION TESTING AND MONITORING METHODS

### INVENTORY RECONCILIATION

- 1) Where inventory reconciliation is required, the liquid level in any storage tank shall be measured at intervals not greater than 7 days
- 2) The level of water at the bottom of an underground storage tank shall be measured at intervals not greater than 7 days
- 3) A comparison of the measurements described in Sentences (1) and (2) with meter readings and a computation of any gain or loss of liquid shall be done each time a required measurement is taken.
- 4) A record of the measurements for each storage tank and of the computations described in Sentence (3) shall be retained for examination by the Fire Department for a period of at least 2 years.

### VISUAL INSPECTION

Visual inspection shall:

- 1) in the case of an exposed piping system
  - A visual inspection routine for the prompt detection of obviously abnormal conditions shall be established and shall be performed at least once each shift.
  - A visual inspection shall be made at least once during each day of operation of all aboveground piping systems, pumps and other ancillary equipment, to detect leakage, and any leakage shall be repaired as quickly as practicable.
  - Visual inspection of a storage tank to ensure that there has not been a leak or equipment failure and documented for:
    - foundations, tank walls, roof, and tank attachments;
    - dyke capacity, condition of the dyke wall and floor, and water removal systems;
    - pumps and product- handling equipment;
    - tank gauging equipment;
    - mechanical and automatic electronic leak detection equipment;
    - dispenser sumps and spill containment devices; and
    - overfill protection devices.
  - Where necessary, flammable vapour indicators shall be used to detect leakage.
  - Open flames and spark-producing devices shall not be used for leakage detection
- 2) In the case of an aboveground storage tank a visual examination of the tank shell, or if the bottom of the tank is not amenable to a visual examination, testing the bottom of the tank.

## LEAK DETECTION TESTS

- 1) Static liquid media leak detection test
- 2) Pneumatic leak detection test of storage tanks and piping (DO NOT use compressed air)
- 3) Precision leak detection test showing a leak rate exceeding 0.38 liters/hour is considered to be leaking.

## PROTOCOLS FOR PNEUMATIC LEAK DETECTION TESTING OF STORAGE TANKS

- The tank is considered to be leaking if the test indicates a pressure drop within 2 hours of establishing steady temperature conditions and removing the source of pressure.
- Pressure applied to underground storage tanks during a pneumatic leak detection test shall be measured by an instrument calibrated in increments of not more than 1 kPa.
- Where a pneumatic leak detection test is conducted before an underground storage tank is backfilled, in the case of a new tank, or after the tank is uncovered, in the case of a previously installed tank, the test pressure shall be in conformance with the production testing requirements of
  - ULC-S603, "Steel Underground Tanks for Flammable and Combustible Liquids," or
  - ULC-S615, "Reinforced Plastic Underground Tanks for Flammable and Combustible Liquids."
- Where a pneumatic leak detection test is performed on a completely buried storage tank, the test pressure shall not be less than 35 kPa (gauge) and shall not exceed the tank manufacturer's specifications.
- Measures shall be taken to guard against the hazards associated with pneumatic leak detection testing in areas where explosive mixtures of flammable liquid or combustible liquid vapours and air may be present in the vicinity of a storage tank that has been in use.

## PROTOCOLS FOR PNEUMATIC LEAK DETECTION TESTING OF PIPING SYSTEMS

A pressure decline test using an inert gas is permitted to be used as a leak detection test for piping systems that are new or in use, and convey a volume of less than 1 000 Liters.

A pressure decline test performed on a piping system shall:

- If the design and installation of the piping system permits, the piping system's contents shall be drained prior to conducting the pressure decline test procedure.
- Pumps, dispensers and other auxiliary equipment that are connected to the piping system and cannot withstand the pressure of the test shall be isolated from the test procedure to prevent damage to the equipment.
- A stabilization period of up to 30 min is required after pressurization.
- Pipe volumes of 500 L or less shall be pressurized for at least 60 min after



stabilization.

- Pipe volumes greater than 500 L but less than 1 000 L shall be pressurized for at least 2 h after stabilization.
- Test pressures shall:
  - be the greater of 350 kPa (gauge) or 1.5 times the maximum operating pressure, and
  - not exceed the piping manufacturer's test specifications.
- The piping system shall be considered to be leaking if any pressure decline is detected within the time periods stated.

## **PROTOCOLS FOR LIQUID MEDIA LEAK DETECTION TESTING OF PIPING SYSTEMS**

Tests shall be conducted by an individual who has been trained in the proper use of the test device and the operating procedures.

- A sufficient amount of time shall be allocated to stabilize the temperature of the liquid throughout the volume of the piping during the test.
- Test pressure shall
  - be the greater of 350 kPa (gauge) or 1.5 times the maximum operating pressure, and
  - not exceed the piping manufacturer's test specifications.
- Test pressures exceeding 700 kPa (gauge) shall not be permitted unless the piping system is designed for such pressures.
- Where test pressures exceed the design pressures for pumps or similar components connected to the piping system being tested, such pumps or components shall be isolated from the test procedure.
- Class I flammable liquids shall not be used for pressure testing piping systems, except that pressure piping normally containing Class flammable I liquids is permitted to be tested with such liquids at pressures not exceeding their maximum operating pressures.
- The pipe shall be considered to be leaking if the leak rate exceeds 0.38 Liters/hour.

## **PROTOCOLS FOR LEAK DETECTION TESTING OF SUMPS**

Static liquid media leak detection testing of turbine, transition, dispenser and pump sumps:

- The liquid used for the test shall
  - exceed the elevation of the piping and other points of entry into the sump, and
  - not be a flammable liquid or a combustible liquid.
- The minimum duration of the test shall be 1 hour.
- The sumps considered to be leaking if the loss of liquid in the sump is measurable.

## **FIRE EXTINGUISHERS**

- 2.5 gallon pressurized Water type
- 5, 10, 20 lb. ABC Dry Chemical Fire.

## **ELECTRICAL**

- Power supply enters the property at the north side of the site where it feeds into the above ground substation.
- High voltage is reduced by transformers and distributed below ground to buildings and equipment installed on the property.

## **EMERGENCY LIGHTING**

- Some buildings have been provided by battery pack units with a minimum required duration of 30-minutes.

## **EVACUATION MUSTERING ASSEMBLY AREA**

- Primary – Near main office building parking area at north end of property, away from vehicle traffic and hazardous conditions.
- Secondary – centre west side of property.

**NOTE:** Be prepared to relocate should conditions warrant (e.g. smoke, toxic fumes/gases, heat, weather, etc.)

### PHOTOS

|   |   |
|---|---|
|    |     |
| <p>Fuel Tank</p>  | <p>Waste Oil Tank</p>   |
|    |     |
| <p>Confined Space Entry Point</p>   | <p>Sprinkler Valve Enclosure</p>  |
|  |   |
| <p>Sprinkler Protection Along Conveyor Line</p>                                     | <p>Deluge Valve Manual Activation</p>   |
|  |  |
| <p>Deluge &amp; Dry Pipe Valve</p>  | <p>Dust Collection System</p>   |

|   |  |
|---|--|
|    |    |
| <p>Causeway to Ship Loader</p>  | <p>Fire Hydrant on Causeway</p>  |
|    |    |
| <p>Sprinkler System Design Data Placard</p>   | <p>Pellet Storage Shed</p>   |
|   |   |
| <p>Private Fire Hydrant &amp; Fire Hose Box</p>                                     | <p>Fire Alarm Control Panel in Guard House</p>                                       |
|  |  |
| <p>Mircom FX-2000 Fire Alarm Control Panel</p>                                      | <p>Fire Pump</p>   |

## **PART 6 – PROTECTIVE EQUIPMENT**

### **INSPECTION MAINTENANCE & TESTING OF FIRE PROTECTION EQUIPMENT**

The building owner or designate is responsible for all other building protective systems and components and is outside of the scope of this Plan.

#### **GENERAL**

The B.C. Fire Code (2012) Regulations Part 6 requires fire protection installations be maintained in operating condition. In most cases the Fire Code does not specify in detail the necessary inspection, maintenance, and testing procedures; instead, it references standards such as those developed by the National Fire Protection Association, Canadian Standards Association, and Underwriters Laboratories of Canada. Where such standards are referenced by the code, they have been identified in this plan as a “Reference Standard”.

#### **RESPONSIBILITY**

Details for the requirements of the inspection and testing of fire and life safety systems are the responsibility of the Fire Safety Director, the Building owner and the owner’s designate. The specifics of what is to be inspected or tested and the frequency of such inspections and testing, are generally outlined in this Fire Safety Plan.

As such, Part 6 of this Fire Safety Plan outlines the general day to day, operational inspection and testing responsibilities of the Fire Safety Director. The FSD is responsible for ensuring these daily activities are conducted and recorded where required. Required records shall be kept within this manual.

This part also outlines, for the benefit of the Fire Safety Director, a general overview or schedule of activities associated with the ongoing maintenance of the protective systems within the scope of responsibility, as noted above.

#### **RECORDS**

Records of inspection, testing or maintenance of fire protection equipment, completed by the Fire Safety Director, qualified staff or qualified private contractors, shall be retained for at least 2 years from the date of the activity or for as long as the required frequency between such tests or inspections, whichever is longer. These reports will be normally kept by the Fire Safety Director for read access and examination by the Fire Department. There shall always be at least one inspection or test record available as a benchmark for comparison to the current inspection or test.

The activities on the Daily Inspection Report are exempted from this requirement.

Reports in Part 8 are provided so that you can keep track of inspection & maintenance activities - Please ensure that you date the form so you know when you started using it.

## **QUALIFIED CONTRACTORS**

Contractors may perform their own “unique” inspection and testing procedures; however, their procedures must meet and accomplish the objectives and minimum requirements set by the BC Fire Code (2012) or applicable referenced standard. Information pertaining to such procedures is available in Part 6 so that the Fire Safety Director has some idea of what the contractor should be doing. Inspection and testing shall be done by technicians certified by ASTTBC (Applied Science Technicians and Technologists of BC).

NOTE – Installation or repair work may need to be done by a technician having a provincial trade qualification, which is beyond the scope of the ASTTBC program. Examples include sprinkler, fire alarm or electrical work, manufacturer’s factory certification for special suppression systems. (This may not be a complete list of ASTTBC disciplines)

## **ASTTBC CERTIFIED TECHNICIANS**

ASTTBC Certified Technicians are to conduct inspection and testing of:

- Portable fire extinguishers
- Fire alarm systems
- Special fire suppression systems
- Commercial cooking ventilation system cleaning
- Emergency power and lighting systems
- Water based fire suppression systems
- Smoke control systems

## **FRAUDULENT USE OF TECHNICIAN CERTIFICATION**

Certified technicians will possess ASTTBC issued photo identification which also displays those systems for which the technician is certified. To prevent fraudulent use of technicians’ stamp and certifications, always request the technician to display his/her credentials. Inspection, testing and maintenance performed by non-certified technicians will be rejected by the Fire Department.

## **FIRE CODE REQUIREMENTS FOR INSPECTION AND TESTING OF EQUIPMENT**

Contractors may perform their own “unique” inspection and testing procedures; however, their procedures must meet and accomplish the objectives and minimum requirements set by the Fire Code or applicable referenced standard. Information pertaining to such procedures is available in Part 6 so that the Fire Safety Director has some idea of what the contractor should be doing.

The Fire Code identifies the 'minimum requirements' for inspection and testing of life and property safety systems in the absence of manufacturer's instructions. The manufacturer's requirements for the inspection, testing and maintenance of an equipment or system should always be followed to ensure ongoing performance as intended. Most manufacturers' requirements for product inspection, testing and maintenance are available online, through various websites. Search for your product manufacturer by name and/or model number, or contact the local supplier or installing contractor for an instruction manual.

## **Reminder: From the BC Fire Code (2012) Division C Part 2**

### **2.2.1.1. Responsibility**

- 1) *Unless otherwise specified, the owner or the owner's authorized agent shall be responsible for carrying out the provisions of this Code.*

### **2.2.1.2. Records**

- 1) *Where this Code requires that tests, inspections, maintenance or operational procedures be performed on a fire safety system, records shall be made and the original or a copy shall be retained at the premises for examination by the authority having jurisdiction.*
- 2) *The initial verification or test reports for each system shall be retained throughout the life of the systems.*
- 3) *Records of tests, inspections, maintenance or operational procedures undertaken after the initial tests referred to in Sentence (2) shall be retained so that at least the current and the immediately preceding records are available.*
- 4) *Notwithstanding the conditions stated in Sentence (3), no record shall be destroyed within two years of being prepared.*

**A-2.2.1.3. (2) Responsibilities.** *The fire commissioner and the fire commissioner's delegates are empowered for the enforcement of the British Columbia Fire Code under the Fire Services Act. It is not the responsibility of the fire commissioner or the fire commissioner's delegates to ensure a building meets the minimum standards as set out in the Code. The owner or owner's agent, as stated in Sentence 2.2.1.1.(1), is responsible for carrying out the provisions of the Code, regardless of the actions of the fire commissioner or the fire commissioner's designates.*

## MEANS OF EGRESS & BUILDING

Reference: BC Fire Code (2012)

### DAILY INSPECTION PROCEDURE:

- Doors in fire separations (where provided) shall be inspected to ensure that they remain closed unless the door is equipped with an acceptable hold open device that will permit the door to close automatically in the event of fire.
- Operate doors monthly to ensure that they latch closed when released.
- Access to exits shall be maintained free of obstructions.
- Exterior pathways providing access to the muster areas shall be maintained free of obstruction, including snow and ice accumulations.
- Other items as listed on the Daily Inspection Report.

RECORD KEEPING: See Daily Inspection Report

RESPONSIBILITY: Fire Safety Director or Designated staff

### MEANS OF EGRESS and FIRE SEPARATIONS (where provided)

| Frequency | Conducted By         | Tasks  |
|-----------|----------------------|--|
| Monthly   | Fire Safety Director | Closing Mechanisms for Fire Doors (where provided) <ul style="list-style-type: none"> <li>• Hardware to be examined and any parts found to be inoperative shall be replaced immediately</li> <li>• Lubricate guides and bearings as needed.</li> </ul> |
| Annual    | Fire Safety Director | Doors in Fire Separations <ul style="list-style-type: none"> <li>• Ensure that doors in place and not obviously damaged or obstructed.</li> </ul>  |

| Frequency | Conducted By                      | Tasks   |
|-----------|-----------------------------------|---|
| Daily     | Fire Safety Director or Designate | Exterior pathways to muster areas <ul style="list-style-type: none"> <li>• Ensure free of obstructions, snow and ice.</li> </ul>        |
| Daily     | Fire Safety Director or Designate | General Requirement <ul style="list-style-type: none"> <li>• Combustible material shall be kept well away from door openings</li> </ul> |
| Weekly    | Fire Safety Director or Designate | Exit Signs (where provided) <ul style="list-style-type: none"> <li>• Ensure illumination and visibility</li> </ul>                      |



## PORTABLE FIRE EXTINGUISHERS

**Reference: BC Fire Code 2012 and NFPA-10 2002 Edition**

Many fires are small at origin and can be extinguished by the use of proper portable fire extinguishers. It is strongly recommended that the fire department be notified as soon as a fire is discovered. This alarm should not be delayed by awaiting results of the application of portable fire extinguishers.

Fire extinguishers represent an important segment of any overall fire protection program. Their successful functioning depends upon the following conditions having been met:

1. The fire extinguisher is properly located and in working order.
2. The fire extinguisher is of the proper type for a fire that can occur.
3. The fire is discovered while still small enough for the fire extinguisher to be effective.
4. The fire is discovered by a person ready, willing, and able to use the fire extinguisher.

The owner of a property in which fire extinguishers are located has an obligation for the care and use of these extinguishers at all times. To discharge this obligation, the owner or occupant should give proper attention to the inspection, maintenance, and recharging of this fire-protective equipment and should also train personnel in the correct use of fire extinguishers on the different types of fires that could occur on the property.

Portable fire extinguishers are appliances to be used principally by the occupants of a fire-endangered building or area who are familiar with the location and operation of the extinguisher through education or training. Portable fire extinguishers are primarily of value for immediate use on small fires. They have a limited quantity of extinguishing material and, therefore, need to be used properly so that this material is not wasted.

Fire extinguishers are mechanical devices. They need care and maintenance at periodic intervals to ensure that they are ready to operate properly and safely. Parts or internal chemicals can deteriorate in time and need replacement. They are pressure vessels, in most cases, and so need to be treated with respect and handled with care.

### General

The procedure for inspection and maintenance of fire extinguishers varies considerably. Minimal knowledge is necessary to perform a monthly "quick check" or inspection in order to follow the inspection procedure as outlined below.

The owner or designated agent or occupant of a property in which fire extinguishers are located shall be responsible for coordinating inspections, maintenance, and recharging.

Maintenance, servicing, and recharging shall be performed by trained persons having available the appropriate servicing manual(s), the proper types of tools, recharge materials, lubricants, and manufacturer's recommended replacement parts or parts specifically listed for use in the fire extinguisher.

- Tags or labels shall not be placed on the front of the fire extinguisher.

- Labels indicating fire extinguisher use or classification or both shall be permitted to be placed on the front of the fire extinguisher.

### Inspection – Frequency

***NOTE: This section briefly describes the minimum required inspection (quick check) program to be conducted by a person having basic fire extinguisher knowledge.***

- Fire extinguishers shall be inspected when initially placed in service and thereafter at approximately 30-day intervals.
- Fire extinguishers shall be inspected, manually or by electronic monitoring, at more frequent intervals when circumstances require.

### Inspection Procedures

Periodic inspection of fire extinguishers shall include a check of at least the following items:

- 1) Location in designated place
- 2) No obstruction to access or visibility
- 3) Operating instructions on nameplate legible and facing outward
- 4) Safety seals and tamper indicators not broken or missing
- 5) Fullness determined by weighing or “hefting”
- 6) Examination for obvious physical damage, corrosion, leakage, or clogged nozzle
- 7) Pressure gauge reading or indicator in the operable range or position
- 8) Condition of tires, wheels, carriage, hose, and nozzle checked (for wheeled units)
- 9) WHMIS label in place

### Corrective Action

- When an inspection of any fire extinguisher reveals a deficiency in any of the preceding conditions, immediate corrective action shall be taken.

### Inspection Recordkeeping

- Personnel making inspections shall keep records of all fire extinguishers inspected, including those found to require corrective action.
- At least monthly, the date the inspection was performed and the initials of the person performing the inspection shall be recorded.
- Records shall be kept on a tag or label attached to the fire extinguisher, on an inspection checklist maintained on file or by an electronic method that provides a permanent record.

### Maintenance – Frequency

***NOTE: This section briefly describes the minimum required maintenance program to be conducted by qualified/certified technicians.***

- Fire extinguishers shall be subjected to maintenance at intervals of not more than 1 year, at the time of hydrostatic test, or when specifically indicated by an inspection or electronic notification.
- Stored-pressure types containing a loaded stream agent shall be disassembled on an annual basis and subjected to complete maintenance. Prior to disassembly, the

fire extinguisher shall be fully discharged to check the operation of the discharge valve and pressure gauge. The loaded stream charge shall be permitted to be recovered and re-used, provided it is subjected to agent analysis in accordance with manufacturer's instructions.

- Fire extinguishers removed from service for maintenance or recharge shall be replaced by a fire extinguisher suitable for the type of hazard being protected and shall be of at least equal rating.
- Maintenance procedures shall include a thorough examination of the basic elements of a fire extinguisher as determined below:
  - Mechanical parts of all fire extinguishers
  - Extinguishing agent of cartridge or cylinder-operated dry chemical, stored-pressure, loaded stream, and pump tank fire extinguishers
  - Expelling means of all fire extinguishers

### **Seals or Tamper Indicators**

- At the time of the maintenance, the tamper seal of rechargeable fire extinguishers shall be removed by operating the pull pin or locking device. After the applicable maintenance procedures are completed, a new tamper seal shall be installed.

### **Six-Year Maintenance**

- Every 6 years, stored-pressure fire extinguishers that require a 12-year hydrostatic test shall be emptied and subjected to the applicable maintenance procedures. When the applicable maintenance procedures are performed during periodic recharging or hydrostatic testing, the 6-year requirement shall begin from that date.

### **Maintenance Recordkeeping**

- Each fire extinguisher shall have a tag or label securely attached that indicates the month and year the maintenance was performed and that identifies the person performing the service.

### **Verification of Service (Maintenance or Recharging)**

Each extinguisher that has undergone maintenance that includes internal examination or that has been recharged shall have a "Verification of Service" collar located around the neck of the container. The collar shall contain a single circular piece of uninterrupted material forming a hole of a size that will not permit the collar assembly to move over the neck of the container unless the valve is completely removed. The collar shall not interfere with the operation of the fire extinguisher. The "Verification of Service" collar shall include the month and year the service was performed, indicated by a perforation such as is done by a hand punch.

### **Recharging**

- All rechargeable-type fire extinguishers shall be recharged after any use or as indicated by an inspection or when performing maintenance.
- When performing the recharging, the recommendations of the manufacturer shall be followed.

The purpose of a well-planned and well-executed maintenance program for a fire extinguisher is to maximize the following probabilities:

- The extinguisher will operate properly between the time intervals established for maintenance examinations in the environment to which it is exposed.
- The extinguisher will not constitute a potential hazard to persons in its vicinity or to operators or rechargers of fire extinguishers.

RECORD KEEPING: Annual Inspection & Testing Report  
 RESPONSIBILITY: Qualified Contractor

## PORTABLE FIRE EXTINGUISHERS

| Frequency | Conducted By         | Tasks  |
|-----------|----------------------|--|
| Annual    | Qualified Contractor | Perform maintenance in accordance with Fire Code Regulations and NFPA-10 |

| Frequency | Conducted By                      | Tasks  |
|-----------|-----------------------------------|--|
| Monthly   | Fire Safety Director or Designate | Portable Fire Extinguisher <ul style="list-style-type: none"> <li>• Located in designated place</li> <li>• No obstruction to access or visibility</li> <li>• Operating instructions on nameplate legible &amp; facing outward</li> <li>• Seals and tamper indicators not broken or missing</li> <li>• Examine for obvious physical damage, corrosion, leakage, or clogged nozzle</li> <li>• Pressure gauge reading or indicator in the operable range or position</li> </ul> |

## EMERGENCY LIGHTING

REFERENCE STANDARD: BC Fire Code 2012 and CAN/CSA-C282, "Emergency Electrical Power Supply for Buildings."

The provincial building regulations require the installation of emergency power in case of normal power failure to provide minimal lighting for safe egress. The ongoing inspection, testing and maintenance are required by the BC Fire Code Regulations. CSA requires that the personnel that are performing the periodic maintenance be properly trained or certified and that an inspection checklist and logbook be maintained.

## EMERGENCY LIGHTING

Reference – BC Fire Code 2012

(Where provided)

### Inspection of Unit Equipment

1. Self-contained emergency lighting unit equipment shall be inspected at intervals not greater than one month to ensure that
  - a. pilot lights are functioning and not obviously damaged or obstructed,
  - b. the terminal connections are clean, free of corrosion and lubricated when necessary,
  - c. the terminal clamps are clean and tight as per manufacturer's specifications, and
  - d. the battery surface is kept clean and dry.
2. Self-contained emergency lighting unit equipment shall be tested
  - a. at intervals not greater than one month to ensure that the emergency lights will function upon failure of the primary power supply
3. After completion of the test required in Clause (2)(b), the charging conditions for voltage and current and the recovery period shall be tested to ensure that the charging system is functioning in accordance with the manufacturer's specifications.

## YEARLY TESTS

### Inspection of Emergency Lights

- Emergency lights shall be inspected at intervals not greater than 12 months to ensure that they are functional.

RECORD KEEPING: Annual Inspection & Testing Report  
RESPONSIBILITY: Qualified Contractor

**SELF CONTAINED EMERGENCY LIGHTS**

| <b>Frequency</b> | <b>Conducted By</b>               | <b>Tasks</b>   |
|------------------|-----------------------------------|--|
| Monthly          | Fire Safety Director or designate | <ul style="list-style-type: none"> <li>• Check that pilot lights are functioning and not obviously damaged or obstructed</li> <li>• Ensure the terminal connections are clean, free of corrosion and lubricated when necessary</li> <li>• Ensure the terminal clamps are clean and tight as per manufacturer's specifications</li> <li>• Ensure the battery surface is kept clean and dry</li> <li>• Check the battery electrolyte level and replenish if necessary (unless the batteries are of the hermetically sealed type).</li> </ul> |

| <b>Frequency</b> | <b>Conducted By</b>  | <b>Tasks</b>   |
|------------------|----------------------|--|
| Annual and Other | Qualified Contractor | Conducted in accordance with requirements in the Fire Code |

| <b>Frequency</b> | <b>Conducted By</b>               | <b>Tasks</b>  |
|------------------|-----------------------------------|---|
| Monthly          | Fire Safety Director or Designate | Test manually by pressing the TEST button on the side of the unit to ensure that it is operative. |

## **FIRE DETECTION & ALARM SYSTEM**

Reference Standard: BC Fire Code (2012) and CAN/ULC S536 "Standard for the Testing, Maintenance of Existing Fire Alarm Systems."

### DAILY INSPECTION PROCEDURE:

- Check Fire Alarm AC power lamp
- Check Fire Alarm trouble lamps

RECORD KEEPING: None

RESPONSIBILITY: FSD or Designate

### MONTHLY TESTING PROCEDURE:

- Notify all persons which may be affected by the alarm eg: alarm supervisory service, fire department
- Notify staff that you are testing the system. Notify them all when you have completed testing.
- One manual alarm initiating device shall be operated on a rotational basis and the system inspected for operation as follows:
  - Intended function of all alarm audible signal appliances shall be ensured
  - The annunciator panel shall be checked to ensure that the tested devices annunciate correctly
  - Intended function of the audible and visual trouble signals shall be insured
- Fire alarm batteries shall be checked to ensure that:
  - Terminals are clean and lubricated where necessary
  - Terminal clamps are clean and tight where necessary
  - Electrolyte level and specific gravity, where applicable, are specified by the manufacturer

RECORD KEEPING: Weekly and Monthly Service Report

RESPONSIBILITY: FSD or designate

### ANNUAL SERVICE PROCEDURE:

Contractor shall perform service in accordance with CAN/ULC S536

RECORD KEEPING: Bi-Monthly to Annual Service Report

RESPONSIBILITY: QUALIFIED CONTRACTOR

## **FIRE DEPARTMENT ACCESS ROUTE**

### DAILY INSPECTION PROCEDURE:

- Ensure that streets, yards and private roadways for fire department access are kept clear at all times.

RECORD KEEPING:               None required

RESPONSIBILITY:               FSD/Security/Designate

## **HEATING, VENTILATING & AIR CONDITIONING**

### ANNUAL TESTING AND SERVICING PROCEDURE:

- Inspect and service as necessary to ensure that these systems do not create a fire hazard.
- Except for self-contained systems within dwelling units, disconnect switches for mechanical air-conditioning and ventilating systems shall be operated to establish that the system can be shut down in an emergency.

RECORD KEEPING:   Service Report

RESPONSIBILITY:   QUALIFIED CONTRACTOR



## WATER-BASED FIRE PROTECTION EQUIPMENT

REFERENCE – BC Fire Code 2012 and NFPA-25

### IMPAIRMENTS

This section provides the minimum requirements for a water-based fire protection system (sprinkler, standpipe, fire pump and fire hydrants) impairment program. Measures shall be taken during the impairment to ensure that increased risks are minimized and the duration of the impairment is limited.

#### Impairment Coordinator

The Fire Safety Director shall assign an impairment coordinator to comply with the following requirements. In the absence of a specific designee, the Fire Safety Director shall be considered the impairment coordinator.

#### Tag Impairment System

A tag shall be used to indicate that a system, or part thereof, has been removed from service.

- The tag shall be posted at each fire department connection and system control valve indicating which system, or part thereof, has been removed from service.
- The Fire Department shall specify where the tag is to be placed.

#### Impaired Equipment

The impaired equipment shall be considered to be the water-based fire protection system, or part thereof, that is removed from service. The impaired equipment shall include, but shall not be limited to, the following:

- Sprinkler systems
- Standpipe system
- Fire Pump
- Underground fire service mains
- Fire service control valves

### PREPLANNED IMPAIRMENT PROGRAMS

All preplanned impairments shall be authorized by the impairment coordinator. Before authorization is given, the impairment coordinator shall be responsible for verifying that the following procedures have been implemented:

- (1) The extent and expected duration of the impairment have been determined.
- (2) The areas or buildings involved have been inspected and the increased risks determined.
- (3) Recommendations have been submitted to management or building owner/manager. Where a required fire protection system is out of service for more than 4 hours in a 24-hour period, the impairment coordinator shall arrange for one of the following:
  - (a) Evacuation of the building or portion of the building affected by the system out

- of service
- (b) An approved fire watch in accordance with the Fire Watch Program within this Fire Safety Plan.
  - (c) Establishment of a temporary water supply
  - (d) Establishment and implementation of an approved program to eliminate potential ignition sources and limit the amount of fuel available to the fire. The program shall be as detailed in this Fire Safety Plan.
- (4) The fire department has been notified.
  - (5) The insurance carrier, the alarm company, building manager, and other authorities having jurisdiction have been notified.
  - (6) The supervisors in the areas to be affected have been notified.
  - (7) A tag impairment system has been implemented.
  - (8) All necessary tools and materials have been assembled on the impairment site.

### **EMERGENCY IMPAIRMENTS**

Emergency impairments include but are not limited to system leakage, interruption of water supply, frozen or ruptured piping, and equipment failure.

When emergency impairments occur, emergency action shall be taken to minimize potential injury and damage. The coordinator shall implement the steps outlined in the Preplanned Impairment Program.

### **Restoring Systems to Service**

When all impaired equipment is restored to normal working order, the impairment coordinator shall verify that the following procedures have been implemented:

- (1) Any necessary inspections and tests have been conducted to verify that affected systems are operational. The appropriate chapter of this standard shall be consulted for guidance on the type of inspection and test required.
- (2) Supervisors have been advised that protection is restored.
- (3) The fire department has been advised that protection is restored.
- (4) The building owner/manager, insurance carrier, Alarm Company, and other authorities having jurisdiction have been advised that protection is restored.
- (5) The impairment tag has been removed.

### **OBSTRUCTION INVESTIGATION**

This Section provides the minimum requirements for conducting investigations of fire protection system piping for possible sources of materials that can cause pipe blockage.

#### **Obstruction Investigation and Prevention**

- An investigation of sprinkler piping and branch line conditions shall be conducted every 5 years by opening a flushing connection at the end of one main and by removing a sprinkler toward the end of one branch line for the purpose of investigating for the presence of foreign organic and inorganic material.
- Tubercles or slime, if found, shall be tested for indications of microbiologically influenced corrosion (MIC).

An obstruction investigation shall be conducted for system or yard main piping wherever any of the following conditions exist:

- The discharge of obstructive material during routine water tests
- Foreign materials in dry pipe valves or in check valves
- Foreign material in water during drain tests or plugging of inspector's test connection(s)
- Plugged sprinklers
- Plugged piping in sprinkler systems dismantled during building alterations
- Failure to flush yard piping or surrounding public mains following new installations or repairs
- A record of broken public mains in the vicinity
- Abnormally frequent false tripping of a dry pipe valve(s)
- There is reason to believe that the sprinkler system contains sodium silicate or highly corrosive fluxes in copper systems
- A system has been supplied with raw water via the fire department connection
- Pinhole leaks
- A 50-percent increase in the time it takes water to travel to the inspector's test connection from the time the valve trips during a full flow trip test of a dry pipe sprinkler system when compared to the original system acceptance test

NOTE: Systems shall be examined for internal obstructions where conditions exist that could cause obstructed piping.

If the condition has not been corrected or the condition is one that could result in obstruction of the piping despite any previous flushing procedures that have been performed, the system shall be examined for internal obstructions every 5 years.

Internal inspections shall be accomplished by examining the interior of the following four points:

- System valve
- Riser
- Cross main
- Branch line

If an obstruction investigation indicates the presence of sufficient material to obstruct sprinklers, a complete flushing program shall be conducted by ASTTBC or Trade Qualified personnel.

## **VALVES, VALVE COMPONENTS AND TRIM**

This section provides the minimum requirements for the routine inspection, testing, and maintenance of valves, valve components, and trim. The Table shall be used to determine the minimum required frequencies for inspection, testing, and maintenance.

Table Summary of Valves, Valve Components, and Trim Inspection, Testing, and Maintenance

| Item  | Activity    | Frequency          | NFPA-25 Reference          |
|---|-------------|--------------------|----------------------------|
| <b>Control Valves</b>                             |             |                    |                            |
| Sealed  | Inspection  | Weekly             | 12.3.2.1                   |
| Locked  | Inspection  | Monthly            | 12.3.2.1.1                 |
| Tamper switches                                   | Inspection  | Monthly            | 12.3.2.1.1                 |
| <b>Alarm Valves</b>                               |             |                    |                            |
| Exterior  | Inspection  | Monthly            | 12.4.1.1                   |
| Interior  | Inspection  | 5 years            | 12.4.1.2                   |
| Strainers, filters, orifices                      | Inspection  | 5 years            | 12.4.1.2                   |
| <b>Check Valves</b>                               |             |                    |                            |
| Interior  | Inspection  | 5 years            | 12.4.2.1                   |
| <b>Deluge Valves</b>                              |             |                    |                            |
| Enclosure (during cold weather)                   | Inspection  | Daily/weekly       | 12.4.3.1                   |
| Exterior  | Inspection  | Monthly            | 12.4.3.1.6                 |
| Interior  | Inspection  | Annually/5 years   | 12.4.3.1.7                 |
| Strainers, filters, orifices                      | Inspection  | 5 years            | 12.4.3.1.8                 |
| <b>Dry Pipe Valves/<br/>Quick-Opening Devices</b> |             |                    |                            |
| Enclosure (during cold weather)                   | Inspection  | Daily/weekly       | 12.4.4.1.1                 |
| Exterior  | Inspection  | Monthly            | 12.4.4.1.4                 |
| Interior  | Inspection  | Annually           | 12.4.4.1.5                 |
| Strainers, filters, orifices                      | Inspection  | 5 years            | 12.4.4.1.6                 |
| <b>Pressure Reducing and Relief<br/>Valves</b>    |             |                    |                            |
| Sprinkler systems                                 | Inspection  | Quarterly          | 12.5.1.1                   |
| Fire pumps  |             |                    |                            |
| Casing relief valves                              | Inspection  | Weekly             | 12.5.6.1, 12.5.6.1.1       |
| Pressure relief valves                            | Inspection  | Weekly             | 12.5.6.2, 12.5.6.2.1       |
| <b>Backflow Prevention<br/>Assemblies</b>         |             |                    |                            |
| Reduced pressure                                  | Inspection  | Weekly/monthly     | 12.6.1                     |
| Reduced pressure detectors                        | Inspection  | Weekly/monthly     | 12.6.1                     |
| <b>Fire Department Connections</b>                |             |                    |                            |
| Main Drains                                       | Test        | Annually/quarterly | 12.2.6, 12.2.6.1, 12.3.3.4 |
| Water-Flow Alarms                                 | Test        | Quarterly          | 12.2.7                     |
| <b>Control Valves</b>                             |             |                    |                            |
| Position  | Test        | Annually           | 12.3.3.1                   |
| Operation   | Test        | Annually           | 12.3.3.1                   |
| Supervisory                                       | Test        | Semiannually       | 12.3.3.5                   |
| <b>Deluge Valves</b>                              |             |                    |                            |
| Priming water                                     | Test        | Quarterly          | 12.4.3.2.1                 |
| Low air pressure alarms                           | Test        | Quarterly          | 12.4.3.2.10                |
| Full flow   | Test        | Annually           | 12.4.3.2.2                 |
| <b>Dry Pipe Valves/<br/>Quick-Opening Devices</b> |             |                    |                            |
| Priming water                                     | Test        | Quarterly          | 12.4.4.2.1                 |
| Low air pressure alarm                            | Test        | Quarterly          | 12.4.4.2.6                 |
| Quick-opening devices                             | Test        | Quarterly          | 12.4.4.2.4                 |
| Trip test   | Test        | Annually           | 12.4.4.2.2                 |
| Full flow trip test                               | Test        | 3 years            | 12.4.4.2.2.2               |
| <b>Pressure Reducing and Relief<br/>Valves</b>    |             |                    |                            |
| Sprinkler systems                                 | Test        | 5 years            | 12.5.1.2                   |
| Circulation relief                                | Test        | Annually           | 12.5.6.1.2                 |
| Pressure relief valves                            | Test        | Annually           | 12.5.6.2.2                 |
| <b>Backflow Prevention<br/>Assemblies</b>         |             |                    |                            |
| Control Valves                                    | Maintenance | Annually           | 12.3.4                     |
| Deluge Valves                                     | Maintenance | Annually           | 12.4.3.3.2                 |
| Dry Pipe Valves/<br>Quick-Opening Devices         | Maintenance | Annually           | 12.4.4.3.2                 |

## General Provisions

- The owner/qualified contractor shall have manufacturer's literature available to provide specific instructions for inspecting, testing, & maintaining valves & associated equipment.
- All pertinent personnel, departments, authorities having jurisdiction, or agencies shall be notified that testing or maintenance of the valve and associated alarms is to be conducted.
- All system valves shall be protected from physical damage and shall be accessible.
- Before opening a test or drain valve, it shall be verified that adequate provisions have been made for drainage.
- The general appearance and condition of all valves shall be observed and noted, and it shall be verified that all valves are in the appropriate open or closed position.

## Main Drain Test

- A main drain test shall be conducted annually at each water-based fire protection system riser to determine whether there has been a change in the condition of the water supply piping and control valves.
- Systems where the sole water supply is through a backflow preventer and/or pressure reducing valves, the main drain test of at least one system downstream of the device shall be conducted on a quarterly basis.

## Water-Flow Alarm

- All water-flow alarms shall be tested quarterly in accordance with the manufacturer's instructions.

## Gauges

- Gauges shall be inspected monthly to verify that they are in good condition and that normal pressure is being maintained.
- Gauges shall be replaced every 5 years or tested every 5 years by comparison with a calibrated gauge.
- Gauges not accurate to within 3 percent of the full scale shall be recalibrated or replaced.

## Records

Records shall be maintained in accordance with the BC Fire Code (2012).

## CONTROL VALVES IN WATER-BASED FIRE PROTECTION SYSTEMS.

- Each control valve shall be identified and have a sign indicating the system or portion of the system it controls.
- When the valve is returned to service, a drain test (either main or sectional drain, as appropriate) shall be conducted to determine that the valve is open.
- Each normally open valve shall be secured by means of a seal or a lock or shall be electrically supervised in accordance with the BC Fire Code.

- Normally closed valves shall be secured by means of a seal or shall be electrically supervised in accordance with the BC Fire Code. Sealing or electrical supervision shall not be required for hose valves.

### Inspection

- All valves shall be inspected weekly.
- Valves secured with locks or supervised in accordance with the BC Fire Code shall be permitted to be inspected monthly.
- After any alterations or repairs, an inspection shall be made by the owner to ensure that the system is in service and all valves are in the normal position and properly sealed, locked, or electrically supervised.
- The valve inspection shall verify that the valves are in the following condition:
  - (1) In the normal open or closed position
  - (2) Properly sealed, locked, or supervised
  - (3) Accessible
  - (4) Provided with appropriate wrenches
  - (5) Free from external leaks
  - (6) Provided with appropriate identification

### Testing

- Each control valve shall be operated annually through its full range and returned to its normal position.
- Outside screw and yoke valves shall be backed a one-quarter turn from the fully open position to prevent jamming.
- A main drain test shall be conducted annually at each system riser and any time the valve is closed at each system riser or feed main after the control valve has been closed to determine whether there has been a change in the condition of the water supply piping and control valves.

### Supervisory Switches

- Valve supervisory switches shall be tested semiannually.
- A distinctive signal shall indicate movement from the valve's normal position during either the first two revolutions of a hand wheel or when the stem of the valve has moved one-fifth of the distance from its normal position.
- The signal shall not be restored at any valve position except the normal position.

### Maintenance

- The operating stems of outside screw and yoke valves shall be lubricated annually.
- The valve then shall be completely closed and reopened to test its operation and distribute the lubricant.

## SYSTEM VALVES

### CHECK VALVES

- **Inspection** - Valves shall be inspected internally every 5 years to verify that all components operate correctly, move freely, and are in good condition.
- **Maintenance** - Internal components shall be cleaned, repaired, or replaced as necessary in accordance with the manufacturer's instructions.

### DRY PIPE VALVES/QUICK-OPENING DEVICES

#### Inspection

- Valve enclosure heating equipment shall be inspected daily during cold weather for its ability to maintain a minimum temperature of at least 4°C (40°F).
- Low temperature alarms, if installed in valve enclosures, shall be inspected annually at the beginning of the heating season.
- Gauges shall be inspected weekly.
  - The gauge on the supply side of the dry pipe valve shall indicate that the normal supply water pressure is being maintained.
  - The gauge on the system side of the dry pipe valve shall indicate that the proper ratio of air or nitrogen pressure to water supply pressure is being maintained in accordance with the manufacturer's instructions.
  - The gauge on the quick-opening device, if provided, shall indicate the same pressure as the gauge on the system side of the dry pipe valve.
- Systems equipped with low air pressure alarms shall be inspected monthly.
- The dry pipe valve shall be externally inspected monthly to verify the following:
  - (1) The valve is free of physical damage.
  - (2) All trim valves are in the appropriate open or closed position.
  - (3) The intermediate chamber is not leaking.
- The interior of the dry pipe valve shall be inspected annually when the trip test is conducted.
- Strainers, filters, and restricted orifices shall be inspected internally every 5 years unless tests indicate a greater frequency is necessary.

#### Testing

- The priming water level shall be tested quarterly.
- Each dry pipe valve shall be trip tested annually during warm weather.
- Every 3 years and whenever the system is altered, the dry pipe valve shall be trip tested with the control valve fully open and the quick-opening device, if provided, in service.
- During those years when full flow testing is not required, each dry pipe valve shall be trip tested with the control valve partially open.
- Grease or other sealing materials shall not be applied to the seating surfaces of dry

pipe valves.

- Quick-opening devices shall be tested quarterly.
- A tag or card that shows the date on which the dry pipe valve was last tripped and the name of the person and organization conducting the test shall be attached to the valve.
- Separate records of initial air and water pressure, tripping air pressure, and dry pipe valve operating conditions shall be maintained on the premises for comparison with previous test results.
- Records of tripping time shall be maintained for full flow trip tests.
- Low air pressure alarms shall be tested quarterly in accordance with the manufacturer's instructions.
- Automatic air pressure maintenance devices shall be tested annually during the dry pipe valve trip test in accordance with the manufacturer's instructions.

### **Maintenance**

- Leaks resulting in air pressure losses greater than 0.7 bar (10 psi) per week shall be located and repaired.
- During the annual trip test, the interior of the dry pipe valve shall be cleaned thoroughly and parts replaced or repaired as necessary.
- Low points in dry pipe sprinkler systems shall be drained after each operation and before the onset of freezing weather conditions.

### **DELUGE VALVES**

#### **Inspection**

- Valve enclosure heating equipment for deluge valves subject to freezing shall be inspected daily during cold weather for its ability to maintain a minimum temperature of at least 4°C (40°F).
- Valve enclosures equipped with low temperature alarms shall be inspected weekly.
- Low temperature alarms, if installed in valve enclosures, shall be inspected annually at the beginning of the heating season.
- Gauges shall be inspected weekly.
- The gauge on the supply side of the deluge valve shall indicate that the normal supply water pressure is being maintained.
- The deluge valve shall be externally inspected monthly to verify the following:
  - (1) The valve is free from physical damage.
  - (2) All trim valves are in the appropriate open or closed position.
  - (3) The valve seat is not leaking.
  - (4) Electrical components are in service.
- The interior of the deluge valve and the condition of detection devices shall be inspected annually when the trip test is conducted.



- Internal inspection of valves that can be reset without removal of a faceplate shall be permitted to be conducted every 5 years.
- Strainers, filters, restricted orifices, and diaphragm chambers shall be inspected internally every 5 years unless tests indicate a greater frequency is necessary.

### Testing

- Each deluge valve shall be trip tested annually at full flow in warm weather and in accordance with the manufacturer's instructions. Protection shall be provided for any devices or equipment subject to damage by system discharge during tests.
- Where the nature of the protected property is such that water cannot be discharged for test purposes, the trip test shall be conducted in a manner that does not necessitate discharge in the protected area.
- Where the nature of the protected property is such that water cannot be discharged unless protected equipment is shut down (e.g., energized electrical equipment), a full flow system test shall be conducted at the next scheduled shutdown. In all cases, the test frequency shall not exceed 3 years.
- Deluge valves protecting freezers shall be trip tested in a manner that does not introduce moisture into the piping in the freezer.
- The water discharge patterns from all open sprinklers or spray nozzles shall be observed to ensure that patterns are not impeded by plugging and to ensure that they are correctly positioned and that obstructions do not prevent discharge patterns from wetting surfaces to be protected.
- Where obstructions occur, the piping and sprinklers or nozzles shall be cleaned and the system retested.

### Pressure Readings

- Pressure readings shall be recorded at the hydraulically most remote nozzle or sprinkler.
- A second pressure reading shall be recorded at the deluge valve.
- These readings shall be compared to the hydraulic design pressures to ensure the original system design requirements are met by the water supply.
- Where the hydraulically most remote nozzle or sprinkler is inaccessible, nozzles or sprinklers in other than foam-water systems shall be permitted to be checked visually without taking a pressure reading on the most remote nozzle or sprinkler.
- Where the reading taken at the riser indicates that the water supply has deteriorated, a gauge shall be placed on the hydraulically most remote nozzle or sprinkler and the results compared with the required design pressure.

**Multiple Systems.** The maximum number of systems expected to operate in case of fire shall be tested simultaneously to check the adequacy of the water supply.

**Manual Operation.** Manual actuation devices shall be operated annually.

**Return to Service.** After the full flow test, the system shall be returned to service in accordance with the manufacturer's instructions.

- Grease or other sealing materials shall not be applied to the seating surfaces of deluge valves.
- Records indicating the date the deluge valve was last tripped and the tripping time as well as the individual and organization conducting the test shall be maintained at a location or in a manner readily available for review by the authority having jurisdiction.
- Automatic air pressure maintenance devices, if provided, shall be tested yearly at the time of the annual deluge valve trip test, in accordance with the manufacturer's instructions.

### **Maintenance.**

- Leaks causing drops in supervisory pressure sufficient to sound warning alarms and electrical malfunctions causing alarms to sound shall be located and repaired.
- During the annual trip test, the interior of the deluge valve shall be cleaned thoroughly and the parts replaced or repaired as necessary.
- Interior cleaning and parts replacement or repair shall be permitted every 5 years for valves that can be reset without removal of a faceplate.
- Low points in deluge systems shall be drained after each operation and before the onset of freezing weather conditions.
- Additional maintenance as required by the manufacturer's instructions shall be provided.

## **FIRE HOSE VALVES**

### **Inspection**

- Hose valves shall be inspected quarterly.
- All deficiencies shall be corrected.
- Hose valves shall be inspected to ensure that hose caps are in place and not damaged.
- Hose threads shall be inspected for damage.
- Valve handles shall be present and not damaged.
- Gaskets shall be inspected for damage or deterioration.
- Hose valves shall be inspected for leaks.
- Hose valves shall be inspected to ensure no obstructions are present.
- Hose valves shall be inspected to ensure that restricting devices are present.

### **Testing**

- Hose valves shall be tested annually by opening and closing the valves.
- Hose valves that are difficult to operate or leak shall be repaired or replaced.
- Hose valves that are difficult to operate or leak shall be repaired or replaced.

## Maintenance

- Hose valves that do not operate smoothly or open fully shall be lubricated, repaired, or replaced.
- All damaged or missing components noted during the inspections specified shall be repaired or replaced in accordance with the manufacturer's instructions.

## BACKFLOW PREVENTION ASSEMBLIES

### Inspection

Inspection of backflow prevention assemblies shall be as described as follows:

- The double check assembly (DCA) valves and double check detector assembly (DCDA) valve shall be inspected weekly to ensure that the OS&Y isolation valves are in the normal open position.
- Valves electrically supervised shall be inspected monthly.
- Reduced pressure assemblies (RPA) and reduced pressure detector assemblies (RPDA) shall be inspected weekly to ensure that the differential-sensing valve relief port is not continuously discharging and the OS&Y isolation valves are in the normal open position.
- After any testing or repair, an inspection by the owner shall be made to ensure that the system is in service and all isolation valves are in the normal open position and properly locked or electrically supervised.

### Testing

- All backflow preventers installed in fire protection system piping shall be tested annually in accordance with the following:
  - A forward flow test shall be conducted at the system demand, including hose stream demand, where inside hose stations are located downstream of the backflow preventer.
  - A backflow performance test, as required by the authority having jurisdiction, shall be conducted at the completion of the forward flow test.
- For backflow preventers sized 50.8 mm (2 in.) and under, the forward flow test shall be acceptable to conduct without measuring flow, where the test outlet is of a size to flow the system demand.
- Where water rationing shall be enforced during shortages lasting more than 1 year, an internal inspection of the backflow preventer to ensure the check valves will fully open shall be acceptable in lieu of conducting the annual forward flow test.
- Where connections do not permit a full flow test, tests shall be completed at the maximum flow rate possible.
- All backflow devices installed in fire protection water supply shall be tested annually at the designed flow rate of the fire protection system, including required hose stream demands.
- Where connections do not permit a full flow test, tests shall be conducted at the maximum flow rate possible.

**Maintenance**

- Maintenance of all backflow prevention assemblies shall be conducted by a trained individual following the manufacturer's instructions in accordance with the procedure and policies of the authority having jurisdiction.
- Rubber parts shall be replaced in accordance with the frequency required by the authority having jurisdiction and the manufacturer's instructions.

**FIRE DEPARTMENT CONNECTION**

Fire department connections shall be inspected quarterly. The inspection shall verify the following:

- (1) The fire department connections are visible and accessible.
  - (2) Couplings or swivels are not damaged and rotate smoothly.
  - (3) Plugs or caps are in place and undamaged.
  - (4) Gaskets are in place and in good condition.
  - (5) Identification signs are in place.
  - (6) The check valve is not leaking.
  - (7) The automatic drain valve is in place and operating properly.
  - (8) The fire department connection clapper(s) is in place and operating properly.
- If fire department connection plugs or caps are not in place, the interior of the connection shall be inspected for obstructions, and it shall be verified that the fire department connection clapper is operational over its full range.
  - Components shall be repaired or replaced as necessary in accordance with the manufacturer's instructions. Any obstructions that are present shall be removed.

## STANDPIPE FIRE HOSE SYSTEMS

This section provides the minimum requirements for the routine inspection, testing, and maintenance of standpipe and fire hose systems. The Table shall be used to determine the minimum required frequencies for inspection, testing, and maintenance.

### Summary - Standpipe Systems Inspection, Testing, & Maintenance

| Item                        | Activity    | Frequency          | NFPA-25 Reference |
|-----------------------------|-------------|--------------------|-------------------|
| Control valves              | Inspection  | Weekly/monthly     | Table 12.1        |
| Pressure regulating devices | Inspection  | Quarterly          | Table 12.1        |
| Piping                      | Inspection  | Quarterly          | 6.2.1             |
| Alarm device                | Test        | Quarterly          | Table 12.1        |
| Hydrostatic test            | Test        | 5 years            | 6.3.2             |
| Flow test                   | Test        | 5 years            | 6.3.1             |
| Main drain test             | Test        | Annually           | Table 12.1        |
| Hose connections            | Maintenance | Annually           | Table 6.2.2       |
| Valves (all types)          | Maintenance | Annually/as needed | Table 12.1        |

### Inspection

- Components of standpipe and hose systems shall be visually inspected quarterly or as specified in the Table above.
- The Table below shall be used for the inspection, testing, and maintenance of all classes of standpipe and hose systems.

### Table Standpipe Systems

| Component/Checkpoint                   | Corrective Action               |
|--|---------------------------------|
| <b>Hose Connections</b>                |                                 |
| Cap missing                            | Replace                         |
| Fire hose connection damaged           | Repair                          |
| Valve handles missing                  | Replace                         |
| Cap gaskets missing or deteriorated    | Replace                         |
| Valve leaking                          | Close or repair                 |
| Visible obstructions                   | Remove                          |
| Restricting device missing             | Replace                         |
| Valve does not operate smoothly        | Lubricate or repair             |
| <b>Piping</b>                          |                                 |
| Damaged piping                         | Repair                          |
| Control valves damaged                 | Repair or replace               |
| Missing or damaged pipe support device | Repair or replace               |
| Damaged supervisory devices            | Repair or replace               |
| Visible obstructions                   | Remove                          |
| All valves easily accessible           | Remove any material not related |

- Checkpoints and corrective actions outlined in the Table above shall be followed to determine that components are free of corrosion, foreign material, physical damage, tampering, or other conditions that adversely affect system operation.

**Flow Tests**

- A flow test shall be conducted every 5 years at the hydraulically most remote hose connection of each zone of an automatic standpipe system to verify the water supply still provides the design pressure at the required flow.
- Where a flow test of the hydraulically most remote outlet(s) is not practical, the authority having jurisdiction shall be consulted for the appropriate location for the test.
- All systems shall be flow tested and pressure tested at the requirements in effect at the time of the installation.
- The actual test method(s) and performance criteria shall be discussed in advance with the authority having jurisdiction.
- A main drain test shall be performed on all standpipe systems with automatic water supplies. The test shall be performed at the low point drain for each standpipe or the main drain test connection where the supply main enters the building (when provided).
- Pressure gauges shall be provided for the test and shall be maintained.

**Hydrostatic Tests**

- Hydrostatic tests at not less than 13.8-bar (200-psi) pressure for 2 hours, or at 3.4 bar (50 psi) in excess of the maximum pressure, where maximum pressure is in excess of 10.3 bar (150 psi), shall be conducted every 5 years on dry standpipe systems and dry portions of wet standpipe systems.
- Hydrostatic tests shall be conducted in manual standpipe systems or on any system that has been modified or repaired.
- Manual wet standpipes that are part of a combined sprinkler/standpipe system shall not be required to be hydrostatically tested.
- The hydrostatic test pressure shall be measured at the low elevation point of the individual system or zone being tested. The inside standpipe piping shall show no leakage.

**Alarm Devices**

- Waterflow alarm and supervisory devices shall be tested on a quarterly basis.
- Where freezing conditions necessitate a delay in testing, tests shall be performed as soon as weather allows.

## SPRINKLER SYSTEMS

This section provides the minimum requirements for the routine inspection, testing, and maintenance of sprinkler systems. The Table shall be used to determine the minimum required frequencies for inspection, testing, and maintenance.

**Table - Summary of Sprinkler System Inspection, Testing, and Maintenance**

| Item                                | Activity    | Frequency                                 | NFPA-25 Reference |
|-------------------------------------|-------------|---|-------------------|
| Control valves                      | Inspection  | Weekly/monthly                            | Table 12.1        |
| Alarm devices                       | Inspection  | Quarterly                                 | 5.2.6             |
| Gauges (dry/deluge systems)         | Inspection  | Monthly                                   | 5.2.4.1           |
| Hydraulic nameplate                 | Inspection  | Quarterly                                 | 5.2.7             |
| Buildings                           | Inspection  | Annually (prior to freezing weather)      | 5.2.5             |
| Hanger/seismic bracing              | Inspection  | Annually                                  | 5.2.3             |
| Pipe and fittings                   | Inspection  | Annually                                  | 5.2.2             |
| Sprinklers                          | Inspection  | Annually                                  | 5.2.1             |
| Spare sprinklers                    | Inspection  | Annually                                  | 5.2.1.3           |
| Fire department connections         | Inspection  | Quarterly                                 | Table 12.1        |
| Valves (all types)                  | Inspection  |   | Table 12.1        |
| Alarm devices                       | Test        | Quarterly/semi-annually                   | 5.3.3             |
| Main drain                          | Test        | Annually                                  | Table 12.1        |
| Gauges                              | Test        | 5 years                                   | 5.3.2             |
| Sprinklers — extra-high temperature | Test        | 5 years                                   | 5.3.1.1.3         |
| Sprinklers — fast response          | Test        | At 20 years and every 10 years thereafter | 5.3.1.1.2         |
| Sprinklers                          | Test        | At 50 years and every 10 years thereafter | 5.3.1.1.1         |
| Valves (all types)                  | Maintenance | Annually or as needed                     | Table 12.1        |
| Obstruction investigation           | Maintenance | 5 years or as needed                      | 13.2.1, 13.2.2    |
| Low point drains (dry pipe system)  | Maintenance | Annually prior to freezing and as needed  | 12.4.4.3.3        |

### Notification to Supervisory Service

To avoid false alarms where a supervisory service is provided, the alarm receiving facility shall be notified by the owner or designated representative as follows:

- (1) Before conducting any test or procedure that could result in the activation of an alarm
- (2) After such tests or procedures are concluded

### Records

Records shall be maintained in accordance with BC Fire Code (2012).

## **INSPECTION**

### **Sprinklers**

Sprinklers shall be inspected from the floor level annually.

- Sprinklers shall not show signs of leakage; shall be free of corrosion, foreign materials, paint, and physical damage; and shall be installed in the proper orientation (e.g., upright, pendent, or sidewall).
- Any sprinkler shall be replaced that has signs of leakage; is painted, corroded, damaged, or loaded; or in the improper orientation.
- Glass bulb sprinklers shall be replaced if the bulbs have emptied.
- Unacceptable obstructions to spray patterns shall be corrected.

The supply of spare sprinklers shall be inspected annually for the following:

- (1) The proper number and type of sprinklers
- (2) A sprinkler wrench for each type of sprinkler

### **Pipe and Fittings**

Sprinkler pipe and fittings shall be inspected annually from the floor level.

- Pipe and fittings shall be in good condition and free of mechanical damage, leakage, corrosion, and misalignment.
- Sprinkler piping shall not be subjected to external loads by materials either resting on the pipe or hung from the pipe.
- Pipe and fittings installed in concealed spaces such as above suspended ceilings shall not require inspection.
- Pipe installed in areas that are inaccessible for safety considerations due to process operations shall be inspected during each scheduled shutdown.

### **Hangers and Seismic Braces**

Sprinkler pipe hangers and seismic braces shall be inspected annually from the floor level.

- Hangers and seismic braces shall not be damaged or loose.
- Hangers and seismic braces that are damaged or loose shall be replaced or refastened.
- Hangers and seismic braces installed in concealed spaces such as above suspended ceilings shall not require inspection.
- Hangers installed in areas that are inaccessible for safety considerations due to process operations shall be inspected during each scheduled shutdown.

### **Gauges**

- Gauges on dry systems shall be inspected weekly to ensure that normal air and water pressures are being maintained.
- Gauges on deluge systems shall be inspected monthly to ensure that normal air and water pressures are being maintained.



### **Alarm Devices**

- Alarm devices shall be inspected quarterly to verify that they are free of physical damage.

### **Hydraulic Nameplate**

- The hydraulic nameplate for hydraulically designed systems shall be inspected quarterly to verify that it is attached securely to the sprinkler riser and is legible.

## **TESTING**

### **Sprinklers**

- Sample sprinklers shall be submitted to a recognized testing laboratory acceptable to the authority having jurisdiction for field service testing.
- Where sprinklers have been in service for 50 years, they shall be replaced or representative samples from one or more sample areas shall be tested. Test procedures shall be repeated at 10-year intervals.
- Sprinklers manufactured using fast-response elements that have been in service for 20 years shall be tested. They shall be retested at 10-year intervals.
- Representative samples of solder-type sprinklers with a temperature classification of extra high 163°C (325°F) or greater that are exposed to semi-continuous to continuous maximum allowable ambient temperature conditions shall be tested at 5-year intervals.
- Where sprinklers are subjected to harsh environments, including corrosive atmospheres and corrosive water supplies, on a 5-year basis, sprinklers shall either be replaced or representative sprinkler samples shall be tested.
- Where historical data indicates, longer intervals between testing shall be permitted.
- Manufacturers shall be permitted to make modifications to their own sprinklers in the field with listed devices that restore the original performance as intended by the listing, where acceptable to the authority having jurisdiction.

### **Gauges**

- Gauges shall be replaced every 5 years or tested every 5 years by comparison with a calibrated gauge. Gauges not accurate to within 3 percent of the full scale shall be recalibrated or replaced.

### **Alarm Devices**

- Water-flow devices shall be tested quarterly.
- Where freezing weather conditions or other circumstances prohibit use of the inspector's test connection, the bypass connection shall be permitted to be used.
- Testing the water-flow alarm on dry pipe, or pre-action systems shall be accomplished by using the bypass connection.

## **MAINTENANCE**

### **Sprinklers**

Replacement sprinklers shall have the proper characteristics for the application intended. These shall include the following:

- (1) Style
  - (2) Orifice size and *K*-factor
  - (3) Temperature rating
  - (4) Coating, if any
  - (5) Deflector type (e.g., upright, pendent, sidewall)
  - (6) Design requirements
- Only new, listed sprinklers shall be used to replace existing sprinklers.
  - Special and quick-response sprinklers as defined by NFPA 13, *Standard for the Installation of Sprinkler Systems*, shall be replaced with sprinklers of the same make, model, orifice, size, temperature range and thermal response characteristics, and *K*-factor.
  - If the special or quick-response sprinkler is no longer manufactured, a special or quick-response sprinkler with comparable performance characteristics shall be installed.
  - A supply of spare sprinklers (never fewer than six) shall be maintained on the premises so that any sprinklers that have operated or been damaged in any way can be promptly replaced.
  - The sprinklers shall correspond to the types and temperature ratings of the sprinklers in the property.
  - The sprinklers shall be kept in a cabinet located where the temperature in which they are subjected will at no time exceed 38°C (100°F).
  - The stock of spare sprinklers shall include all types and ratings installed and shall be as follows for protected facilities :
    - (1) having under 300 sprinklers — no fewer than 6 sprinklers
    - (2) having 300 to 1000 sprinklers — no fewer than 12 sprinklers
    - (3) having over 1000 sprinklers — no fewer than 24 sprinklers
  - A special sprinkler wrench shall be provided and kept in the cabinet to be used in the removal and installation of sprinklers. One sprinkler wrench shall be provided for each type of sprinkler installed.
  - Sprinklers shall not be altered in any respect or have any type of ornamentation, paint, or coatings applied after shipment from the place of manufacture.

### **DRY PIPE SYSTEMS**

Dry pipe systems shall be kept dry at all times.

- During nonfreezing weather, a dry pipe system shall be permitted to be left wet if the only other option is to remove the system from service while waiting for parts or during repair activities.
- Air driers shall be maintained in accordance with the manufacturer's instructions.
- Compressors used in conjunction with dry pipe sprinkler systems shall be maintained in accordance with the manufacturer's instructions.

## FIRE PUMP

This shall be used to determine the minimum required frequencies for inspection, testing, and maintenance.

**Table Summary of Fire Pump Inspection, Testing, and Maintenance**

| Item                           | Activity    | Frequency | NFPA-25 Reference |
|--------------------------------|-------------|-----------|-------------------|
| Fire pump system               | Inspection  | Weekly    | 8.2.2(2)          |
| Pump operation                 |             |           |                   |
| No-flow condition              | Test        | Weekly    | 8.3.1             |
| Flow condition                 | Test        | Annually  | 8.3.3.1           |
| Hydraulic                      | Maintenance | Annually  | 8.5               |
| Mechanical transmission        | Maintenance | Annually  | 8.5               |
| Electrical system              | Maintenance | Varies    | 8.5               |
| Controller, various components | Maintenance | Varies    | 8.5               |
| Motor                          | Maintenance | Annually  | 8.5               |

## AUXILIARY EQUIPMENT

The pump assembly auxiliary equipment shall include the following:

- (1) Pump accessories as follows:
  - (a) Pump shaft coupling
  - (b) Automatic air release valve
  - (c) Pressure gauges
  - (d) Circulation relief valve (not used in conjunction with diesel engine drive with heat exchanger)
- (2) Pump test device(s)
- (3) Pump relief valve and piping (where maximum pump discharge pressure exceeds the rating of the system components or the driver is of variable speed)
- (4) Alarm sensors and indicators
- (5) Pressure maintenance (jockey) pump and accessories

## WATER SUPPLY TO PUMP SUCTION

The suction supply for the fire pump shall provide the required flow at a gauge pressure of zero (0) bar, zero (0) psi or higher at the pump suction flange to meet the system demand.

## NOTIFICATION TO SUPERVISORY SERVICE

To avoid false alarms where a supervisory service is provided, the alarm receiving facility always shall be notified by the owner or designated representative as follows:

- (1) Before conducting any test or procedure that could result in the activation of an alarm
- (2) After such tests or procedures are concluded

## INSPECTION OF FIRE PUMP

The purpose of inspection shall be to verify that the pump assembly appears to be in operating condition and is free from physical damage.

The pertinent visual observations specified in the following checklists shall be performed **weekly**:

- (1) Pump system conditions:
  - (a) Pump suction and discharge and bypass valves are fully open.
  - (b) Piping is free of leaks.
  - (c) Suction line pressure gauge reading is normal.
  - (d) System line pressure gauge reading is normal.
- (2) Electrical system conditions:
  - (a) Controller pilot light (power on) is illuminated.
  - (b) Transfer switch normal pilot light is illuminated.
  - (c) Isolating switch is closed — standby (emergency) source.
  - (d) Reverse phase alarm pilot light is off or normal phase rotation pilot light is on.
  - (e) Oil level in vertical motor sight glass is normal.

## TESTING OF FIRE PUMP

A **weekly test** of fire pump assemblies shall be conducted without flowing water. The test shall be conducted as follows:

1. Start the pump automatically.
2. An electric pump shall run a minimum of 10 minutes.
3. A valve installed to open as a safety feature shall be permitted to discharge water.
4. The automatic weekly test timer shall be permitted to be substituted for the starting procedure.

## WEEKLY TESTS

Qualified operating personnel shall be in attendance during the weekly pump operation. The pertinent visual observations or adjustments specified in the following checklists shall be conducted while the pump is running:

- (1) Pump system procedure:
  - (a) Record the system suction and discharge pressure gauge readings
  - (b) Check the pump packing glands for slight discharge
  - (c) Adjust gland nuts if necessary
  - (d) Check for unusual noise or vibration
  - (e) Check packing boxes, bearings, or pump casing for overheating
  - (f) Record the pump starting pressure

- (2) Electrical system procedure:
  - (a) Observe the time for motor to accelerate to full speed
  - (b) Record the time controller is on first step (for reduced voltage or reduced current starting)
  - (c) Record the time pump runs after starting (for automatic stop controllers)

### **ANNUAL TEST OF FIRE PUMP**

- An annual test of each pump assembly shall be conducted under minimum, rated, and peak flows of the fire pump by controlling the quantity of water discharged through approved test devices.
- If available suction supplies do not allow flowing of 150 percent of the rated pump capacity, the fire pump shall be permitted to operate at maximum allowable discharge. This test shall be conducted by an ASTTBC certified technician in a manner as described in NFPA-25.

### **TEST RESULTS AND EVALUATION**

- The interpretation of the test results shall be the basis of determination of performance of the pump assembly. Qualified individuals shall make interpretation of the test results.

### **Reports**

- Any abnormality observed during inspection or testing shall be reported promptly to the person responsible for correcting the abnormality.
- Test results shall be recorded and retained for comparison.
- All time delay intervals associated with the pump's starting, stopping, and energy source transfer shall be recorded.

### **Maintenance**

- A preventive maintenance program shall be established on all components of the pump assembly in accordance with the manufacturer's recommendations.
- Records shall be maintained on all work performed on the pump, driver, controller, and auxiliary equipment.
- The preventive maintenance program shall be initiated immediately after the pump assembly has passed acceptance tests.

### **Records**

- Records shall be maintained in accordance with the BC Fire Code.

## PRIVATE FIRE SERVICE MAINS AND FIRE HYDRANTS

This chapter shall provide the minimum requirements for the routine inspection, testing, and maintenance of private fire service mains and their appurtenances. The Table shall be used to determine the minimum required frequencies for inspection, testing, and maintenance.

**Summary of Private Fire Service Main Inspection, Testing, and Maintenance**

| Item                             | Activity    | Frequency                                | NFPA-25 Reference |
|----------------------------------|-------------|--|-------------------|
| Hydrants                         | Inspection  | Annually and after each operation        | 7.2.2.4           |
| Mainline strainers               | Inspection  | Annually and after each significant flow | 7.2.2.3           |
| Piping (exposed)                 | Inspection  | Annually                                 | 7.2.2.1           |
| Piping (underground)             | Inspection  | See 7.2.2.2                              | 7.2.2.2           |
| Hydrants                         | Test        | Flow annually                            | 7.3.2             |
| Piping (exposed and underground) | Flow test   | 5 years                                  | 7.3.1             |
| Hydrants                         | Maintenance | Annually                                 | 7.4.3             |

\*\* These functions shall be permitted to be carried out simultaneously.

### Notification to Supervisory Service.

- To avoid false alarms where a supervisory service is provided, the alarm receiving facilities always shall be notified by the owner or designated representative as follows:
  - (1) Before conducting any test or procedure that could result in the activation of an alarm
  - (2) After such tests or procedures are concluded

## INSPECTION

### General

- Private fire service mains and their appurtenances shall be inspected at the intervals specified in the Table above.

### Procedures

- All procedures shall be carried out in accordance with the manufacturer's instructions, where applicable.

## Exposed Piping

- Exposed piping shall be inspected annually.
- Piping shall be inspected, and the necessary corrective action shall be taken as shown in the following Table.

**Table Exposed Piping**

| Condition         | Corrective Action                                   |
|-------------------|---|
| Leaks             | Repair  |
| Physical damage   | Repair or replace                                   |
| Corrosion         | Clean or replace and coat with corrosion protection |
| Restraint methods | Repair or replace                                   |

- Piping installed in areas that are inaccessible for safety considerations due to process operations shall be inspected during each scheduled shutdown.

## Underground Piping

- Generally, underground piping cannot be inspected on a routine basis. However, flow testing can reveal the condition of underground piping and shall be conducted as specified later in this section.

## Dry Barrel Hydrants

Dry barrel hydrants shall be inspected annually and after each operation with the necessary corrective action taken as shown in the Table below.

**Dry Barrel Hydrants**

| Condition   | Corrective Action   |
|---|---|
| Inaccessible  | Make accessible   |
| Barrel contains water or ice (presence of water or ice could indicate a faulty drain, a leaky hydrant valve, or high groundwater table) | Repair and drain; for high groundwater it could be necessary to plug the drain and pump out the barrel after each use |
| Improper drainage from barrel   | Repair drain  |
| Leaks in outlets or at top of hydrant   | Repair or replace gaskets, packing, or parts as necessary   |
| Cracks in hydrant barrel  | Repair or replace   |
| Tightness of outlets  | Lubricate if necessary; tighten if necessary  |
| Worn nozzle threads   | Repair or replace   |
| Worn hydrant operating nut  | Repair or replace   |
| Availability of operating wrench  | Make sure wrench is available   |

## TESTING

### Underground and Exposed Piping Flow Tests

- Underground and exposed piping shall be flow tested to determine the internal condition of the piping at minimum 5-year intervals.
- Flow tests shall be made at flows representative of those expected during a fire for the purpose of comparing the friction loss characteristics of the pipe with those expected for the particular type of pipe involved, with due consideration given to the age of the pipe and to the results of previous flow tests.
- Any flow test results that indicate deterioration of available water flow and pressure shall

be investigated to the complete satisfaction of the authority having jurisdiction to ensure that the required flow and pressure are available for fire protection.

- Where underground piping supplies individual fire sprinkler, standpipe systems and there are no means to conduct full flow tests, tests generating the maximum available flows shall be permitted.

### **Hydrants**

- Hydrants shall be tested annually to ensure proper functioning.
- Each hydrant shall be opened fully and water flowed until all foreign material has cleared.
- Flow shall be maintained for not less than 1 minute.
- After operation, dry barrel hydrants shall be observed for proper drainage from the barrel.
- Full drainage shall take no longer than 60 minutes.
- Where soil conditions or other factors are such that the hydrant barrel does not drain within 60 minutes, or where the groundwater level is above that of the hydrant drain, the hydrant drain shall be plugged and the water in the barrel shall be pumped out.
- Dry barrel hydrants that are located in areas subject to freezing weather and that have plugged drains shall be identified clearly as needing pumping after operation.

## **MAINTENANCE**

### **General**

- All equipment shall be maintained in proper working condition, consistent with the manufacturer's recommendations.

### **Hydrants**

- Hydrants shall be lubricated annually to ensure that all stems, caps, plugs, and threads are in proper operating condition.
- Hydrants shall be kept free of snow, ice, or other materials and protected against mechanical damage so that free access is ensured.

### **Records**

- Records shall be maintained in accordance with the BC Fire Code (2012).



## MISCELLANEOUS PROTECTIVE EQUIPMENT

### INSPECTION, TESTING and MAINTENANCE

#### **2.1.3.7. Inspection, Maintenance and Testing of Fire Safety Devices**

- 1. The inspection, maintenance and testing of fire safety devices shall be conducted in accordance with this Code.*
- 2. Where specific references to the inspection, maintenance and testing of fire safety devices are not made in this Code, such devices shall be maintained to ensure they operate as per their design requirements.*

The BC Fire Code (2012) identifies inspection and testing requirements for protective equipment as outlined in the Part of the Fire Safety Plan. The BC Fire (2012) does not include references for certain fire safety devices, but are not limited to safety devices and systems as part of this facility which include:

- Misters
- FireFly-AB System
- Carbon Monoxide monitors
- Manually actuated deluge valves, and
- Conveyor and product transport systems

These and other safety systems/devices are to be inspected, tested and maintained to ensure they operate as intended. The manufacturer's and specific design requirements shall be used to ensure intended performance.

Blank Page

MASTER

## **PART 7 - MISCELLANEOUS**

### **MISCELLANEOUS INFORMATION AND COMPLETED FORMS**

**Insert completed forms and inspection reports from registered fire protection technicians within this section. The completed forms and reports form part of this Fire Safety Plan.**

MASTER

**Blank Page**

MASTER

## **PART 8 – BLANK FORMS**

### **BLANK FORMS AND REPORTS**

Copy an original form. Complete and insert into Part 7 of this plan.

MASTER

## APPOINTMENT OF THE FIRE SAFETY DIRECTOR

### ANNOUNCEMENT

DATE: \_\_\_\_\_  
NAME: \_\_\_\_\_  
TITLE: \_\_\_\_\_  
WORK ADDRESS: \_\_\_\_\_  
HOME ADDRESS: \_\_\_\_\_

### METHODS OF CONTACT

OFFICE PHONE: \_\_\_\_\_  
HOME PHONE: \_\_\_\_\_  
PAGER NUMBER: \_\_\_\_\_  
CELLULAR PHONE: \_\_\_\_\_  
WORK HOURS: \_\_\_\_\_

I hereby appoint \_\_\_\_\_ as Fire Safety Director, authorized to fulfil the duties outlined in the fire safety plan for Fibreco Export Ltd., District of North Vancouver BC.

### APPOINTING OFFICER

NAME: \_\_\_\_\_  
POSITION: \_\_\_\_\_  
ADDRESS: \_\_\_\_\_  
PHONE: \_\_\_\_\_

## APPOINTMENT OF THE DEPUTY FIRE SAFETY DIRECTOR

### ANNOUNCEMENT

DATE: \_\_\_\_\_  
NAME: \_\_\_\_\_  
TITLE: \_\_\_\_\_  
WORK ADDRESS: \_\_\_\_\_  
HOME ADDRESS: \_\_\_\_\_

### METHODS OF CONTACT

OFFICE PHONE: \_\_\_\_\_  
HOME PHONE: \_\_\_\_\_  
PAGER NUMBER: \_\_\_\_\_  
CELLULAR PHONE: \_\_\_\_\_  
WORK HOURS: \_\_\_\_\_

I hereby appoint \_\_\_\_\_ as Deputy Fire Safety Director, authorized to fulfil the duties outlined in the fire safety plan for Fibreco Export Ltd., District of North Vancouver BC.

### APPOINTING OFFICER

NAME: \_\_\_\_\_  
POSITION: \_\_\_\_\_  
ADDRESS: \_\_\_\_\_  
PHONE: \_\_\_\_\_

**FIRE WATCH LOG**

**Address:** \_\_\_\_\_

| Date | Time | Watch Person | Notes |
|------|------|--------------|-------|
|      |      |              |       |
|      |      |              |       |
|      |      |              |       |
|      |      |              |       |
|      |      |              |       |
|      |      |              |       |
|      |      |              |       |
|      |      |              |       |
|      |      |              |       |
|      |      |              |       |
|      |      |              |       |
|      |      |              |       |
|      |      |              |       |
|      |      |              |       |
|      |      |              |       |
|      |      |              |       |
|      |      |              |       |
|      |      |              |       |
|      |      |              |       |
|      |      |              |       |
|      |      |              |       |
|      |      |              |       |
|      |      |              |       |
|      |      |              |       |
|      |      |              |       |
|      |      |              |       |
|      |      |              |       |
|      |      |              |       |
|      |      |              |       |
|      |      |              |       |
|      |      |              |       |
|      |      |              |       |
|      |      |              |       |
|      |      |              |       |
|      |      |              |       |
|      |      |              |       |
|      |      |              |       |
|      |      |              |       |
|      |      |              |       |
|      |      |              |       |
|      |      |              |       |
|      |      |              |       |
|      |      |              |       |
|      |      |              |       |





**INCIDENT / ACTIVITY REPORT**

**INCIDENT / ACTIVITY**

- FIRE
- FALSE ALARM
- FIRE DRILL
- TRAINING
- FIRE SAFETY MEETING
- FIRE EQUIP. OPERATED
- FIRE SAFETY PLAN UPDATE

**DETAIL**

DATE \_\_\_\_\_ TIME \_\_\_\_\_ DEVICE/EQUIP. \_\_\_\_\_  
 FLOOR \_\_\_\_\_ # OF INJURIES \_\_\_\_\_  
 CAUSE / REASON FOR INCIDENT \_\_\_\_\_  
 DAMAGE / LOSS \_\_\_\_\_

**ACTION**

WHO DISCOVERED THE FIRE? \_\_\_\_\_  
 DID FIRE DEPT ATTEND? \_\_\_ IF NOT WHY? \_\_\_\_\_  
 WHO OPERATED FIRE EQUIPMENT? \_\_\_\_\_

**COMMENTS / RECOMMENDATIONS**

---



---



---

SIGNED \_\_\_\_\_ DATE \_\_\_\_\_

**DISTRIBUTION LIST**

- FIRE DEPARTMENT
- HEAD OFFICE
- DEPUTY FIRE SAFETY DIRECTOR
- STAFF
- INSURANCE COMPANY
- POLICE

## DAILY INSPECTION REPORT

### GENERAL

- No flammable or combustible liquid storage except where designed for such use
- Solvent/parts wash tanks in maintenance shops – condition, solvent type compatibility, sources of ignition
- No combustible - refuse accumulations inside or outside
- No worn electrical extension cords
- No oily or stain - soaked rags
- Exterior routes and pathways leading to the muster areas are clear of obstructions including snow and ice.
- No obstructions to access of fire hydrants
- No obstructions to access of fire extinguishers
- No obstructions to access of fire protection valves
- Fire protection control valves subject to freezing (in cold weather) to be checked
- Sprinkler valve enclosures checked for adequate heat during cold weather
- Fire alarm control panels checked for normal AC power and alarm/trouble conditions
- Fire Department vehicle access routes checked for obstructions
- Propane cylinder cage – content and condition
- Fuel tank, aboveground piping, pump, containment - condition
- Waste oil tank, aboveground piping, containment - condition

\* Use this form as a guide only - not necessary to retain.

## MONTHLY INSPECTION & TESTING REPORT

MONTHS

1

( ) PORTABLE FIRE EXTINGUISHERS

Record the serial number of each extinguisher requiring maintenance by a qualified contractor:

|           |           |           |
|-----------|-----------|-----------|
| (1) _____ | (2) _____ | (3) _____ |
| (4) _____ | (5) _____ | (6) _____ |
| (7) _____ | (8) _____ | (9) _____ |

( ) EMERGENCY LIGHTING UNITS

USE 1 FORM PER MONTH - check off completed items

FORM DATE: \_\_\_\_\_

## YEARLY TESTING REPORT

### ANNUAL INSPECTION & TESTING REPORT

YEARS

1

- PORTABLE FIRE EXTINGUISHERS
- HEATING, VENTILATING & AIR COND.
- EMERGENCY LIGHTING UNITS
- SPRINKLER SYSTEMS
- STANDPIPE SYSTEM
- FIRE HYDRANTS
- FIRE PUMP
- MISTERS
- FIREFLY-AB
- FIRE SAFETY PLAN – REVIEW and UPDATE AS NEEDED

USE 1 FORM PER YEAR - check off completed items

RETAIN COPY OF CONTRACTORS REPORT IN PART 7

FORM DATE: \_\_\_\_\_

### DUST COLLECTOR CHECKLIST

| Department   | Yes | No | Recommended Actions |
|--|-----|----|---------------------|
| Enclosure: <ul style="list-style-type: none"> <li>• Access door leakage</li> <li>• Identified rusting</li> </ul>   |     |    |                     |
| Fan: <ul style="list-style-type: none"> <li>• Unnecessary vibration</li> <li>• Safety guards in place, no damage</li> <li>• Identified rusting</li> <li>• Belts tight</li> <li>• Motor amperage exceeded</li> </ul>  |     |    |                     |
| Discharge flex connection: <ul style="list-style-type: none"> <li>• In good condition</li> <li>• No holes</li> <li>• Properly installed with clamps</li> <li>• Clamps in operating condition</li> <li>• Barrels not rusting or leaking</li> </ul>                  |     |    |                     |
| Static electric ground: <ul style="list-style-type: none"> <li>• Direct to good earth</li> <li>• Visible corrosion</li> <li>• Missing grounding straps</li> </ul>  |     |    |                     |
| Filter fabric: <ul style="list-style-type: none"> <li>• Visible rips or tears</li> <li>• Differential pressure maximum not exceeded</li> <li>• Missing grounding straps</li> <li>• Bags properly connected to tube sheet</li> <li>• Build-up inside bag</li> </ul> |     |    |                     |
| Shaker: <ul style="list-style-type: none"> <li>• Shaker operational</li> <li>• Shaker arm seal intact</li> </ul>   |     |    |                     |
| Fire protection: <ul style="list-style-type: none"> <li>• Hose connection in good condition</li> <li>• Hose connection area clear</li> </ul>   |     |    |                     |
| Initials of person doing inspection: _____ Date: _____ Time: _____   |     |    |                     |

### COMBUSTIBLE DUST RISK ASSESSMENT - CHECKLIST

|   |  | Comments and notes |
|---|--|--------------------|
| <b>Dust material</b>  | <input type="checkbox"/> Wood,<br><input type="checkbox"/> Other _____   |                    |
| <b>Physical properties of dust via a "Determination of Combustion Characteristics Test"</b> | <input type="checkbox"/> Moisture content _____<br><input type="checkbox"/> Particle size _____<br><input type="checkbox"/> Combustibility _____<br><input type="checkbox"/> Impact sensitivity _____<br><input type="checkbox"/> Explosion severity _____<br><input type="checkbox"/> Pressure generation _____<br><input type="checkbox"/> Specific gravity _____  |                    |
| <b>Dust producing sources</b>   | <input type="checkbox"/> Cutting<br><input type="checkbox"/> Sanding<br><input type="checkbox"/> Planning<br><input type="checkbox"/> Grinding<br><input type="checkbox"/> Control equipment<br><input type="checkbox"/> Other _____   |                    |
| <b>Open areas where combustible dust is building up</b>                                     | <p><b>Horizontal surfaces</b></p> <input type="checkbox"/> Beams/Joists<br><input type="checkbox"/> Truss<br><input type="checkbox"/> Purlins<br><input type="checkbox"/> Ducts<br><input type="checkbox"/> Pipes<br><input type="checkbox"/> Cable trays<br><input type="checkbox"/> Light fixtures<br><input type="checkbox"/> Sprinkler pipe<br><input type="checkbox"/> Storage racks/shelves<br><input type="checkbox"/> Stairs, railings<br><input type="checkbox"/> Top of equipment/fixtures |                    |
|   | <p><b>Vertical surfaces</b></p> <input type="checkbox"/> Walls<br><input type="checkbox"/> Equipment<br><input type="checkbox"/> Other _____   |                    |
| <b>Hidden or enclosed areas where combustible dust building up</b>                          | <input type="checkbox"/> Equipment<br><input type="checkbox"/> Ceiling cavity<br><input type="checkbox"/> Wall cavity<br><input type="checkbox"/> Sub-floor cavity<br><input type="checkbox"/> Other _____   |                    |
| <b>Means of dust dispersion to air</b>  | <input type="checkbox"/> Compressed air<br><input type="checkbox"/> Equipment vibration<br><input type="checkbox"/> Velocity of process equipment<br><input type="checkbox"/> Other _____  |                    |
| <b>Potential ignition sources</b>   | <input type="checkbox"/> Hot work<br><input type="checkbox"/> Static   |                    |

|   |   |  |
|---|---|--|
|   | <ul style="list-style-type: none"> <li><input type="checkbox"/> Friction</li> <li><input type="checkbox"/> Bearings</li> <li><input type="checkbox"/> Electrical equipment</li> <li><input type="checkbox"/> Portable equipment</li> <li><input type="checkbox"/> Industrial trucks</li> <li><input type="checkbox"/> Fuel fired equipment</li> <li><input type="checkbox"/> Propellant actuated equipment</li> <li><input type="checkbox"/> Hot surfaces</li> <li><input type="checkbox"/> Foreign material in stock</li> <li><input type="checkbox"/> Other _____</li> </ul>  |  |
| <b>Areas with risk of secondary dispersion from deflagration</b>  | <ul style="list-style-type: none"> <li><input type="checkbox"/></li> </ul>  |  |
| <b>Engineering controls</b>   | <ul style="list-style-type: none"> <li><input type="checkbox"/> Exhaust ventilation system</li> <li><input type="checkbox"/> Appropriate filter media</li> <li><input type="checkbox"/> Appropriate electrical equipment</li> <li><input type="checkbox"/> Grounding of material conveyance systems</li> <li><input type="checkbox"/> Misting systems</li> <li><input type="checkbox"/> Explosion venting</li> <li><input type="checkbox"/> Abort gates</li> <li><input type="checkbox"/> Deflagration\Explosion suppression system</li> <li><input type="checkbox"/> Spark detection system</li> <li><input type="checkbox"/> Duct access doors/openings/removable sections of duct</li> <li><input type="checkbox"/> Other _____</li> </ul> |  |
| <b>Housekeeping inspection schedules and procedures for preventative maintenance including inspection</b> | <ul style="list-style-type: none"> <li><input type="checkbox"/> Equipment that may act as an ignition source (produces heat or sparks if not properly maintained)</li> <li><input type="checkbox"/> Elevated horizontal surfaces such as machine tops</li> <li><input type="checkbox"/> Beams, joists, purlins, ducts, pipes and cable trays, light fixtures, sprinkler pipe, ..</li> <li><input type="checkbox"/> Vertical surfaces (walls, etc.)</li> <li><input type="checkbox"/> Hidden areas</li> <li><input type="checkbox"/> On the surface of and within electrical equipment (e.g., motor control cabinets)</li> </ul>   |  |
| <b>Description of dust clean-up program</b>   | <ul style="list-style-type: none"> <li><input type="checkbox"/> Vacuums</li> <li><input type="checkbox"/> Compressed air</li> <li><input type="checkbox"/> Water</li> <li><input type="checkbox"/> Specialized tools</li> <li><input type="checkbox"/> Other _____</li> </ul>   |  |
| <b>Criteria or thresholds</b>   | <ul style="list-style-type: none"> <li><input type="checkbox"/> Accumulation of 1/8 inch or less</li> </ul>   |  |
| <b>Specific safe work programs</b>  | <p><b>Written Procedures</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Hot work</li> <li><input type="checkbox"/> Smoking control</li> </ul>  |  |



|   |  |  |
|---|--|--|
|   | <ul style="list-style-type: none"> <li><input type="checkbox"/> Emergency preparedness training</li> <li><input type="checkbox"/> Equipment de-energized during clean-up activities</li> <li><input type="checkbox"/> Lockout/Tagout</li> <li><input type="checkbox"/> Storage, handling, dispensing &amp; disposal of dangerous goods</li> <li><input type="checkbox"/> Contractor/sub-contractor safety orientation procedures</li> <li><input type="checkbox"/> Decision-making process necessary to determine the degree and extent of the hazard and the personal protective equipment and job planning necessary to perform the task safely</li> <li><input type="checkbox"/> Use of portable equipment</li> <li><input type="checkbox"/> Management of change</li> </ul> <p><b>Training programs</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Hot work permit</li> <li><input type="checkbox"/> Smoking control</li> <li><input type="checkbox"/> Emergency preparedness</li> <li><input type="checkbox"/> Equipment de-energized during clean-up activities</li> <li><input type="checkbox"/> Lockout/Tagout</li> <li><input type="checkbox"/> Storage, handling dispensing &amp; disposal of dangerous goods</li> <li><input type="checkbox"/> Contractor/sub-contractor safety orientation procedures</li> <li><input type="checkbox"/> Decision-making process necessary to determine the degree and extent of the hazard and the personal protective equipment and job planning necessary to perform the task safely</li> <li><input type="checkbox"/> Use of portable equipment</li> </ul> <p><b>Audit programs</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Hot work permit</li> <li><input type="checkbox"/> Smoking control</li> <li><input type="checkbox"/> Emergency preparedness training</li> <li><input type="checkbox"/> Equipment de-energized during clean-up activities</li> <li><input type="checkbox"/> Lockout/Tagout</li> <li><input type="checkbox"/> Storage, handling dispensing &amp; disposal of dangerous goods</li> <li><input type="checkbox"/> Contractor/sub-contractor safety orientation procedures</li> <li><input type="checkbox"/> Decision-making process necessary to determine the degree and extent of the hazard and the personal protective equipment and job planning necessary to perform the task safely</li> <li><input type="checkbox"/> Use of portable equipment</li> <li><input type="checkbox"/> Management of change</li> </ul> |  |
| <p><b>Third party inspections</b></p>   | <ul style="list-style-type: none"> <li><input type="checkbox"/> Insurance</li> <li><input type="checkbox"/> Fire Department</li> <li><input type="checkbox"/> Service contractor</li> <li><input type="checkbox"/> Other _____</li> </ul>  |  |
| <p>Initials of person doing inspection/audit: _____ Date: _____ Time: _____</p> |  |  |

**DUST COLLECTION SYSTEM DUCT AND HANGERS CHECKLIST**

| Department  | Yes | No | Recommended Actions |
|---|-----|----|---------------------|
| Ducting : <ul style="list-style-type: none"> <li>• In good condition</li> <li>• Visible holes or damage</li> <li>• Interior build-up</li> <li>• Joints sealed and no visible leakage</li> </ul> |     |    |                     |
| Hangers: <ul style="list-style-type: none"> <li>• In good condition</li> <li>• Visible damage</li> <li>• Any removed or altered</li> <li>• Additional items hanging from ducts</li> </ul>       |     |    |                     |
| Hoods: <ul style="list-style-type: none"> <li>• Properly attached to equipment</li> <li>• Visible damage</li> <li>• Capture efficiency satisfactory</li> </ul>                                  |     |    |                     |
| Inspection doors: <ul style="list-style-type: none"> <li>• In closed position</li> <li>• No visible damage or warping</li> </ul>  |     |    |                     |
| Blast gates: <ul style="list-style-type: none"> <li>• In original balance condition</li> <li>• Visible signs of tampering</li> </ul>  |     |    |                     |
| Sprinkler housings (if applicable): <ul style="list-style-type: none"> <li>• No visible leakage</li> <li>• Protective plastic bag correctly attached</li> </ul>                                 |     |    |                     |
|   |     |    |                     |
| Initials of person doing inspection: _____ Date: _____ Time: _____  |     |    |                     |

**DUST COLLECTION SYSTEM SAFETY DEVICES CHECKLIST**

| Department   | Yes | No | Recommended Actions |
|--|-----|----|---------------------|
| Level sensor : <ul style="list-style-type: none"> <li>• Operation unobstructed</li> <li>• No material build-up on sensor</li> </ul>              |     |    |                     |
| Heat sensor (if applicable): <ul style="list-style-type: none"> <li>• Unobstructed</li> <li>• No material build-up on sensor</li> </ul>          |     |    |                     |
| Pressure sensor (if applicable): <ul style="list-style-type: none"> <li>• No apparent damage</li> <li>• No building-up in access tube</li> </ul> |     |    |                     |
|  |     |    |                     |
|  |     |    |                     |
|  |     |    |                     |
|  |     |    |                     |
| Initials of person doing inspection: _____ Date: _____<br>Time: _____  |     |    |                     |

**DUST COLLECTION SYSTEM EXPLOSION VENTING CHECKLIST**

| Department  | Yes | No | Recommended Actions |
|---|-----|----|---------------------|
| Visual inspection: <ul style="list-style-type: none"> <li>• Door/vent In good condition</li> <li>• Latch (if present) in good condition</li> <li>• Rust present on door/vent/latch</li> </ul> |     |    |                     |
| Latch (if present): <ul style="list-style-type: none"> <li>• Opens freely</li> <li>• Lubricated</li> </ul>  |     |    |                     |
| Door/vent: <ul style="list-style-type: none"> <li>• Door seals intact</li> <li>• Hinges open freely and lubricated</li> </ul>   |     |    |                     |
| Fire ball pathway: <ul style="list-style-type: none"> <li>• In good condition</li> <li>• Clear of debris</li> <li>• Vents/doors obstructed (if yes, obstruction must be removed)</li> </ul>   |     |    |                     |
| Signage: <ul style="list-style-type: none"> <li>• Present and readable on vent/door</li> <li>• Present and readable on compound</li> </ul>  |     |    |                     |
|   |     |    |                     |
|   |     |    |                     |
| Initials of person doing inspection: _____ Date: _____<br>Time: _____   |     |    |                     |

**DUST COLLECTION SYSTEM BONDING AND GROUNDING CHECKLIST**

| Department  | Yes | No | Recommended Actions |
|---|-----|----|---------------------|
| Bonding cables: <ul style="list-style-type: none"> <li>In good condition</li> <li>Good contact points</li> </ul>  |     |    |                     |
| Bonding clamps: <ul style="list-style-type: none"> <li>In good condition</li> <li>Good metal connection</li> </ul>  |     |    |                     |
| Grounding conductors: <ul style="list-style-type: none"> <li>In good condition</li> <li>Lead to earth</li> </ul>  |     |    |                     |
| Static electric ground: <ul style="list-style-type: none"> <li>Direct to good earth</li> </ul>  |     |    |                     |
| The following are free of static grounds: <ul style="list-style-type: none"> <li>Electrical conduit system</li> <li>Plastic pipes</li> <li>Gas or steam pipes</li> <li>Sprinkler system piping</li> <li>Lightning rods</li> </ul> |     |    |                     |
| Continuity checked  |     |    |                     |
| Conductivity measured   |     |    |                     |
| Safety cans: <ul style="list-style-type: none"> <li>Bonded and grounded</li> </ul>  |     |    |                     |
| Initials of person doing inspection: _____ Date: _____<br>Time: _____   |     |    |                     |

## LOCKOUT / TAGOUT PROGRAM AUDIT CHECKLIST

| LOCKOUT/TAGOUT PROGRAM AUDIT CHECKLIST   | OK | ACTION<br>NEEDED |
|--|----|------------------|
| Does a program and procedures exist for affixing lockout/tagout devices to energy isolating devices?   |    |                  |
| Are written procedures in use?   |    |                  |
| Are all releases of energy (kinetic, potential, electrical, pneumatic, hydraulic) considered?  |    |                  |
| Are all pieces of equipment requiring lockout/tagout identified?   |    |                  |
| Is training given to all affected workers on lockout/tagout procedures?  |    |                  |
| Are periodic inspections routinely conducted before equipment servicing or maintenance?  |    |                  |
| Are all pieces of equipment not capable of lockout or tagged out in such a manner as to prevent worker injury?   |    |                  |
| Is there a program in place to ensure no piece of equipment is purchased with an energy isolating device that cannot accept a lockout device?          |    |                  |
| Do all lockout/tagout procedures contain:  |    |                  |
| Specific statements of procedure applicability (i.e., to what pieces of equipment they pertain to)?  |    |                  |
| Procedures for shutting down, isolating, blocking and securing machines or equipment to control hazardous energy?                                      |    |                  |
| Specific procedural steps for the placement, removal and transfer of lockout/tagout devices and responsibilities for them?                             |    |                  |
| Testing requirements to verify the effectiveness of lockout/tagout and other required energy control devices?  |    |                  |
| Are all lockout/tagout devices used capable of protecting affected personnel from all specific energy sources?   |    |                  |
| Are all lockout/tagout devices sufficiently durable for the environments in which they are used?   |    |                  |
| Are all lockout/tagout devices used only for hazardous energy control purposes?  |    |                  |
| Are all lockout devices substantial enough to prevent unauthorized removal without unusual force?  |    |                  |
| Are all tagout devices equivalent to 50 pound nylon cable tie, non-reusable and non-releasable.  |    |                  |
| Are all lockout/tagout devices easily identifiable and containing appropriate warnings (e.g., Do Not Start)?   |    |                  |
| Are energy control procedures reviewed annually?   |    |                  |
| Does the annual inspection contain an assessment of the adequacy of the procedure?   |    |                  |
| Is the review conducted by an authorized employee other than the one utilizing the procedure?  |    |                  |
| Does the inspection correct identified deviations or inadequacies?   |    |                  |
| Has the employer certified that periodic inspections have been performed?  |    |                  |
| Does the certification include identifying the equipment, the date of the inspection, the employees included and the person conducting the inspection? |    |                  |
| <b>Fire Safety Director:</b> _____ <b>Date:</b> _____<br><br>Comments:   |    |                  |

(Page 1 of 2)

\*\*To be completed by Fire Safety Director or Designate

## LOCKOUT / TAGOUT PROCEDURES

|   |           |                          |       |
|---|-----------|--------------------------|-------|
| <b>LOCKOUT/TAGOUT</b>   |           | Page 1                   |       |
|   |           | Date:                    |       |
| <b>PROCEDURE</b>  |           |                          |       |
| Organization:   | Facility: | Location:                |       |
| <p><b>SCOPE:</b><br/>This procedure covers the necessary safety precautions and procedures for servicing and maintenance of machines and equipment in which the unexpected energization or start up, or release of stored energy could cause injury to employees.</p>   |           |                          |       |
| <p><b>PURPOSE:</b><br/>This procedure covers the minimum requirements for lockout and/or tagout of energy isolating devices to protect employees from hazardous energy including electrical, mechanical hydraulic, pneumatic, or other energy. It will be used as a facility wide general procedure for isolating all potentially hazardous energy (lockout/tagout) before employees perform any servicing and maintenance activities where unexpected energization, start up or release of stored energy could cause injury. This procedure, when used in conjunction with the specific information recorded on the attached pages of this procedure, provides the necessary information for lockout/tagout.</p>   |           |                          |       |
| <p><b>PROCEDURE:</b></p> <ol style="list-style-type: none"> <li>1. Only trained, authorized employees can lockout/tagout.</li> <li>2. All affected and other employees working in or entering work areas where lockout/tagout is performed must be trained.</li> <li>3. Determine all energy isolating devices requiring lockout/tagout to ensure effective control of hazardous energy.</li> <li>4. Determine the type and magnitude of the energy and required controls.</li> <li>5. Notify all affected employees of the plans to lockout/tagout.</li> <li>6. Shutdown the equipment/process by normal procedures.</li> <li>7. Locate the necessary energy isolating device(s) to equipment/process and operate them to isolate energy sources and affix lockout/tagout devices.</li> <li>8. Relieve all stored or residual energy and take appropriate measures to ensure it does not re-accumulate. Affix lockout/tagout device as necessary.</li> <li>9. Verify energy isolation and relief of stored energy after ensuring employees are not exposed and before beginning work. After start buttons are activated, press the stop button.</li> <li>10. Perform the servicing and maintenance.</li> <li>11. To safely restore machines, equipment or process to normal production operations, replace all guards and safety devices, remove all personnel and remove all tools and equipment.</li> <li>12. Notify affected employees.</li> <li>13. Remove lockout/tagout devices (by authorized employee installing lockout/tagout devices).</li> </ol> |           |                          |       |
| <p><b>LOCKOUT/TAGOUT DEVICE REMOVAL BY EMPLOYER:</b></p> <p>When it becomes necessary to remove the lockout/tagout devices of an employee who is unavailable at the facility, it can be <u>done only by the employer and then under a special, approved procedure</u>, as follows:</p> <p>_____.</p>  |           |                          |       |
| <p><b>GROUP LOCKOUT/TAGOUT</b></p> <p>When a lockout/tagout job involves numerous lockout/tagout devices and many employees, a group lockout/tagout procedure may be used. <u>A separate, special written procedure or permit is required.</u></p>  |           |                          |       |
| <p><b>CONTRACTORS</b></p> <p>All contractors must comply with the lockout/tagout procedures specified by the site employer and employees of the employer must not violate the contractors lockout/tagout.</p>   |           |                          |       |
| Procedures Prepared By:   | Date:     | Procedure Authorized By: | Date: |

NOTE: Use this form for Specific Machines and Equipment as needed:

| <b>LOCKOUT/TAGOUT PROCEDURE</b>          |        |                    |                      |                | Page 2        |
|--|--------|--------------------|----------------------|----------------|---------------|
|  |        |                    |                      |                | Date:         |
| Department Work Area:                    |        | Equipment/Machine: |                      | Process:       |               |
| Description (Equipment/Machine/Process): |        |                    |                      |                |               |
| Energy Sources (type/magnitude):         |        |                    |                      |                |               |
| <b>ENERGY ISOLATION DEVICES</b>          |        |                    |                      |                |               |
| No.#                                     | Device | Location           | Lockout/tagout Means | Comments       | Locked Tagged |
|  |        |                    |                      |                |               |
|  |        |                    |                      |                |               |
|  |        |                    |                      |                |               |
|  |        |                    |                      |                |               |
|  |        |                    |                      |                |               |
|  |        |                    |                      |                |               |
|  |        |                    |                      |                |               |
|  |        |                    |                      |                |               |
|  |        |                    |                      |                |               |
| <b>STORED/RESIDUAL ENERGY EQUIPMENT</b>  |        |                    |                      |                |               |
|  |        |                    |                      |                |               |
|  |        |                    |                      |                |               |
|  |        |                    |                      |                |               |
| <u>Comments:</u>                         |        |                    |                      |                |               |
| Completed By:                            |        | Date:              |                      | Authorized By: |               |
|  |        |                    |                      |                |               |



### LOCKOUT/TAGOUT PERIODIC AUDIT FORM

|   |       |  |
|---|-------|--|
| DATE:   | DEPT: | MACHINE/EQUIPMENT:                             |
| Name of employee(s) using lockout/tagout  |       | Serial number of lock(s) being used on lockout |
| Message on tag used with lock _____<br>_____  |       |  |
| Were there more than one employee working on the equipment which was locked? Explain _____<br>_____ |       |  |
| Were there locks being used for each employee? Explain _____<br>_____                               |       |  |
| Reason for using lockout/tagout procedure: _____<br>_____   |       |  |
| Has proper procedures been used in lockout/tagout shutdown? Yes ___ No ___<br>Explain _____         |       |  |
| Interview with employees next to operation being locked or tagged out? Comments: _____<br>_____     |       |  |
| Has proper procedure been used in lockout/tagout start up? Yes ___ No ___<br>Explain _____<br>_____ |       |  |
| When was the last time the employee was trained on lockout/tagout procedures? _____<br>_____        |       |  |

Signature \_\_\_\_\_  
(Fire Safety Director or designate)

| <b>LOCKOUT/BLOCKOUT</b>   |              |                 |                            |                |
|---|--------------|-----------------|----------------------------|----------------|
| <b>HAZARD</b>   | Satisfactory | Needs Attention | Target Date for Correction | Date Corrected |
| Is all equipment capable of movement, required to be disengaged, de-energized and blocked or locked-out during cleaning, servicing, adjusting or setting up operations, whenever possible?          |              |                 |                            |                |
| Where the power disconnecting means for equipment does not also disconnect the electrical control circuit:  |              |                 |                            |                |
| Are the appropriate electrical enclosures identified?   |              |                 |                            |                |
| Are means provided to assure the control circuit can also be disconnected and locked out?   |              |                 |                            |                |
| Is the locking-out of control circuits in lieu of locking-out main power disconnects prohibited?  |              |                 |                            |                |
| Are all equipment control valve handles provided with a means for locking-out?  |              |                 |                            |                |
| Does the lock out procedure require that stored energy (mechanical, hydraulic, air, etc.) be released or blocked before equipment is locked-out for repairs?  |              |                 |                            |                |
| Are appropriate employees provided with individually keyed personal safety locks?   |              |                 |                            |                |
| Are employees required to keep personal control of their key(s) while they have safety locks in use?  |              |                 |                            |                |
| Is it required that only the employee exposed to the hazard, place or remove the safety lock?   |              |                 |                            |                |
| Is it required that employees check the safety of the lock out by attempting a start up after making sure no one is exposed?  |              |                 |                            |                |
| Are employees instructed to always push the control circuit stop button prior to re-energizing the main power switch?   |              |                 |                            |                |
| Are a sufficient number of accident preventive signs or tags and safety padlocks provided for any reasonably foreseeable repair emergency?  |              |                 |                            |                |
| If an operation requires the operator to leave his station to do other functions, & part of the machine could move if accidentally activated, is such element required to be locked or blocked out? |              |                 |                            |                |
| In the event that equipment or lines cannot be shut down, locked-out and tagged, is a safe job procedure established and rigidly followed?  |              |                 |                            |                |
| <b>Name:</b>  | <b>Date:</b> |                 |                            |                |

### HAZARD ASSESSEMENT FORM (Contractors)

Name of Contractor \_\_\_\_\_

Type of Work to be done \_\_\_\_\_

Duration of Work \_\_\_\_\_

Will any Fire Emergency Systems be affected – Describe:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Will any exits or exit routes be affected – Describe:

\_\_\_\_\_  
\_\_\_\_\_

Fire Safety Director's Approval: \_\_\_\_\_

Requirements/Conditions of Approval:

Hot Work Permit  Red Tag System  Notify Fire Department   
Notify Insurance Company  Construction Fire Safety Plan

Requirements (Additional):

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Note: Form to be completed by Fire Safety Director or designate

## HOT WORK PERMIT

**BEFORE INITIATING HOT WORK, ENSURE ACCEPTABLE PREVENTATIVE FIRE SAFETY PRECAUTIONS ARE IN PLACE! A FIRE WATCH IS REQUIRED IN ALL CASES!**

This Hot Work Permit is required for any operation involving open flames or producing heat and /or sparks. This includes, but is not limited to: Brazing, Cutting, Grinding, Soldering, Thawing Pipe, Torch-Applied Roofing and Cad welding.

| INSTRUCTIONS  | REQUIRED PRECAUTIONS/ACTIONS CHECKLIST  |
|---|---|
| <p><b>A. Verify precautions listed at right (or do not proceed with the work.</b></p> <p><b>B. Complete permit &amp; post in hot work area.</b></p> <p><b>C. FSD to retain completed Permit after work.</b></p> | <ul style="list-style-type: none"> <li><input type="checkbox"/> Available sprinklers, hose streams and extinguishers in service and operable.</li> <li><input type="checkbox"/> Hot work equipment in good repair</li> </ul> <p><b>Requirements within 10m (35 feet) of work:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Flammable liquids, dust, lint and oil deposits removed.</li> <li><input type="checkbox"/> Explosive atmosphere in area confirmed eliminated.</li> <li><input type="checkbox"/> Floors swept clean.</li> <li><input type="checkbox"/> Combustible floors/surfaces are wet-down, covered with damp sand or fire-resistant sheets/materials.</li> <li><input type="checkbox"/> Remove combustibles where possible; otherwise protect with fire resistant tarps or metal shields.</li> <li><input type="checkbox"/> All wall and floor openings covered with acceptable material.</li> <li><input type="checkbox"/> Fire resistant tarps suspended below work.</li> </ul> <p><b>Work on walls or ceilings/enclosed equipment:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Construction is non-combustible and without combustible covering or insulation.</li> <li><input type="checkbox"/> Combustibles on other side of walls moved away.</li> <li><input type="checkbox"/> Danger not exist by conduction of heat into other area</li> <li><input type="checkbox"/> Enclosed equipment cleaned of all combustibles.</li> <li><input type="checkbox"/> Containers purged of flammable liquids/vapours.</li> </ul> <p><b>Other precautions taken:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Confined space entry permit required.</li> <li><input type="checkbox"/> Area protected with smoke or heat detection.</li> <li><input type="checkbox"/> Ample ventilation to remove smoke/vapour from work area.</li> <li><input type="checkbox"/> Lockout/tag out required.</li> </ul> <p><b>Fire Watch/Hot work area monitoring:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Fire Watch personnel approved by FSD/DSFD <u>AND</u> to have <u>NO OTHER DUTIES!</u><br/>Name of Fire Watch: _____</li> <li><input type="checkbox"/> Fire watch will be provided during any work progress breaks, including coffee or lunch breaks.</li> <li><input type="checkbox"/> Fire watch is provided with suitable extinguishers.</li> <li><input type="checkbox"/> Fire watch is trained in the use of this equipment AND in sounding alarm.<br/><u>Fire Watch may be required for adjoining areas, above and below.</u></li> <li><input type="checkbox"/> Additional dedicated Fire Watch personnel assigned for adjoining areas, above and below. .</li> <li><input type="checkbox"/> Hot work Contractor to monitor hot work area(s) for 30 minutes after job is completed.</li> <li><input type="checkbox"/> Fire Watch continues for at least 1-hour after completion of work (time: ____ Initial:____)</li> <li><input type="checkbox"/> Fire Watch (intermittent) every 30 minutes for at least 2-hours after completion of work. (time: ____ Initial:____)<br/>(time: ____ Initial: ____) (time: ____ Initial: ____)</li> <li><input type="checkbox"/> Fire Watch final inspection at 4-hours after completion of work. (time: ____ Initial:____)</li> <li><input type="checkbox"/> Completed Permit form filed with FSD or DFSD. (time: ____)</li> </ul> |
| <p><b>HOT WORK BEING DONE BY:</b></p> <p><input type="checkbox"/> <b>EMPLOYEE</b> _____</p> <p><input type="checkbox"/> <b>CONTRACTOR</b> _____</p>   |   |
| <p><b>DATE:</b> _____</p>   |   |
| <p><b>LOCATION/BLDG &amp; FLOOR:</b></p> <p>_____</p>   |   |
| <p><b>NATURE OF JOB/OBJECT:</b></p> <p>_____</p>  |   |
| <p><b>NAME OF PERSON DOING HOT WORK</b></p> <p>_____</p>  |   |
| <p><b>I verify the above location has been examined, the precautions checked on the Required Precautions Checklist have been taken to prevent fire, and permission is authorized for work.</b></p>              |   |
| <p><b>SIGNED:</b> _____<br/><small>(FSD or DSD)</small></p>   |   |
| <p><b>PERMIT EXPIRES:</b></p> <p><b>Date:</b> _____ <b>Time:</b> _____</p>  |   |
| <p align="center"><b>THIS PERMIT IS GOOD FOR ONE DAY ONLY!</b></p> <p align="center"><b>FIRE WATCH IS AUTHORIZED TO SUSPEND HOT WORK ACTIVITY IF CONDITIONS WARRANT.</b></p>                                    |   |

## FIXED AREA/LOCATION HOT WORK PERMIT

**BEFORE INITIATING HOT WORK, ENSURE ACCEPTABLE PREVENTATIVE FIRE SAFETY PRECAUTIONS ARE IN PLACE! A FIRE WATCH IS REQUIRED IN ALL CASES!**

This Hot Work Permit is required for any operation involving open flames or producing heat and /or sparks. This includes, but is not limited to: Brazing, Cutting, Grinding, Soldering, Thawing Pipe, Torch-Applied Roofing and Cad welding.

| INSTRUCTIONS   | REQUIRED PRECAUTIONS/ACTIONS CHECKLIST  |
|--|---|
| <p><b>A. Verify precautions listed at right (or do not proceed with the work.</b></p> <p><b>B. Complete permit &amp; post in hot work area.</b></p> <p><b>C. FSD to retain completed Permit after work.</b></p>  | <ul style="list-style-type: none"> <li><input type="checkbox"/> Available sprinklers, hose streams and extinguishers in service and operable.</li> <li><input type="checkbox"/> Hot work equipment in good repair</li> </ul>  |
| <p><b>HOT WORK BEING DONE BY:</b></p> <p><input type="checkbox"/> <b>EMPLOYEE</b> _____</p> <p><input type="checkbox"/> <b>CONTRACTOR</b> _____</p>  | <p><b>Requirements within 10m (35 feet) of work:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Flammable liquids, dust, lint and oil deposits removed.</li> <li><input type="checkbox"/> Explosive atmosphere in area confirmed eliminated.</li> <li><input type="checkbox"/> Floors swept clean.</li> <li><input type="checkbox"/> Combustible floors/surfaces are wet-down, covered with damp sand or fire-resistant sheets/materials.</li> <li><input type="checkbox"/> Remove combustibles where possible; otherwise protect with fire resistant tarps or metal shields.</li> <li><input type="checkbox"/> All wall and floor openings covered with acceptable material.</li> <li><input type="checkbox"/> Fire resistant tarps suspended below work.</li> </ul>  |
| <p><b>DATE:</b> from: _____ to: _____</p>  | <p><b>Work on walls or ceilings/enclosed equipment:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Construction is non-combustible and without combustible covering or insulation.</li> <li><input type="checkbox"/> Combustibles on other side of walls moved away.</li> <li><input type="checkbox"/> Danger not exist by conduction of heat into other area</li> <li><input type="checkbox"/> Enclosed equipment cleaned of all combustibles.</li> <li><input type="checkbox"/> Containers purged of flammable liquids/vapours.</li> </ul>   |
| <p><b>EXACT LOCATION OF FIXED WORK AREA:</b></p> <p>_____</p>  | <p><b>Other precautions taken:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Confined space entry permit required.</li> <li><input type="checkbox"/> Area protected with smoke or heat detection.</li> <li><input type="checkbox"/> Ample ventilation to remove smoke/vapour from work area.</li> <li><input type="checkbox"/> Lockout/tag out required.</li> </ul>   |
| <p><b>NATURE OF HOT WORK:</b></p> <p>_____</p>   | <p><b>Fire Watch/Hot work area monitoring:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Fire Watch personnel approved by FSD/DSFD <u>AND</u> to have <u>NO OTHER DUTIES!</u><br/>Name of Fire Watch: _____</li> <li><input type="checkbox"/> Fire watch will be provided during any work progress breaks, including coffee or lunch breaks.</li> <li><input type="checkbox"/> Fire watch is provided with suitable extinguishers.</li> <li><input type="checkbox"/> Fire watch is trained in the use of this equipment AND in sounding alarm.<br/><i>Fire Watch may be required for adjoining areas, above and below.</i></li> <li><input type="checkbox"/> Additional dedicated Fire Watch personnel assigned for adjoining areas, above and below. .</li> <li><input type="checkbox"/> Hot work Contractor to monitor hot work area(s) for 30 minutes after job is completed.</li> <li><input type="checkbox"/> Fire Watch continues for at least 1-hour after completion of work (time: ____ Initial:____)</li> <li><input type="checkbox"/> Fire Watch (intermittent) every 30 minutes for at least 2-hours after completion of work. (time: ____ Initial:____)<br/>(time: ____ Initial: ____) (time: ____ Initial: ____)</li> <li><input type="checkbox"/> Fire Watch final inspection at 4-hours after completion of work. (time: ____ Initial:____)</li> <li><input type="checkbox"/> Completed Permit form filed with FSD or DFSD. (time: ____)</li> </ul> |
| <p><b>NAME OF PERSON DOING HOT WORK</b></p> <p>_____</p>   |   |
| <p><b>I verify the above location has been examined, the precautions checked on the Required Precautions Checklist have been taken to prevent fire, and permission is authorized for work.</b></p> <p><b>SIGNED:</b> _____<br/><small>(FSD or DSD)</small></p> |   |
| <p><b>PERMIT EXPIRES:</b></p> <p><b>Date:</b> _____ <b>Time:</b> _____</p>   |   |
| <p><b>THIS PERMIT IS GOOD FOR THE DURATION OF HOT WORK AT THE SPECIFIED FIXED LOCATION!</b></p> <p><b>FSD OR FIRE WATCH IS AUTHORIZED TO SUSPEND HOT WORK ACTIVITY IF CONDITIONS WARRANT.</b></p>  |   |

Blank Page

MASTER

## PART 9 – ADDITIONAL INFORMATION

### FIRE PROTECTION TECHNICIAN STAMP - PRACTICE GUIDELINE

The Fire Safety Director is responsible for ensuring that all systems intended to protect life and property are inspected, tested and maintained in accordance with the BC Fire Code Regulations and manufacturer's requirements. Persons performing inspections and testing of such systems are expected to be qualified to do so. Some cities and municipalities have passed bylaws requiring those persons conducting inspections and testing to be a Registered Fire Protection Technician (RFPT) through the authority of the Applied Science Technicians and Technologists of BC (ASTTBC). The Fire Safety Director should ensure that technicians are certified a RFPT even if the community has not adopted such a bylaw.

Due to the potential for fraudulent use of the RFPT stamp, on inspection tags and reports, the building owner or owner's designated agent should:

- be aware of the restrictions on the use of the stamp, as outlined below, and
- ask to see photo identification of the technician prior to commencement of work.

All RFPT's are required to use the new stamp that was issued. The stamp will identify the disciplines for which the technician has full certification. The disciplines will be identified the bottom of the stamp by the following two-letter designations:

- Fire Alarms AL
- Unit Emergency Lighting EM
- Fire Extinguishers EX
- Generator Systems GS
- Special Suppression Systems SP
- Water Based Extinguishing Systems WA



Sample Stamp

#### Professional Responsibility

- The possession of stamped tags is restricted to the RFPT whose name appears on the stamp and their registered trainee(s) and only while under supervision.
- Tags may only be stamped at the actual jobsite for which they are required.

#### Use of Stamp

- Use of the stamp is protected under the ASTT Regulations pursuant to the Applied Science Technologists and Technicians Act.
- Only a RFPT in good standing may use their Stamp.
- The right to use the stamp is a privilege granted by ASTTBC.
- Pre stamping of tags and documents other than at the applicable job site is unacceptable.
- Tags and documents shall not be reproduced with a stamp imprint on them.

#### Application of Stamp

- The RFPT professional stamp shall be applied in a clear and legible manner.

- The stamp shall be used on any preliminary, draft or final documents, which have been prepared by the RFPT or prepared under the supervision of the RFPT.
- The number of tags or documents stamped shall be only sufficient for the applicable job site and for that time of service.
- The use of either, the normal usual signature, legal signature or initials of the RFPT shall be clearly shown in the space provided. Whatever the choice for form of signature, it should be used consistently and a copy of the stamp signature should reside on file with ASTTBC.
- The date the stamp is used, when required, shall be noted.

### **Documents Requiring Stamp**

- Transfer of technician information, or
- Having a technical impact on a third party, or
- Have been specifically requested by a client or an authority with jurisdiction.

As a guideline, the stamp is to be used for tags and reports. The RFPT shall only apply the stamp in those disciplines in which certification has been granted by ASTTBC. Letters would not come under this category unless used as an inspection notification. Any unauthorized reproduction or production of an ASTTBC RFPT stamp is a matter for both civil and criminal proceedings, as well as action by the ASTTBC.

**Caution!** Inspection and testing of life and property protection systems not performed and documented in conformance with the BC Fire Code (2012) Regulations, referenced standards or local bylaws may be rejected by the Fire Department. The inspection or test may need to be performed again as required. Reduce the likelihood of rejection by ensuring you contract an RFPT or other agent acceptable to the Fire Department.

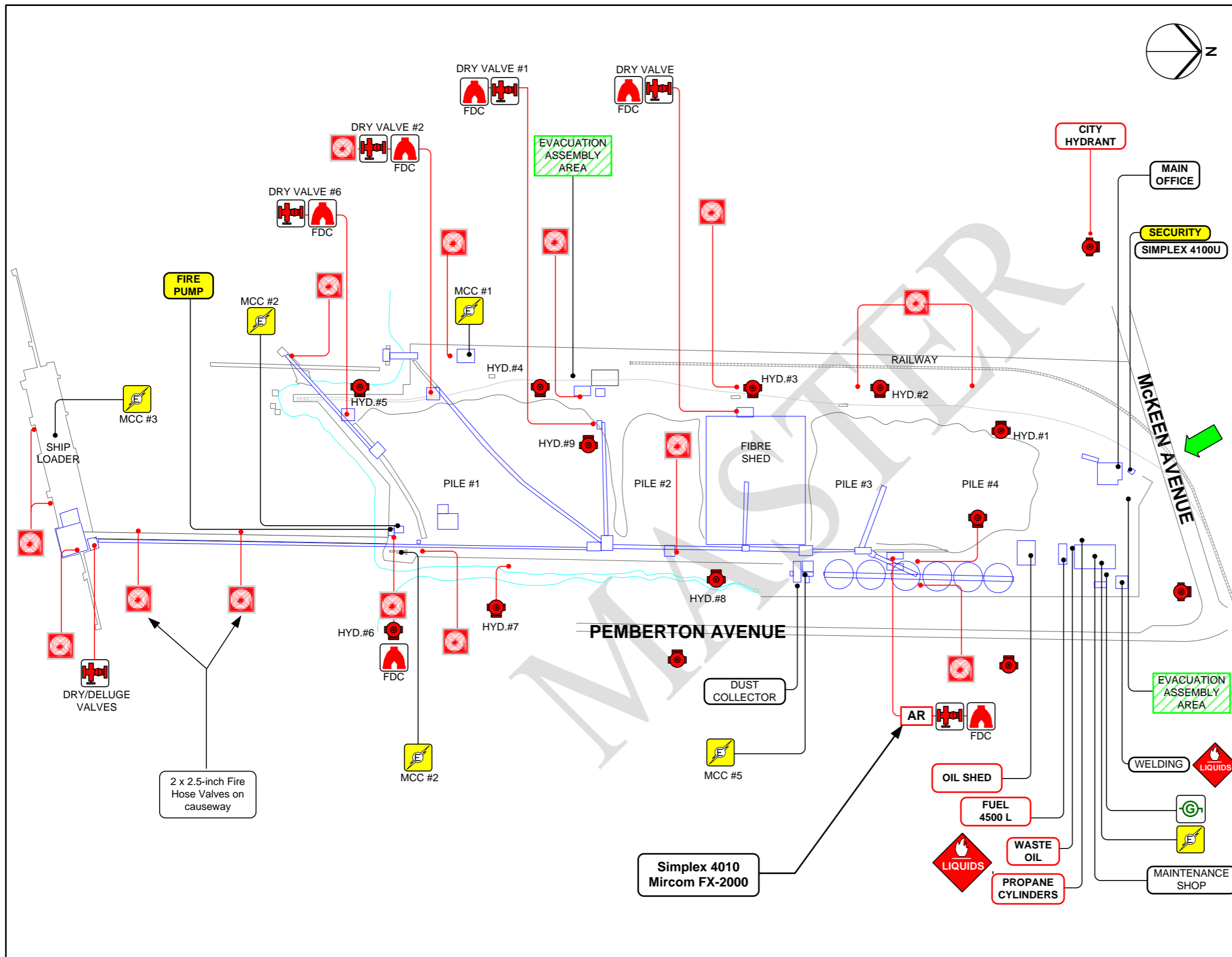


**PART 10 – PLANS**

MASTER

Blank Page

MASTER



**ORSO LOSS CONTROL CONSULTING Inc.**

Tel: 604-761-6381  
 Fax: 604-590-0704  
 orsolosscontrol.com

---

PROJECT/CLIENT:

**Fibreco**  
 1209 McKeen Avenue,  
 North Vancouver, B.C.

---

**SYMBOL LEGEND**

|  |                          |  |                            |
|--|--------------------------|--|----------------------------|
|  | Fire Extinguisher        |  | Floor Isolation Valve      |
|  | Manual Pull Station      |  | Domestic Water Valve       |
|  | Exit Route               |  | Generator                  |
|  | Fire Alarm Control Panel |  | Fire Department Connection |
|  | Fire Alarm Annunciator   |  | Electrical                 |
|  | Sprinkler Valves         |  | Sliding/Overhead Door      |
|  | Gas Valves               |  | Fire Fighters Keys         |
|  | Primary Entry Point      |  |                            |
|  | Fire Hose                |  |                            |

---

| No. | MANUAL DWG  | 11/19/12 | AF |
|-----|-------------|----------|----|
| 1   | DESCRIPTION | DATE     | BY |

REVISIONS

---

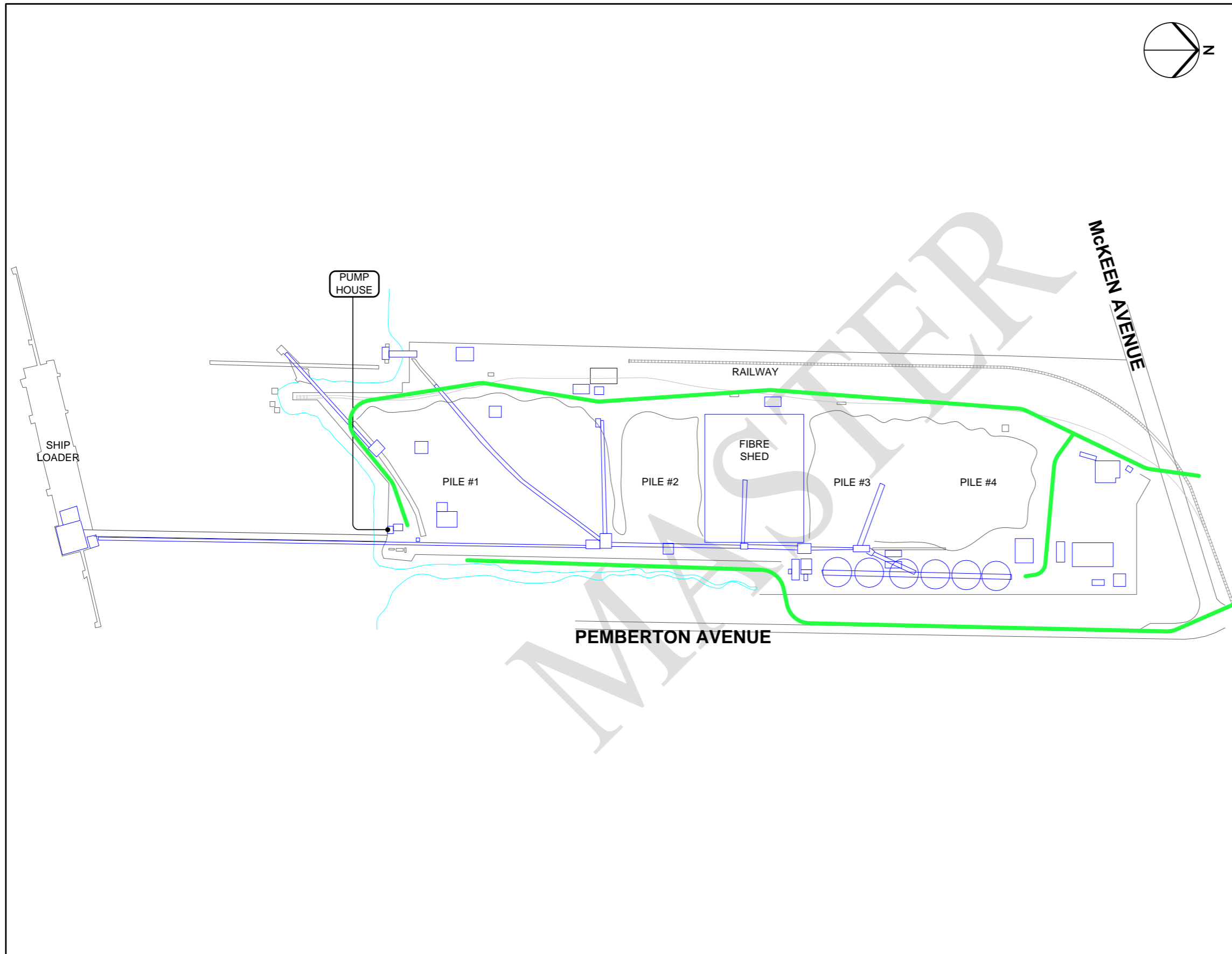
DRW. TITLE: **SITE**  
 Approximate Locations

|                  |                        |
|------------------|------------------------|
| DATE: 11/19/2012 | PROJECT NO. 100111-220 |
| NOT TO SCALE     | DRAWING NO. 1          |
| DWG. BY: AF      |                        |

---

ALL DRAWINGS, DESIGNS AND RELATED INFORMATION HEREIN IS THE PROPERTY OF OLCC INC. IT IS NOT TO BE USED, COPIED, OR REPRODUCED WITHOUT WRITTEN PERMISSION FROM OLCC INC.

SHEET: 1



**ORSO LOSS CONTROL CONSULTING Inc.**

Tel: 604-761-6381  
 Fax: 604-590-0704  
 orsolosscontrol.com

PROJECT/CLIENT:  
**Fibreco**  
 1209 McKeen Avenue,  
 North Vancouver, B.C.

**SYMBOL LEGEND**

|  |                          |  |                            |
|--|--------------------------|--|----------------------------|
|  | Fire Extinguisher        |  | Floor Isolation Valve      |
|  | Manual Pull Station      |  | Domestic Water Valve       |
|  | Exit Route               |  | Generator                  |
|  | Fire Alarm Control Panel |  | Fire Department Connection |
|  | Fire Alarm Annunciator   |  | Electrical                 |
|  | Sprinkler Valves         |  | Sliding/Overhead Door      |
|  | Gas Valves               |  | Fire Fighters Keys         |
|  | Primary Entry Point      |  |                            |
|  | Fire Hose                |  |                            |

| No. | DESCRIPTION | DATE     | BY |
|-----|-------------|----------|----|
| 1   | MANUAL DWG  | 11/19/12 | AF |

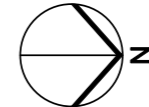
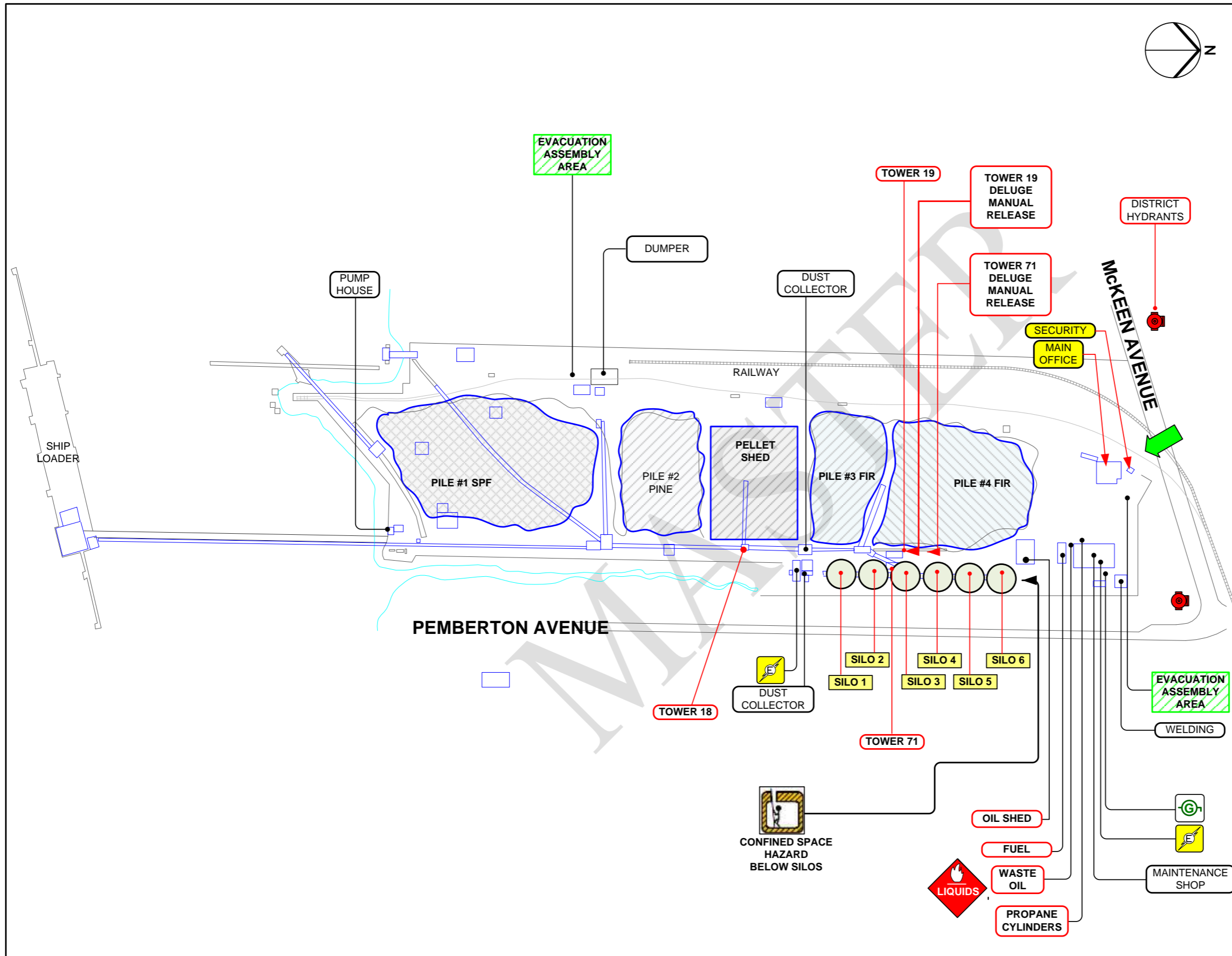
REVISIONS

DRW. TITLE:  
**Fire Department Vehicle Access**  
 Approximate Locations

|                  |                        |
|------------------|------------------------|
| DATE: 11/19/2012 | PROJECT NO. 100111-220 |
| NOT TO SCALE     | DRAWING NO. 1          |
| DWG. BY: AF      |                        |

ALL DRAWINGS, DESIGNS AND RELATED INFORMATION HEREIN IS THE PROPERTY OF OLCC INC. IT IS NOT TO BE USED, COPIED, OR REPRODUCED WITHOUT WRITTEN PERMISSION FROM OLCC INC.

SHEET: 1



**ORSO LOSS CONTROL CONSULTING Inc.**

Tel: 604-761-6381  
 Fax: 604-590-0704  
 orsolosscontrol.com

PROJECT/CLIENT:  
**Fibreco**  
 1209 McKeen Avenue,  
 North Vancouver, B.C.

**SYMBOL LEGEND**

|  |                          |  |                            |
|--|--------------------------|--|----------------------------|
|  | Fire Extinguisher        |  | Floor Isolation Valve      |
|  | Manual Pull Station      |  | Domestic Water Valve       |
|  | Exit Route               |  | Generator                  |
|  | Fire Alarm Control Panel |  | Fire Department Connection |
|  | Fire Alarm Annunciator   |  | FDC                        |
|  | Sprinkler Valves         |  | Electrical                 |
|  | Gas Valves               |  | Sliding/Overhead Door      |
|  | Primary Entry Point      |  | Fire Fighters Keys         |
|  | Fire Hose                |  |                            |

| No. | DESCRIPTION | DATE     | BY |
|-----|-------------|----------|----|
| 1   | MANUAL DWG  | 11/19/12 | AF |

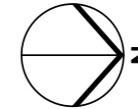
REVISIONS

DRW. TITLE:  
**GENERAL SITE FEATURES**  
 Approximate Locations

|                  |                        |
|------------------|------------------------|
| DATE: 11/19/2012 | PROJECT NO. 100111-220 |
| NOT TO SCALE     | DRAWING NO. 1          |
| DWG. BY: AF      |                        |

ALL DRAWINGS, DESIGNS AND RELATED INFORMATION HEREIN IS THE PROPERTY OF OLCC INC. IT IS NOT TO BE USED, COPIED, OR REPRODUCED WITHOUT WRITTEN PERMISSION FROM OLCC INC.

SHEET: 1

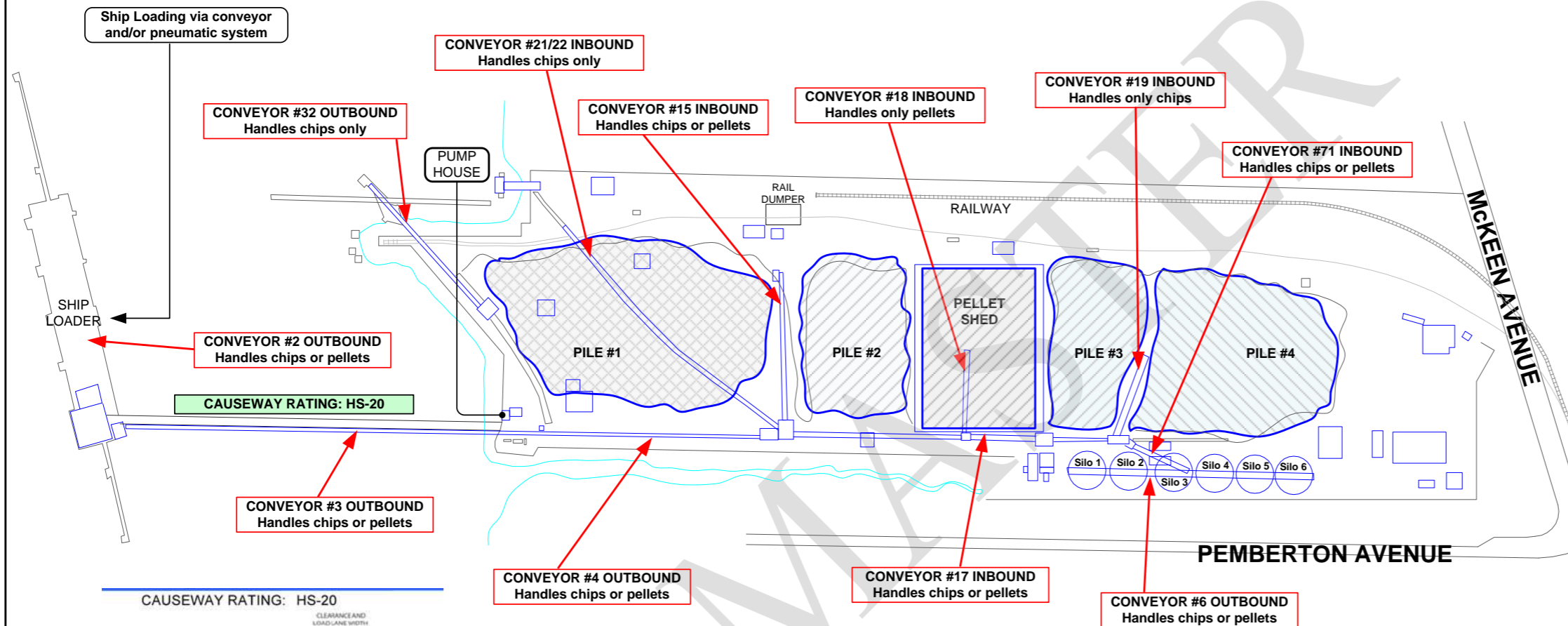


**ORSO LOSS CONTROL CONSULTING Inc.**

Tel: 604-761-6381  
 Fax: 604-590-0704  
 orsolosscontrol.com

PROJECT/CLIENT:

Fibreco  
 1209 McKeen Avenue,  
 North Vancouver, B.C.



**SYMBOL LEGEND**

|  |                          |  |                            |
|--|--------------------------|--|----------------------------|
|  | Fire Extinguisher        |  | Floor Isolation Valve      |
|  | Manual Pull Station      |  | Domestic Water Valve       |
|  | Exit Route               |  | Generator                  |
|  | Fire Alarm Control Panel |  | Fire Department Connection |
|  | Fire Alarm Annunciator   |  | Electrical                 |
|  | Sprinkler Valves         |  | Sliding/Overhead Door      |
|  | Gas Valves               |  | Fire Fighters Keys         |
|  | Primary Entry Point      |  |                            |
|  | Fire Hose                |  |                            |

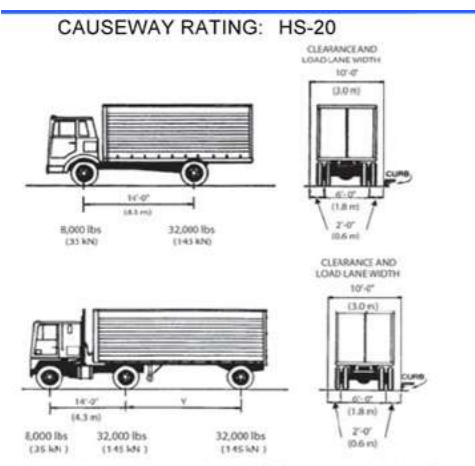
| REVISIONS |             |          |    |
|-----------|-------------|----------|----|
| No.       | DESCRIPTION | DATE     | BY |
| 1         | MANUAL DWG  | 11/19/12 | AF |

DRW. TITLE: **Conveyors**  
 Approximate Locations

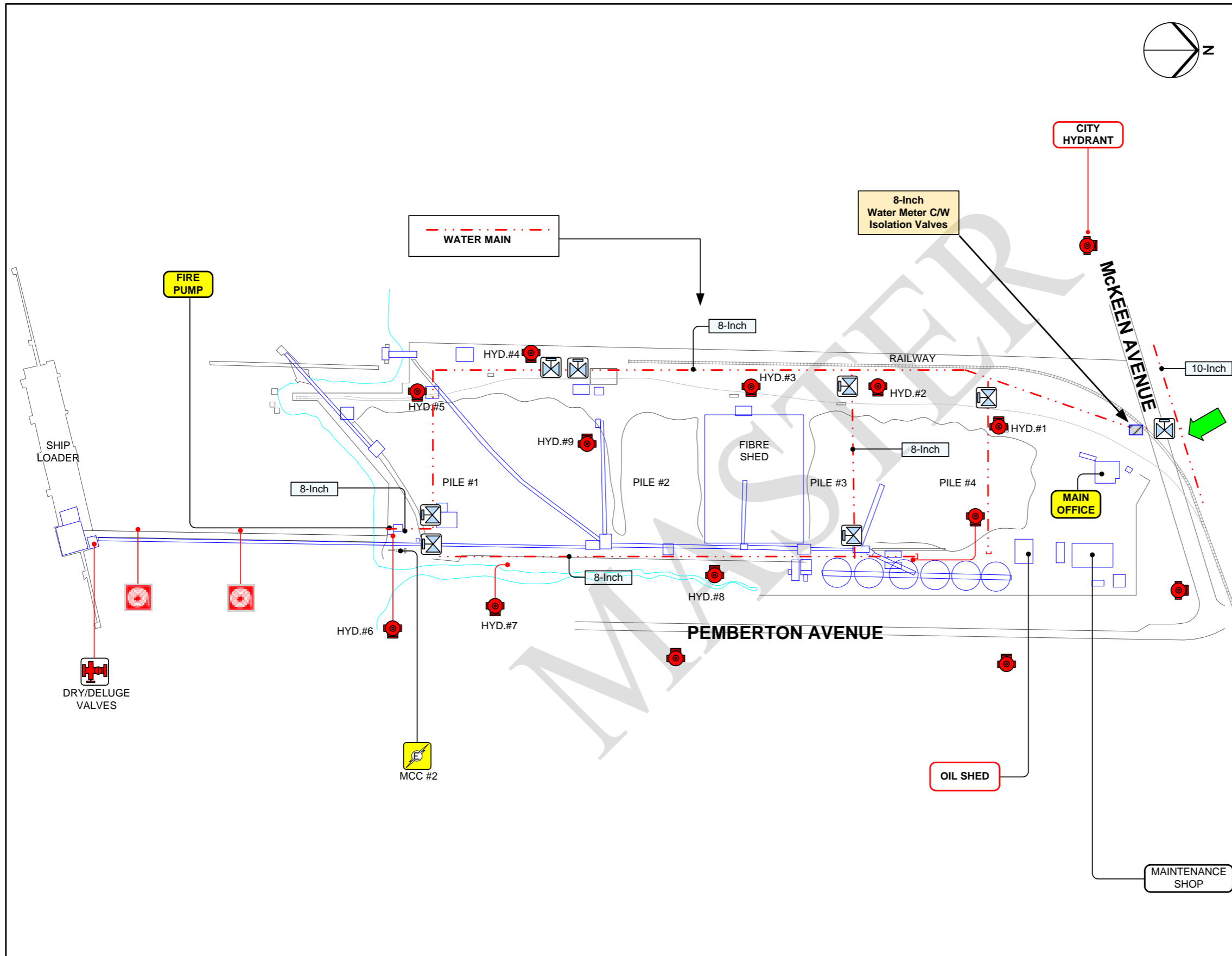
|                  |                        |
|------------------|------------------------|
| DATE: 11/19/2012 | PROJECT NO. 100111-220 |
| NOT TO SCALE     | DRAWING NO. 1          |
| DWG. BY: AF      |                        |

ALL DRAWINGS, DESIGNS AND RELATED INFORMATION HEREIN IS THE PROPERTY OF OLCC INC. IT IS NOT TO BE USED, COPIED, OR REPRODUCED WITHOUT WRITTEN PERMISSION FROM OLCC INC.

SHEET: 1



These sketches illustrate the AASHTO-approved live loading specifications for standard H20 and HS20 trucks.  
 Source: AASHTO Standard Specifications for Highway Bridges.



**ORSO LOSS CONTROL CONSULTING Inc.**

Tel: 604-761-6381  
Fax: 604-590-0704  
orsolosscontrol.com

---

PROJECT/CLIENT:

Fibreco  
1209 McKeen Avenue,  
North Vancouver, B.C.

---

**SYMBOL LEGEND**

|  |                          |  |                            |
|--|--------------------------|--|----------------------------|
|  | Fire Extinguisher        |  | Floor Isolation Valve      |
|  | Manual Pull Station      |  | Water Control Valve        |
|  | Exit Route               |  | Generator                  |
|  | Fire Alarm Control Panel |  | Fire Department Connection |
|  | Fire Alarm Annunciator   |  | FDC                        |
|  | Sprinkler Valves         |  | Electrical                 |
|  | Gas Valves               |  | Sliding/Overhead Door      |
|  | Primary Entry Point      |  | Fire Fighters Keys         |
|  | Fire Hose                |  |                            |

---

| No. | DESCRIPTION | DATE     | BY |
|-----|-------------|----------|----|
| 1   | MANUAL DWG  | 11/19/12 | AF |

REVISIONS

---

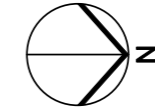
DRW. TITLE: **Water Mains**  
Approximate Locations

|                  |                        |
|------------------|------------------------|
| DATE: 11/19/2012 | PROJECT NO. 100111-220 |
| NOT TO SCALE     | DRAWING NO. 1          |
| DWG. BY: AF      |                        |

---

ALL DRAWINGS, DESIGNS AND RELATED INFORMATION HEREIN IS THE PROPERTY OF OLCC INC. IT IS NOT TO BE USED, COPIED, OR REPRODUCED WITHOUT WRITTEN PERMISSION FROM OLCC INC.

SHEET: 1



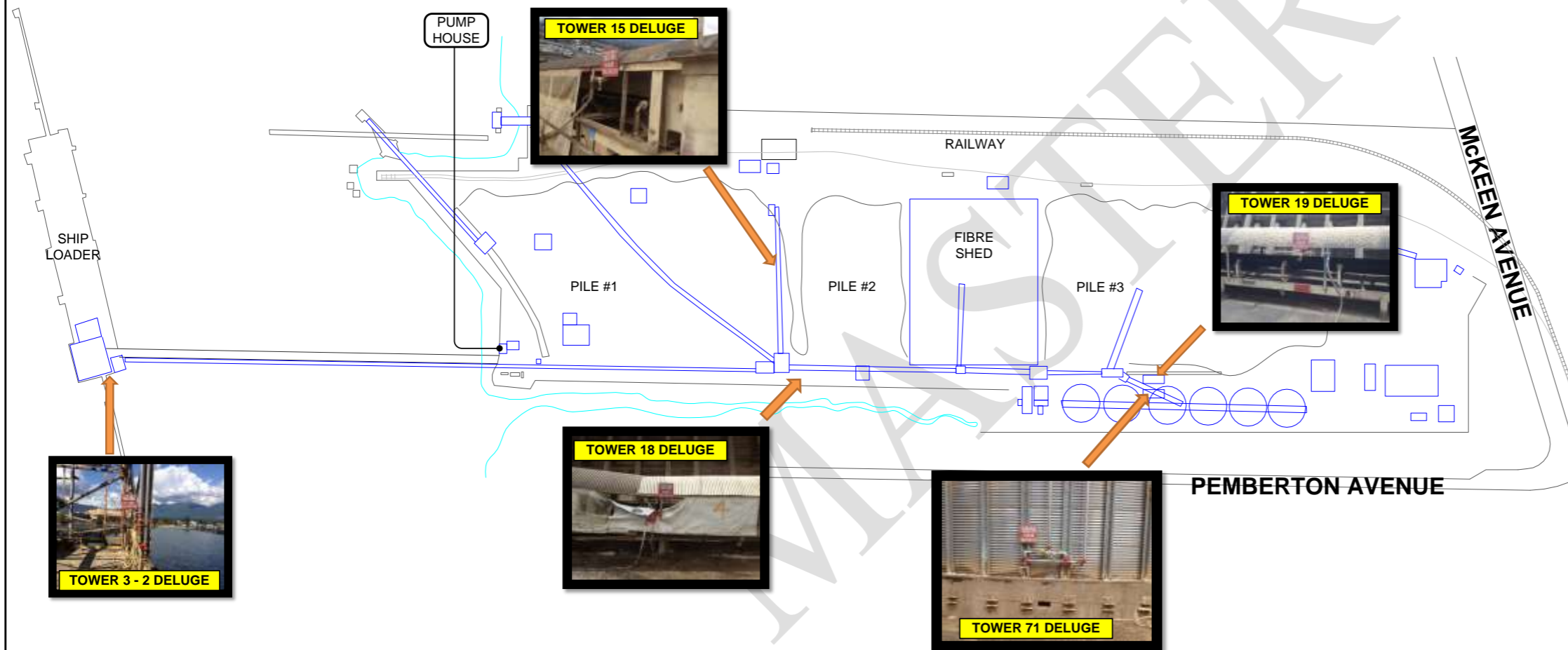
**ORSO LOSS CONTROL CONSULTING Inc.**



Tel: 604-761-6381  
 Fax: 604-590-0704  
 orsolosscontrol.com

PROJECT/CLIENT:

Fibreco  
 1209 McKeen Avenue,  
 North Vancouver, B.C.



**SYMBOL LEGEND**

- Fire Extinguisher
- Manual Pull Station
- Exit Route
- Fire Alarm Control Panel
- Fire Alarm Annunciator
- Sprinkler Valves
- Gas Valves
- Primary Entry Point
- Fire Hose
- Floor Isolation Valve
- Domestic Water Valve
- Generator
- Fire Department Connection
- Electrical
- Sliding/Overhead Door
- Fire Fighters Keys

| No.       | DESCRIPTION | DATE     | BY |
|-----------|-------------|----------|----|
| 1         | MANUAL DWG  | 11/19/12 | AF |
| REVISIONS |             |          |    |

DRW. TITLE: **Manual Deluge Valves**  
 Approximate Locations

|                  |                        |
|------------------|------------------------|
| DATE: 11/19/2012 | PROJECT NO. 100111-220 |
| NOT TO SCALE     | DRAWING NO. 1          |
| DWG. BY: AF      |                        |

ALL DRAWINGS, DESIGNS AND RELATED INFORMATION HEREIN IS THE PROPERTY OF OLCC INC. IT IS NOT TO BE USED, COPIED, OR REPRODUCED WITHOUT WRITTEN PERMISSION FROM OLCC INC. SHEET: 1



MASTER