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Non-Proprietary Information

BWRX-300 Darlington New Nuclear Project (DNNP) Preliminary Fire Hazards Assessment Report

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1.0 INTRODUCTION

1.1 Purpose

This document describes the fire hazard analysis for the OPG Darlington New Nuclear Project (DNNP) BWRX-300. This document reviews the applicable codes and standards, defines necessary acceptance criteria, informs the fire protection design, and reviews the preliminary design of other systems as related to the FHA and confirms suitability. This document is currently preliminary and does not include all the analysis that is necessary for a complete fire hazard assessment. The document will be expanded in the future to address the fire hazard assessment in more detail, including a review of the fire hazards for each building in the protected area of the OPG DNNP BWRX-300 facility.

1.2 Scope

This document identifies applicable codes and standards for the fire hazard assessment. In addition, this document reviews the prescriptive and performance-based requirements of the applicable codes and standards and provides acceptance criteria for the DNNP. Expansion to this document will provide further analysis of the OPG DNNP, based on the progression of the design and analyze the fire protection system design against the design criteria. Information directly related to the fire protection system is found in Document [[ ]]. BWRX-300 Fire Protection CNSC VDR Focus Area 12 Vendor Design Review Information related to Document [[ ]], BWRX-300 Fire Protection System (FPS). While references to life safety are made in this Fire Hazard Assessment (FHA), the complete Life Safety Egress Assessment is in several separate documents identified in Section 5.

2.0 APPLICABLE DOCUMENTS

The following documents are applicable to the fire hazard assessment for the BWRX-300 facility. These documents are used as the basis for further design.

2.1 Supporting Requirements Documents

A. [[ ]], OPG Applicable Codes and Standards Report

B. [[ ]], OPG DNNP-1 BWRX-300 Fire Safety Shutdown Analysis Requirements Document

C. [[ ]], Plant Level Architectural and Life Safety Design Specification

2.2 Codes and Standards

This FHA, for the OPG DNNP BWRX-300 facility, is performed based on the Canadian Regulatory Document CSA N293-12 (R2017), CSA N293S1:21, and associated references. Additionally, other codes and standards have been referenced for specific areas as the basis for a performance-based analysis. The following codes and standards form the basis of this analysis to the extent specified herein. Reference [[ ]] OPG Applicable Codes and Standards Report, for applicable editions.

2.2.1 Canadian Regulatory Documents

A. CSA N293-12 (R2017) Fire Protection for Nuclear Power Plants

B. CSA N293S1:21 Supplement No.1 to CSA N293-12: Fire protection for nuclear power plants (application to small modular reactors)

2.2.2 Canadian Codes and Standards

A. National Building Code of Canada (NBCC), where specifically referenced in CSA N293

B. National Fire Code of Canada (NFCC), where specifically referenced in CSA N293

C. CSA C22.1-12 Canadian Electrical Code, Part 1

2.2.3 International Codes and Standards

A. NFPA 10, Standard for Portable Fire Extinguishers

B. NFPA 11, Standard for Low-, Medium-, and High-Expansion Foam Systems

C. NFPA 12, Standard for Carbon Dioxide Extinguishing Systems

D. NFPA 13, Standard for the Installation of Sprinkler Systems

E. NFPA 14, Standard for the Installation of Standpipe and Hose Systems

F. NFPA 15, Standard for Water Spray Fixed Systems for Fire Protection

G. NFPA 20, Standard for the Installation of Stationary Pumps for Fire Protection

H. NFPA 22, Standard for Water Tanks for Private Fire Protection

I. NFPA 30, Flammable and Combustible Liquids Code

J. NFPA 37, Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines

K. NFPA 51B, Standard for Fire Prevention During Welding, Cutting, and Other Hot Work

L. NFPA 70, National Electrical Code

M. NFPA 75, Standard for the Protection of Information Technology Equipment

N. NFPA 80, Standard for Fire Doors and Other Opening Protectives

O. NFPA 101, Life Safety Code

P. NFPA 220, Standard on Types of Building Construction

Q. NFPA 600, Standard on Facility Fire Brigades

R. NFPA 780, Standard for the Installation of Lightning Protection Systems

S. NFPA 804, Standard for Fire Protection for Advanced Light Water Reactor Electric Generating Plants

T. NFPA 806, Performance-Based Standard for Fire Protection for Advanced Nuclear Reactor Electric Generating Plants Change Process

U. NFPA 855, Installation of Stationary Energy Storage Systems

V. NFPA 2001, Standard on Clean Agent Fire Extinguishing Systems

W. IEEE 383, Standard for the Type Test of Class 1E Electrical Cables, Field Splices and Connections for Nuclear Power Generating Stations

3.0 REQUIREMENTS

CSA N293-12 and CSA N293S1 are the base requirements for fire protection for the BWRX-300 facility. This FHA is required by CSA N293 to ensure an adequate level of fire protection in the plant. The FHA documents are required to be submitted to the AHJ for acceptance (N293, 4.6.1). Where specific design or operational requirements are not addressed in this standard, the NBCC, or the NFCC, good engineering practice shall apply and, where appropriate, recognized Standards (such as those of the National Fire Protection Association (NFPA) shall be used (N293, 5.1.3).

When specifying requirements, "shall" is used to denote actions that must be performed or requirements that must be met. "Should" is used to indicate recommended practices and guidance. Each requirement and guideline statement are accompanied by a basis which provides the justification for why the requirement or guideline exists, why it is specified in a particular manner, and why it has a particular value.

Exceptions noted in the requirements tables are approved and identified in the referenced code. Any exceptions or deviations from the specific requirements are identified and justified in the specific building assessment.

3.1 General Construction and Other System Requirements

The following general construction features, base requirements of CSA N293 and good engineering practices, are used as the basis for the fire hazard assessment.

The assessment is based on the existing level of design and on the currently planned, but not yet purchased, equipment. The assessment provides a basis for evaluating the fire protection characteristics and features of equipment as it is purchased.

[LATER] The buildings are generally steel frame construction except for the Rad Waste Building which is of reinforced concrete construction and the Reactor Building which is steel composite construction. The walls, floors, and ceilings have 3-hour fire resistance ratings where required based on high combustible loadings (lubrication oil tank, for example) in the room or where an adjacent room contains equipment or systems from a different Safety-Related division. Corridors, stair enclosures and elevator hoistways that do not communicate between areas of different Safety-Related divisions may have walls with a 2-hour minimum fire rating. Non-concrete interior walls are constructed of metal studs and gypsum wallboard to the required fire resistance rating. Additional buildings beyond the power block will be analyzed based on their intended use at as their design is developed.

Basis: N293, 5.7.5.1.2 & NBCC

[LATER] All structures, including buildings, above-ground tanks, stacks, antennas, construction cranes, and meteorological towers, shall be protected by a lightning protection system in accordance with NFPA 780.

Basis: N293, 6.8.9.3

[LATER] Doors penetrating rated fire barriers comply with NBCC or equivalent NFPA ratings for that barrier. There are also doors that provide fire area separation that may not be

labeled fire doors but do provide equivalent protection. Typically, these are the doors for the personnel air lock into the reactor containment and the missile/tornado doors at the equipment access entrance to the Reactor Building (RB). The term “doors,” where used in the analysis means doors, frames, and hardware

Basis: NBCC Table 3.1.8.4

[LATER] The fireproofing of structural steel members, where required by calculation based on combustible loading, is accomplished by application of an Underwriters Laboratory of Canada (ULC) or equivalent Underwriters Laboratory (UL) - listed or Factory Mutual (FM)-approved cementitious or ablative material, or by an UL- listed or FM-approved boxing design. The required fire rating determines the fireproofing material thickness. Gypsum board is utilized for protection of fireproofing in high traffic or office areas.

Basis: NBCC

[LATER] Where fire rated construction is provided, all supporting elements shall have the same fire-resistance rating as the construction being supported. If used, continuity of fireproofing shall be maintained.

Basis: NBCC

[LATER] The building arrangement and equipment layout shall be designed with consideration of the need for access for manual firefighting by responders with full turnout gear.

Basis: N293, 7.3.8.2

[LATER] Surface finishes (wall and ceiling) are specified to meet flame spread index of 0-25 and smoke-developed index of 0-100) in accordance with CAN/ULS-S102. Floor finishes have a flame spread rating of 0-300 and a smoke development classification less than 450 when tested in accordance with ASTM E648 and ASTM E662. The epoxy liner on the containment wall has a flame spread rating less than or equal to 40 when tested in accordance with CAN/ULC-S102 or CAN/ULC-S102.2.

Basis: N293, 6.8.1.4

[LATER] Filter media (excluding charcoal filters and high efficiency particulate air (HEPA) filters) used in air handling systems meet the combustibility requirements of Class I in accordance with CAN/ULC-S111

Basis: N293, 6.8.3.2

[LATER] The use of plastic materials, including electrical cable insulation other than IEEE 383 is minimized in the BWRX design.

Basis: N293, 5.3.2

[LATER] Electrical cable in open tray raceways is limited to low voltage cable and meets IEEE 383 standards. Vertical cables have a maximum vertical char of 1.5m when tested in accordance with the vertical flame tray test (Method 2-FT4) test in CSA C22.2 No. 2556. Circuitry over 1000 volts is in conduit.

Basis: N293, 6.8.4.4

[LATER] The electrical cable fire-stops are tested to demonstrate a fire rating equal to the rating of the barrier they penetrate. As a minimum the penetrations meet the requirements of NUREG-1552, including Supplement 1/ CSA C22.2 No 0.3. The tests are performed or witnessed by a representative of a qualified, independent testing laboratory. The documented test results for the acceptable fire-stops are made a part of the plant design records.

Basis N293, 6.5.2.1

[LATER] Control, power, or instrument cables and equipment of redundant systems used for achieving and maintaining safe shutdown, are separated from redundant systems by three hour rated fire barriers, except within inerted containment. Where the equipment of more than one division is required to be located within a single fire area (Control Room), cables are within conduit or a floor trench.

Basis: N293 6.3.1.1

[LATER] Certain areas of the plant have cable trays in a stacked array. Where stacking of trays occurs, power cable, which is the most susceptible to internally generated fires, is routed in the uppermost tray to the greatest extent possible to provide isolation from other trays in the stack. A vertical separation of 0.5 m spacing is provided between horizontal cable trays. Groups of stacked tray are separated from each other by 1.8 to 2.5 m horizontally.

Basis: N293 6.5.3

[LATER] Cables for local indication (meters) are included in the safe shutdown analysis where failure of the cable could cause failure of functionally associated circuits or where required to provide either diagnostic or process parameter information for recovery.

Basis: N293 5.4.2.6

[LATER] Electrical and Control Cabinets shall be designed to limit flame spread across cabinets.

Basis: N293, 6.8.4.2

[LATER] Suspended ceilings are used in some areas of the plant. The ceilings, including the lighting fixtures, are of noncombustible construction.

Basis: N293, 5.7.1.1

[LATER] Emergency lighting is provided throughout the protected area in paths of egress, manual firefighting areas, control rooms, areas where field actions are expected, airlocks and transfer chambers. The emergency lights will be a mix of lights with battery packs and lights on the generator buss. Details of the design and installation will be per N293 and the NBCC.

Basis: N293, 5.5.1(f), 6.6.1.2, NBCC

[LATER] Communication systems are provided throughout the protected area. Details of the design and installation will be per N293 and the NBCC.

Basis: N293, 10.6, B.3.5.5.8, NBCC

[LATER] Total reliance on a single fire suppression method is not used. At least two fire suppression methods are available to suppress a fire in each fire area. The plant design provides the following types of suppression methods and utilizes them in suitable combination for the fire hazard considered:

a. Automatic wet pipe sprinkler system.
b. Automatic preaction sprinkler system.
c. Automatic dry pipe sprinkler system.
d. Automatic deluge sprinkler or spray system.
e. Manual deluge sprinkler or spray system.
f. Standpipe and hose stations.
g. Portable fire extinguishers.

Basis: N293 5.7.4

[LATER] Fire response capability commensurate with the fire hazards at the plant is required for the life cycle of the plant (N293-17, Clause 10.1). One component of the fire response capability is the fire brigade. N293-S1 clarifies that the FHA analysis shall determine the need for manual response and the compliment of organizations assumed to respond. A fire brigade, as defined in Clause 10.2, for incipient firefighting, followed by the municipal fire fighters for full attack is required, based on the assessment in this FHA. See Section 4.2.2 of this report for additional detail.

Basis: N293, 10.2

[LATER] Fire protection piping within the Reactor Building is designed to maintain pressure integrity following a Safe Shutdown Earthquake (SSE). The standpipes which supply firewater to hose stations covering safe shutdown equipment are contained within the concrete stairwells or dedicated concrete chases, and thus, are protected from other phenomena of less severity and greater frequency.

Basis: N293 5.7.7.1

[LATER] Diking, drainage, a combination of both, or other means of containment shall be provided to limit the spread of flammable and combustible liquids (including firefighting

water contaminated with flammable and combustible liquids) and to divert liquid from equipment that, when damaged by water, becomes inoperable and affects nuclear safety. Individual diked area shall not exceed 25% of the sprinkler design area except where the size of the fire compartment is less than 1000 m² (10,000 ft.²). Diking or the diking/drainage combination shall contain and/or control the volume of liquid and firefighting water within the sprinkler design area based on a 30 minute discharge.

Additionally diking, drainage, a combination of both, or other means of containment should be provided to:

a. Reduce equipment damage
b. Prevent damage to the environment
c. Maintain access for firefighters

Basis: N293, 7.3.3.6 / A7.3.3.6

[LATER] Piping cable tray, and other penetrations are provided with fire-stops when penetrating fire rated barriers.

Basis: N293, 6.5.2.1

[LATER] Heating, Ventilation and Air Conditioning (HVAC) penetrations through 2-hour or 3-hour rated fire barriers are provided with fire dampers compatible with the rating of the fire barrier.

Basis: NBCC, Division B, Part 3

[LATER] Spill control is provided to contain the contents of any above grade oil-filled vessel or tank larger than 208 liters (55 gallons) and all tanks containing chemicals used in water/wastewater treatment or quality control.

In accordance with NFPA 804 and Regulatory Guide (RG) 1.189, the following design criteria are used for fire containment sizing:

Drainage and any associated drainage facilities for a given area is sized to accommodate the volume of liquid produced by all the following:

a. The spill of the largest single container of any flammable or combustible liquids in the area.
b. Where automatic suppression is provided throughout, the credible volume of discharge (as determined by the fire hazard assessment) for the suppression systems operating for a period of 30 minutes.
c. Where automatic suppression is not provided throughout, the contents of piping systems and containers that are subject to failure in a fire.
d. Where the installation is outside, credible environmental factors such as rain and snow.
e. Where automatic suppression is not provided throughout, the volume is based on a manual fire-fighting flow rate of 1900 l/m (500 gal/m) for a duration of 30

minutes, unless the fire hazard assessment demonstrates a different flow rate and duration.

Basis: N293, 7.3.3.6, A.7.3.3.6, 7.3.1.1.3(q) / A7.3.1.1.3(q) NFPA 804, Regulator Guide (RG) 1.189

[LATER] The post-fire safe-shutdown circuit analysis will assume that any spurious actuations associated with a postulated fire occur simultaneously or in rapid succession.

Basis: N293, B.4.5.2

[LATER] Circuit routing will conform to the methodology provided in Revision 1 of NEI 00-01, Guidance for Post-Fire Safe Shutdown Analysis, in accordance with RIS 05-030, NRC Regulatory Issue Summary 05-30, Clarification of Post-Fire Safe Shutdown Circuit Regulatory Requirements.

Basis: NEI 00-01

[LATER] Control Room equipment cabinets shall be designed such that fire cannot spread through openings and along cable traveling between adjacent equipment cabinets.

Basis: N293 A.5.7.8.4

4.0 FIRE HAZARD ASSESSMENT

4.1 Introduction

N293-12 (reaffirmed 2017) Fire protection for Nuclear Power Plants, and Supplement No. 1 (application to small modular reactors) requires and provides guidance in the preparation of the Fire Hazard Assessment (FHA). The standard provides the minimum fire protection requirements for the design, construction, commissioning, operation, and decommissioning of nuclear power plants, including structures, systems, and components (SSCs) that directly support the plant and the protected area. The standard contains prescriptive and performance-based requirements and recommendations for the facility. To ensure an adequate level of fire protection, a fire protection assessment is to be prepared, demonstrating compliance with the applicable requirements of this standard. Documents forming part of the fire protection assessment shall be submitted to the AHJ for acceptance.

The FHA is a living document that informs the design process and construction. The document should be reviewed and updated to include any changes occurring during construction and changes occurring during the life of the plant. The requirements for modifications are included in N293, Article 5.9.

4.1.1 Goals

The fire protection goals for the plant are:

- Minimize the risk of radiological releases to the public that are a result of fire
- Protect plant occupants from death or injury due to fire
- Minimize economic loss resulting from fire damage to structures, equipment and inventories
- Minimize the impact of radioactive and hazardous materials on the environment as a result of fire

4.1.2 Defense-in-Depth Principle

The defense in depth principle shall be used to achieve a high degree of fire protection by providing redundancy, diversity and balance in fire protection measures the elements of the defense in depth principle for the Fire Hazard Assessment and design, are as follows:

- Prevent Fires - Design measures shall be put in place to reduce or eliminate, where practical, combustible materials and ignition sources.
- Fire Detection and Suppression - Means shall be provided to quickly detect and extinguish or control fires.
- Limit the Effects of Fire - Fire separations or other measures shall be provided to limit the spread of fire and its affects, thus minimizing the impact on the plant and its occupants.

4.1.3 Objective

The FHA objective is to identify the specific hazards in fire protection capabilities in each area of the plant to demonstrate the potential damage will be limited by various active and passive fire protection measures, such that the fire protection goals of this standard are achieved.

4.1.4 Scope

This Fire Hazard Assessment (FHA) establishes and evaluates distinct fire areas for the power block (Reactor Building, Rad Waste Building, Turbine Building, Control Building and Plant Services Area) and other standalone buildings, structures or equipment in the protected area for the OPG DNNP BWRX-300 plant. These other buildings, structures or equipment include but are not limited to:

- Fire Pump Enclosure
- Outdoor Transformers

Additionally, equipment or buildings outside the protected area that directly affect the safe operation of the plant, such as the fuel oil storage tank(s), will be in the scope.

4.1.5 Terminology

Fire Area - that portion (aggregate floor area) of a building or plant enclosed and bounded by fire walls, fire barriers, exterior walls, fire-resistance rated horizontal assemblies of a building, or other means in order to contain fire within that area.

Fire Alarm System - a system or portion of a combination system that consists of components and circuits arranged to monitor and annunciate the status of fire alarm or supervisory signal initiating devices and to initiate the appropriate response to those signals.

Fire Barrier - a continuous vertical or horizontal fire-resistance rated construction assembly designed and constructed to limit the spread of heat and fire and to restrict the movement of smoke. Rated fire barriers are those fire barriers (e.g., walls, floors, ceilings, and their supports, including beams, joists, columns, penetration seals, fire doors, fire door closers/hold open devices, and fire dampers) that are rated, or capable of being rated, by proving laboratories in hours of resistance to fire and are used to prevent the spread of potential fire. Fire barriers that define the boundaries of a fire area should have a fire resistance rating of at least three hours. All openings (doors, windows, penetrations, ductwork, etc.) through fire barriers should be properly protected, sealed, and qualified by fire endurance testing to a fire resistance rating as required by the applicable codes, up to the same fire resistance rating of the fire barrier itself.

Fire Extinguishing System - fire extinguishing systems are fixed automatic or manually activated systems with agents including water mist, clean agent, carbon dioxide (CO_2), foam and dry chemicals.

Fire Extinguishers – a portable device carried or on wheels and operated by hand, containing an extinguishing agent that can be expelled under pressure for the purpose of suppressing or extinguishing a fire.

Fire Separation - a construction assembly that acts as a barrier against the spread of fire.

Fire Suppression System – an active water- based system that sharply reduces the heat release rate of a fire and prevents its regrowth by means of direct and sufficient application of water through the fire plume to the burning fuel surface. Manual fire suppression systems include standpipe and hose systems. Automatic fire suppression systems included water sprinkler or spray systems.

Fire Wall - a fire-resistance rated wall having unprotected openings, which restrict the spread of fire and extend continuously from the foundation to or through the roof, with sufficient structural stability under fire conditions to allow collapse of construction on either side without collapse of the wall.

Fire Zone- subdivisions of a fire area based on the fire hazard assessment to demonstrate that the fire protection systems and features within the fire zones provide an appropriate level of protection for the associated hazards.

Horizontal Exit - a way of passage from one building to an area of refuge in another building on approximately the same level, or a way of passage through or around a fire barrier to an area of refuge on approximately the same level in the same building that affords safety from fire and smoke originating from the area of incidence and areas communicating therewith.

Interior Exit Stairway - an exit component that serves to meet one or more means of egress design requirements, such as required number of exits or exit access travel distance and provides for a protected path of egress travel to the exit discharge or public way.

Means of Egress - A continuous and unobstructed way of travel from any point in a building or structure to a public way consisting of three separate and distinct parts: (1) the exit access, (2) the exit, and (3) the exit discharge.

Noncombustible Material - material that, in the form of which it is used in under the conditions anticipated, will not ignite, burn, support combustion, or release flammable vapors when subjected to fire or heat.

Performance Barrier – FPA fire zone boundaries within the plant that are credited to mitigate the effects of fire from one fire zone to another

Safety-Related Structures, Systems and Components - those structures, systems and components that are relied upon to remain functional during and following design basis events to assure:

(1) The integrity of the reactor coolant pressure boundary

(2) The capability to shut down the reactor and maintain it in a safe shutdown condition; or

(3) The capability to prevent or mitigate the consequences of accidents which could result in potential offsite exposures comparable to the applicable guideline exposures set forth in 10 CFR 50.34(a)(1) or 10 CFR 50.2, 100.11, and the Canadian equivalent (TBD) as applicable

Spatial Separation – separation by a physical distance sufficient to prevent damage by fire

Sprinkler System - a system, commonly activated by heat, from a fire and discharges water over the fire area, that consists of an integrated network of piping designed in accordance with fire protection engineering standards, that includes a water supply source, a water control valve, a waterflow alarm, and a drain. The portion of the sprinkler system above ground is a network of specifically sized or hydraulically design piping installed in a building, structure, or area, generally overhead, and to which sprinklers are attached in a systematic pattern.

Standpipe and Hose System - an arrangement of piping, valves, hose connections, and associated equipment installed in a building or structure, with the hose connections located in such a manner that water can be discharged in streams or spray patterns through attached hose and nozzles, for the purpose of extinguishing a fire, thereby protecting the building or structure and its contents, in addition to protecting the occupants.

Water Spray System - an automatic or manually actuated fixed pipe system connected to a water supply and equipped with water spray nozzles designed to provide a specific water discharge and distribution over the protected surfaces or area.

4.1.6 Systems Required to Achieve Safe Shutdown in the Event of Fire

See systems noted in the OPG DNNP-1 BWRX-300 Fire Safety Shutdown Analysis Requirements Document (2.1.B).

4.1.7 Redundant Non-Safety-Related Systems and Equipment

The fire protection system relies on the non-safety related power supply system (R30) which is redundant for normal power. There are no redundant non-safety related systems or equipment required to achieve safe shutdown in the event of fire per the Fire Safety Shutdown Analysis Requirements Document.

4.1.8 Fire Safety Shutdown Analysis Approach

The Fire Safety Shutdown Analysis Requirements Document utilizes a deterministic methodology as the primary analysis approach. See reference 2.1.B for further details.

4.1.9 Fire Hazard and Safety Shutdown Analysis Summary

The systems and components affected by the Fire Safe Shutdown Analysis are noted in reference 2.1.B. See the Fire Safety Shutdown Analysis and Requirements Document for more details.

4.2 Fire Response Capability

Fire response capability commensurate with the fire hazards at the plant is required for the life cycle of the plant (CSA N293-17, Clause10.1.1). One component of the fire response capability is the fire brigade (CSA N293-17, Clause 10.1.2). The fire response capability shall be based on the analysis of Clause 10.1.4 (CSA N293-S1, Clause 10.1.2). This analysis, to be referred to as Fire Response Needs Analysis (FRNA), shall determine the need for manual response and the compliment of organizations including brigade make-up, minimum compliment, training (in accordance with N293 and NFPA 600), and equipment capacity. This FHA will provide the analysis of the postulated fires for the FRNA to determine the required fire response needs of the facility (CSA N293-S1, Clause 10.1.4).

As noted below in the FHA, many rooms and/or fire areas have a relatively low fire loading (below 700 MJ/m^2, except electrical rooms which are limited to 1400 MJ/m^2), and thus a practical design choice was made to rely on manual means (hose streams and fire extinguishers) as the primary and backup fire suppression. Therefore, for the purposes of this FHA, a fire brigade, as defined in Clause 10.2, is assumed to be required for this facility. The fire response capability for this facility will be a combination of both the on-site industrial fire brigade and municipal fire departments. The necessary compliment of on-site industrial fire brigade, as determined by the FRNA, is required to be on site at all times. These members, while forming the minimum compliment, are only permitted to be on dual roles that permit immediate response. It is understood that the licensee will have a mutual aid agreement with the municipality who will provide the external fire fighters to compliment the industrial fire brigade.

For the purpose of this FHA, implementation of the fire attack plan no later than 15 minutes of notification of the fire is assumed (CSA N293, Clause 10.8.3). The on-site fire brigade is to perform incipient stage firefighting as defined in NFPA 600, prior to the arrival of the municipal fire department. Upon arrival of the municipal fire department, the on-site fire brigade will split evenly and integrate with the municipal firefighters to form main and back-up response teams to implement the fire attack plan. On-site industrial fire brigade members will hold the necessary qualifications and training to escort the combined response team into radiological areas (CSA N293-17, Clause 10.4.3).

The required fire brigade training for all fire fighters shall be determined by the FRNA. For the purposes of this FHA, it is assumed that the external responders meet the requirements of NFPA 600 or 1081 as appropriate and the on-site industrial brigade training will meet all requirements in NFPA 600 and CSA N293 including the following additional requirements:

- Radioactivity and health physics considerations, including rad escort qualifications
- Use of protective clothing, respiratory protective equipment, radiation monitoring equipment and personal dosimeters

4.3 Fire Protection Requirements – Site / Protected Area

4.3.1 Water Supply

The protected area for the DNNP site is the area within the security fence. Buildings within the protected area are supplied with fire protection water from the fire pumps and tanks within the area and are addressed in the FHA. The only known structure outside the protected area that is directly related to plant operation is the fuel oil storage tank for the two Turbine Building diesel generators. This is understood to be a {40,000 – 50,000 gallon} steel, buried tank. Two tanks should be considered if the two diesel generators are required to be completely redundant to meet other non-safety requirements. A fire hydrant and wheeled fire extinguisher should be provided for the fuel unloading station. A fire line and hydrant could be extended from the protected area if fire hydrants are not being provided along the road outside the area.

4.3.2 Water Supply Requirements / Preliminary Calculations

The fire protection water supply for the area within the protected area is regulated by CSA N293. The source (make-up water for tanks) for fire protection water will be a tap to the municipal water main (from Clarington) along the rail right-of-way, north of the plant. This plant feed main (source) is required to be able to supply a minimum 7600 L/min (2000 gpm) at 1.4bar (20 psi) for additional availability of fire fighters.

The fire protection water supply is required to be sized for the largest expected flow rate for a 2-hour period. 2 x 100% capacity tanks are required by CSA N293 for redundancy. The tanks are required to be designed per NFPA 22. The feed main size from the municipal supply is driven from the 7600 L/min requirement above and thus tank refill can be accomplished in less than eight hours. The largest flow rate is anticipated to be the simultaneous operation of a turbine underfloor system (both levels) and the turbine bearing system, including hose streams. CSA N293 requires the flow of the highest demand system(s) plus the calculated demand for large hose where required by pre-fire plans, plus 2839 L/min (750 gpm) for attack hose streams. CSA N293S1 allows FHA consideration on the necessity of the large hose demand. Based on the provision of automatic sprinklers for the turbine underfloor / turbine bearing system (largest combined system demand) designed with the robust densities of the Annex (FM Global recommendations) and the smaller size of the building for the small modular reactor, 2839 L/min for inside and outside attack hose streams is considered adequate for simultaneous automatic and manual protection, without the need for additional large hose streams.

The most demanding sprinkler/hose stream flow is estimated as follows:

- Turbine Underfloor Systems (Ground Floor and Mezzanine Floor) – {9084L/min (2400gpm)}
- Turbine Bearing System – {1362L/min (360gpm)}
- Attack Hose Streams – 2839 L/min (750gpm)

Total Flow – {13,285 L/min (3510gpm)}

CSA N293 requires a standpipe minimum 690 kPa (100 psi) residual pressure at 950 L/min (250 gpm) at the most remote outlet, and design in accordance with NFPA 14. Each standpipe will be designed for a flow of 1900 L/min (950 L/min through each of the two most remote 65 mm outlets) with a minimum outlet pressure of 690 kPa (100psi). This flow and pressure will be achieved with the simultaneous flow of 946 L/min (250 gpm) at each of the other outlets in the given building.

The most demanding standpipe flow is the Turbine Building based on the four standpipes serving the building. The flow is 1900 L/min (500 gpm) in the most remote standpipe and 950 L/min (250 gpm) at the other three standpipes (total flow of {4750 L/min (1250 gpm)}. The highest hose station outlet is on the high roof (Stair A or B), Elevation 30.48M.

Demand Summary - The most demanding flow for the site is the Turbine Building sprinkler/hose stream demand of {13,285 L/min (3510 gpm)}. The most demanding standpipe flow is 4750 L/min (1250 gpm) with a minimum hose outlet pressure of 690 kPa (100 psi).

The Minimum Reservoir Capacity (Reservoir Usable Capacity) = 13,285 L/min X 2 hours = {1,594,200 L (421,200 gallons)}. Freeboard and sump will be determined by the tank design.

For calculation purposes the following component sizes, materials and assumptions were used:

- 3 – 2500 gpm at 145psi (8949 L/min at 10 bar) horizontal centrifugal fire pumps (2 pumps in service)
- Pump Discharge Piping = Steel Schedule 40, 305 mm (12 inch)
- Loop Piping = 13.7 m (45 feet) out from the power block buildings, HDPE DR9, 406 mm (16 inch), (311 mm, 12.23 inch ID)
- Building Feed Mains = HDPE DR9, 356 mm (14inch), (272 mm, 10.7inch ID)
- TB Interior Loop = Steel Schedule 40, 254 mm (10inch)
- Standpipes = Steel Schedule 40, 152 mm (6 inch)
- Sprinkler System residual pressure (base of riser) = 6.2 bar (90 psi)
- Sprinkler system hose allowance = (950 L/min inside and 1900 L/min outside)
- Shortest leg of the loop (between the pump house and the Turbine Building) was impaired

The most demanding sprinkler/hose stream and the most demanding standpipe (as defined above) were calculated with the following results (at the fire pump discharge flange):

- Turbine Building Sprinkler System – {13 514 L/min at 8.76 bar (3570 gpm at 127 psi)}
- Turbine Building Standpipe System – {4732 L/min at 10.14 bar (1250 gpm at 147 psi)}

Although the metric units are listed first above, please note that calculations were performed with hard Imperial units and converted to Metric values.

The above values are preliminary and will be refined as the design work progresses.

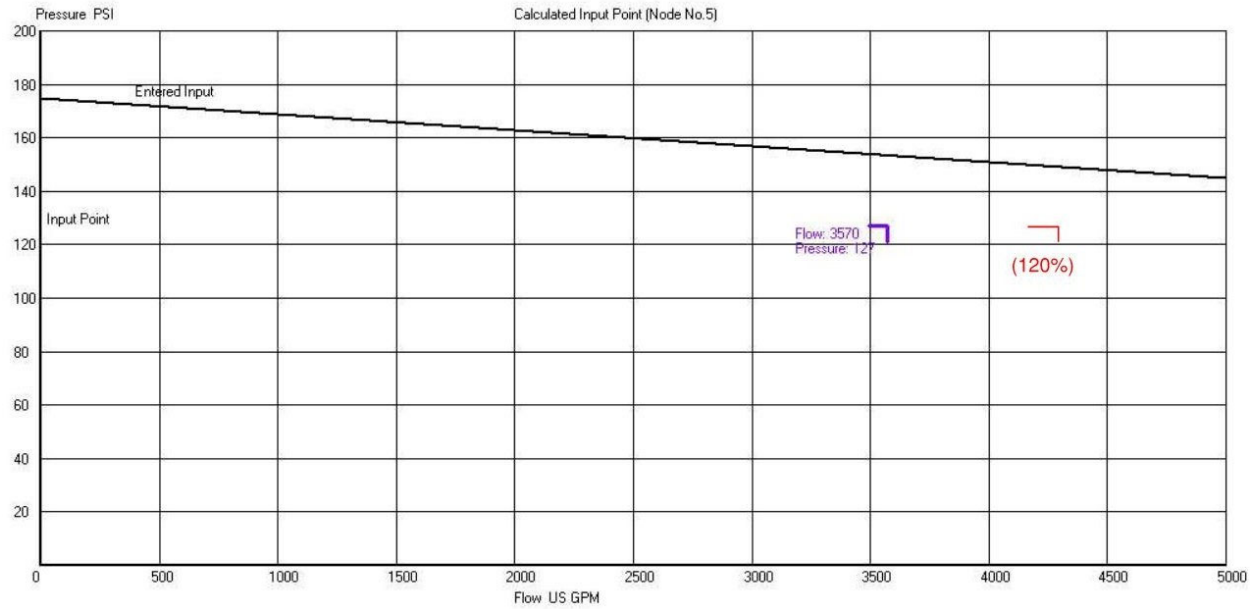


Figure 4.4.2A – Turbine Building Water Supply and Sprinkler System Demand

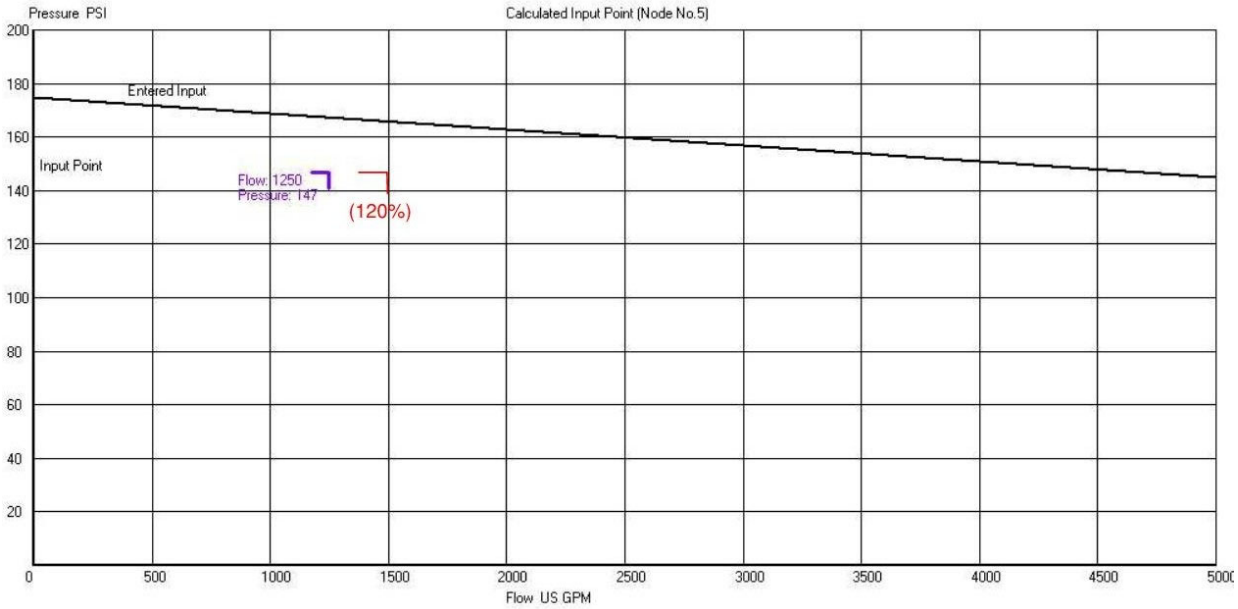


Figure 4.4.2B – Turbine Building Water Supply and Standpipe Demand

The systems were also modeled using 2000 gpm at 145 psi pumps (2) and met, however were close to the 120% capacity requirement per CSA N293 (approximately 200 gpm margin with sprinkler demand). As the design of the piping layout is in an early stage, the 2500 gpm pumps are recommended until more detailed calculations can be performed.

Three 60% capacity pumps are recommended. Driver types for each pump are being researched and developed. Pumps shall be separated from each other and unrelated equipment and areas by 3-hour rated fire barriers. A pressure maintenance pump shall be provided. Two 4000 – 5000

gpm pumps is an option but was not selected as not all manufacturers manufacture pumps this size. Additionally, the electrical requirements will likely be greater than 600 volts and thus be more costly for the service and pump controller.

Suction piping shall be arranged so that each fire pump can take suction from either or both tanks. A failure in one tank shall be able to be isolated as to not cause both tanks to drain. Each pump shall have a dedicated supply pipe to the yard loop.

A loop is required around the power block with sectional valves located to prohibit a single impaired section from impacting both the primary and secondary fire suppression for a given fire area. In the case of a sprinklered room or area, a single impairment will not impact the sprinkler system and the associated standpipe.

Fire Hydrants are located along the loop at spacings not exceeding 75 m (250 feet) and located no closer than 12.2 m (40 feet) from the buildings.

4.4 Fire Protection Requirements by Building

4.4.1 Site Buildings / Structures / Equipment

Buildings, Structures and Equipment, other than the power block buildings, within the fence are as follows.

4.4.1.1 Fire Pump Enclosure

The fire pump building and fire water storage tanks are located in the southeast yard area, within the protected area. The building is currently placed over 15.2 m (50 feet) from the southeast corner of the power block building. No other buildings are within 91 m (300 feet) of the pump building at this time. Other external exposures are limited to vegetation in the yard and thus considered light. The fire pump building details are not available at this time, however, the building will be of non-combustible construction and split into four fire areas (one area for each pump and one for switchgear).

4.4.1.2 Transformers

Four single phase GSU Transformers, one Unit Auxiliary Transformer and one Reserve Auxiliary Transformer are located in the yard, within the protected area, to the east of the Plant Services Building. The Generator Bus penetrates the Turbine Building wall and runs above the roof of the Plant Services to the transformer area. The spare GSU and Reserve Auxiliary Transformers are permanently set and wired. Each of the six transformers are oil-insulated and have individual open containment pits.

CSA N293 is silent on fire walls between transformers. NFPA 804 has been used as a basis for the evaluation of passive protection for the transformers. NFPA 804 requires fire walls between adjacent transformers where they are closer than 50 feet, for transformers exceeding 18,925 L (5,000 gallons), and 25 feet for transformers under 18,925 L (5,000 gallons). The oil quantity of the individual transformers is unknown at this time, and the locations of the transformers are preliminary. Evaluation will be performed when the details of the design are known.

4.4.2 Power Block Buildings

The power block includes five major structures. They are as follows:

- Turbine Building (NBCC Occupancy Group F, Division 2) – 3 Story
- Reactor Building (NBCC Occupancy Group F, Division 3) – 8 story

- Rad Waste Building (NBCC Occupancy Group F, Division 3) – 3 Story
- Control Building (NBCC Occupancy Group F, Division 3) – 1 Story
- Plant Services Area (NBCC Occupancy Group F, Division 3) – 1 Story

4.4.2.1 NBCC Requirements

The structures are understood to have NBCC occupancy classifications as noted above. Although the areas are given the names of the primary function and ”Building”, the areas are currently identified to be divided by substantial construction identified as 3-hour fire barriers (not fire walls) and thus are defined as fire areas and not buildings by the NBCC. See the Building Architectural and Life Safety documents referenced in Section 5 for the details of building classifications, construction and other NBCC requirements.

4.4.2.2 CSA N293-12 Requirements

As noted above, the fire protection and fire hazard assessment requirements are contained in CSA N293 as modified by CSA N293S1. The requirements will be based on the prescriptive requirements of these standards and the performance-based assessment requirements. Prescriptive requirements regarding separations (passive protection) are as follows.

- Fire separations are required to separate redundant fire safe shutdown systems and separate safe shutdown systems from other hazards. Spatial separation is allowed where separations are impractical due to the design of the space, presence of equipment or the separation would interfere with nuclear operation or pose a risk to nuclear safety. In these instances, spatial separation in combination with additional measures are required. In general, a fire resistance rating of the separation is three hours except where determined to be acceptable with a lower rating based on additional measures.
- The structure housing the turbine generator and associated ancillary process equipment (Turbine Building) shall be designed and separated from other areas of the plant such that a fire involving the turbine generator will not spread to other areas and will not result in progressive structural collapse.
- Areas or rooms used for the storage or handling of combustible materials or ignitable liquids and solids or gasses shall be separated from the remainder of the building by separation having a minimum two-hour resistance rating.
- Spatial separation or fire separations shall be provided between cable trays and risers to reduce the spread of fire and have adequate space for firefighting.
- The control room complex shall be separated from the remainder of the building by a 2-hour minimum rated fire separation. Smoke management is required in the control rooms.
- Two travel routes are required between the main and secondary control rooms. The paths are required to be protected as follows:
    - Not subject to a common cause failure
    - Be designed and protected in accordance with the width, height, fire resistance rating, and integrity specified for exits in the NBCC
    - Be designed to minimize smoke infiltration during a fire, such that the routes will not contain more than 1% of contaminated air
    - Be provided with emergency lighting in accordance with NBCC, Division B Article 3.2.7.3

The first path includes the south door of the secondary control room, Room 1501 Boron Injection, Reactor Building Stair B 1191, Room 1660 Services 0 A, Reactor Building Egress Pathway 3195 (in Rad Waste Building) and Control Building Hallway 4181. These components (except rooms 1501 and 1660) will be provided with 2 hour rated barriers and other exit enclosure features, provided with enclosure pressurization and emergency lighting. Protection for rooms 1501 and 1660 have not been finalized.

The second path includes the north secondary control room door, two intervening rooms (1550 and 1560), Reactor Building Stair A 1190, Stair C (1690), Reactor Building Egress Passageway 5186 (Plant Services Area) to the exterior. Interior path continues at any of the four south exterior doors to the Control Building and Corridor 4181 to the Main Control Room (east or west door). Stair A and the egress pathway will be provided with 2 hour rated barriers and other exit enclosure features including pressurization and emergency lighting. The corridors in the Control Building will be provided with 3-hour ratings however not pressurized.

Travel distance to Stair A from the north door of the Secondary Control Room is approximately 30.48 m (100 feet). The path travels through the SDC Piping Room and the Electrical Distribution Room. The SDC piping area has a low combustible loading (piping and valves). The electrical distribution room is a typical electrical/switchgear room, and has a moderate loading. The travel path in these rooms cannot be practically separated. Activation of the smoke detectors in the electrical room will be annunciated in both control rooms, which will warn the operator regarding using the secondary path. The corridors in the Control Building will also have smoke detection, annunciated in the control rooms. While all parts of the path are not protected as an exit, the control room operator will be aware of any issue along its length and thus it is considered an acceptable second path.

- Structure supporting fire separations shall have a fire rating of at least the separation rating.

Prescriptive requirements regarding active fire protection systems are as follows.

- CSA N293 requires a Class I automatic wet standpipe system in accordance with NFPA 14. Additionally, the minimum pressure available at the Class I hose valve shall be 690 kPa (100 psi) at a flow rate of 950 L/min (250 gpm).
- CSA N293 requires automatic suppression throughout the buildings except where it is demonstrated that other measures will meet the goals. The system designs are required to include 2850 L/min (750 gpm) for hose streams. Where automatic fire suppression systems are not provided, the FHA shall demonstrate that adequate manual fire suppression or passive fire mitigation is provided and that all fire protection goals are met. Special extinguishing systems may be used in place of automatic sprinkler systems where it can be demonstrated that they provide an adequate level of fire protection for the specific fire hazard and an acceptable level of reliability. See the discussion on combustible loading under “Fire Protection Analysis by Room or Fire Area” below regarding criteria for providing sprinkler protection in the individual areas.

  Oil filled transformers are prescriptively required to have an automatic water spray system.

  The Control Room Complex, outside the control room, control equipment room and control computer room are prescriptively required to be provided with sprinkler protection.

  CSA N293 Annex A highly recommends sprinkler protection in the turbine area with design requirements per the FM Global data Sheets (DS7-101). The FHA recommends protection in these areas and incorporates the more conservative FM Global recommendations for sprinkler density.

The assessment will evaluate the combustible loading of each room and its associated fire barriers to determine fire suppression needs. The combustible loading and evaluation of each room, along with its associated suppression requirements, will be documented on the room data sheets.

- NFPA 855 requires sprinkler protection in rooms containing lithium-ion batteries with an aggregate capacity exceeding 20 kilowatt-hours (kWh) (NFPA 855 Table 1.3 and Table 4.4.2).
- NFPA 855 requires sprinkler protection in rooms containing lead-acid batteries with an aggregate capacity exceeding 70 kilowatt-hours (kWh) (NFPA 855 Table 1.3 and Table 4.4.2), unless used in UL 1778-listed uninterruptable power supplies occupying an area not exceeding 10 percent of the floor area (4.11.5).
- All areas of the plant to be protected by portable fire extinguishers in accordance with the NFCC and NFPA 10. The extinguishers shall be Listed (ULC) for their intended use.
- CSA N293 requires a fire alarm system throughout the plant. CSA N293 Annex A recommends smoke detection throughout all areas except where it is demonstrated that other measures will meet the goals. The system is required to include automatic voice for occupant notification, inside and outside in the protected area. Main control room staff shall be able to deliver manual messages.

  Manual pull stations shall be located at all exits required by the NBCC. Additionally, manual pull stations are provided along the exit path so that the maximum travel distance is not more than 30m in areas without sprinklers and not more than 45m in areas with sprinklers.

  Fire detection shall include very early warning technology in areas where detection is provided for spatial separation and within the control room complex.

  Occupant notification appliances shall be provided in all accessible spaces, with the exception of the main and secondary control rooms.

4.4.2.3 Other Recommendations

- Standpipes – CSA N293 requires Class I standpipes as noted above. A Class I standpipe outlet consists of a single 65mm valve/outlet. NFPA 804 requires Class III standpipes. A Class III standpipe outlet includes a 65mm and 40mm outlet. The reasoning behind the Class III outlet is to allow the fire brigade to more easily control or extinguish an incipient stage fire using the smaller hose. The smaller outlet may also be chosen by the offsite fire fighters for incipient stage fires. The Class III capability may be accomplished by two valve/outlet assemblies or by a 65mm valve/outlet with a reducer in the cabinet or attached. The most reliable way to ensure that the small outlet is available is to provide the two valves at each location. Class III standpipes utilizing the two valves are recommended.

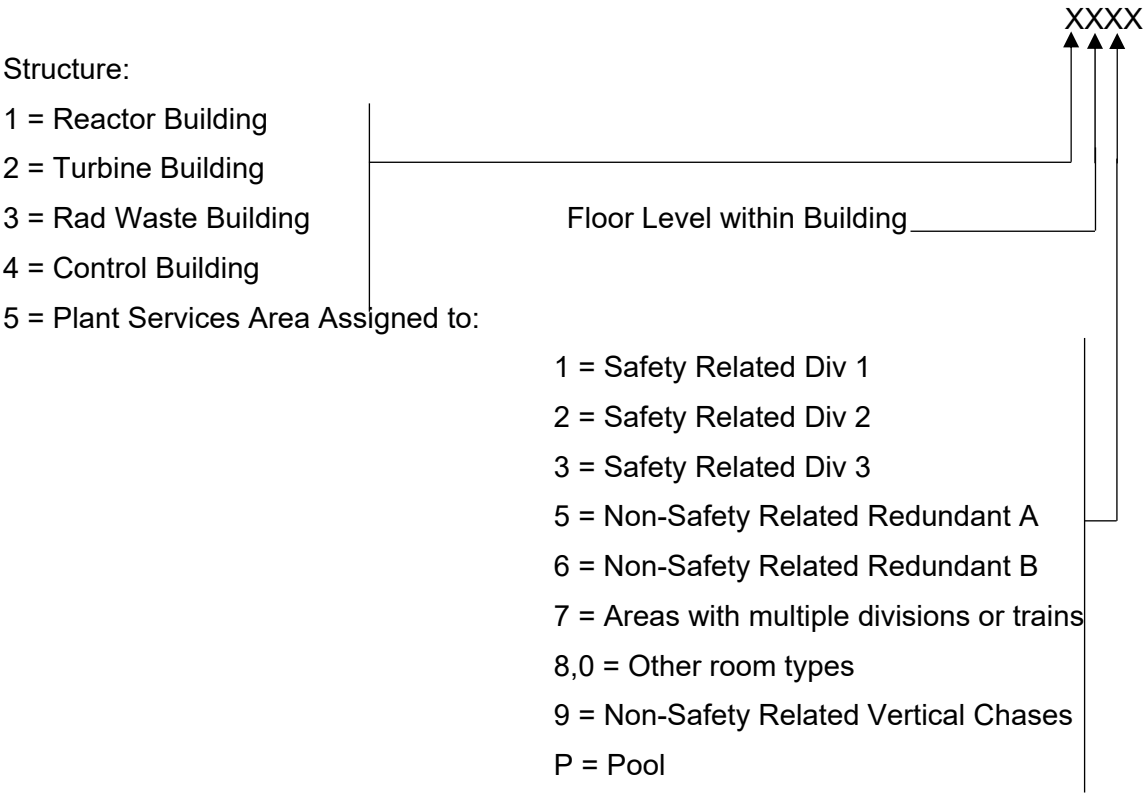
4.5 Fire Protection Analysis by Room or Fire Area

4.5.1 Fire Area Drawings

Fire area drawings are provided for each building or structure, illustrating fire protection features such as fire barriers, standpipes, and sprinklers. The standpipes (Class III) are located in the stair enclosures throughout all multiple story buildings in the power block. The standpipes have one 65mm (2-1/2inch) and one 40mm (1-1/2inch) valved hose outlet on every level, including roof levels where served by the stair. The Rad Waste Building has a single stair and uses doors through the wall to the Turbine as the second exit. Class III hose stations (with 65mm and 40mm valves) are

provided at these doors as illustrated on the drawings. The Control Building has Class III hose stations (with 65mm and 40mm valves) at the exterior doors and outside the Control Room Complex as illustrated on the drawings.

Room numbers contain the following information:



Fire area numbers correspond to the lowest major room within the fire area.

4.5.2 Room Data Sheets

A room data sheet has been developed for each significant room in the power block identifying information such as the room number, associated fire area, fire barriers, room contents, estimated combustible loading, fire detection, fire suppression and fire impact (with and without fire protection systems). Explanation of the data sheet fields are as follows.

4.5.2.1 Building Construction Type

The building construction type and fire rating of the major elements of construction are noted on the data sheets in a NFPA 220 format structure (Type X(XXX)). Building Type for the plant is required to be noncombustible which limits the construction types to Type I and Type II. Type I and Type II are generally understood to be as follows:

- □ Type I: Noncombustible construction with a high level of fire resistance, typically concrete construction.
- □ Type II: Noncombustible construction with a lower level of fire resistance than Type I, typically this is steel construction with or without fireproofing.

The fire ratings of major elements within the Construction Types are identified by the three Arabic numbers in the parentheses as follows:

- First Arabic number — exterior bearing walls
- Second Arabic number — columns, beams, girders, trusses, and arches, supporting bearing walls, columns, or loads from more than one floor
- Third Arabic number — floor construction

The specifics of requirements for different minor elements are summarized in Table 4.1.1 of NFPA 220.

The building construction types in the data sheets are for the overall structure (i.e., Reactor Building) and not the barrier ratings associated with the room. Building construction types represent the minimum requirement.

4.5.2.2 Fire Barriers and Fire Areas

Fire barriers are provided as prescriptively required by CSA N293 to separate rooms or areas with safety related division equipment cables or other related components from other divisions and from other hazards in the plant. The data sheets identify the presence of divisional components, the safety related division number and the associated fire barriers. The fire barriers listed on a given data sheet are related to the requirements for that room. The ratings are not duplicated on the adjacent room data sheets unless required for an adjacent room. The overall fire barrier arrangement is illustrated on the Fire Area Drawings.

4.5.2.3 Non-Safety Related Redundant Load Groups (Trains)

Redundant systems (equipment, power, and cabling) are provided to enhance the reliability of the unit. The data sheets identify the presence of major redundant equipment, power sources and related cable systems. A data sheet field identifies the Load Group (A and/or B) feeders passing through a given room or feeding redundant equipment in the room and identifies additional building features (passive or active) where deemed necessary, to maintain the redundancy. Load Group A or B circuitry that dead ends at non-redundant equipment in a given room is not identified on that room's data sheet.

4.5.2.4 Combustible Loading

Most areas of the plant have a low level of combustible loading due to the general nature of a nuclear power plant. A general threshold of combustibility has been determined for this project to invoke sprinkler protection. The combustible loading limit for electrical areas has been preliminarily assumed to be 1400 MJ/m^2 (123,340 Btu/ft^2) and the combustible loading limit for all other indoor areas has been conservatively determined as 700 MJ/m^2 (61,670 Btu/ft^2). This approach conservatively assumes that all combustible material within a fire area instantaneously releases its net heat content upon ignition of the fire. In fire areas where the loading is below these thresholds, except where specifically noted otherwise, the combination of low combustible loading and fire barriers, meets the goals for safe shutdown and life safety, without automatic sprinkler protection. Rooms that exceed these limits, except where specifically noted otherwise, will be provided with automatic fire suppression.

The estimated combustible loading threshold of each room is identified on each room data sheet.

Materials Load

The heat of combustion of various materials found in the power block areas are identified in the table below. The first values shown are directly from referenced sources. The parenthetical value is a conversion.

Table 4.4.2.4-1 – Heat of Combustion for Materials

Material	Heat of Combustion	Source
Mineral Oil	46 MJ/kg (153 MJ/gallon)	SFPE Handbook, Volume 3, Table A.32
Fyrquel EHC	13,459 Btu/lb (31.28 MJ/kg)	Product Data Sheet
Diesel Fuel Oil	39.16 MJ/liter (148 MJ/gallon)	Compilation of data from multiple sources on various grades of diesel fuel
Electrical or optical fiber wires and cables that have complied with the fire tests required for use in risers (vertical runs in a shaft or from floor to floor) or in plenums (ducts, plenums and other spaces used for environmental air) as required by NFPA 70	15 MJ/kg	NFPA 557 Table 7.3.2

Cable Tray Loads

The preliminary cable tray routing is illustrated on preliminary cable tray sketches provided by Black & Veatch on September 2, 2021. Cable tray drawings have not been officially issued. In general, each tray shown on the sheets represents two stacks of three trays (six total) configured as follows:

- Bottom Tray – Instrument and Control Cables
- Middle Tray – Low Voltage (LV) 120 to 208 volts
- Top Tray – Low Voltage (LV) 600 volts

Medium and high voltage cable will be in conduit. Each tray is assumed to be 36 inches (914.4 mm) wide with minimum 6 inch (152.4 mm) sidewalls. The trays are separated from each other (horizontally) by 6 to 8 feet (1828.8 to 2438.4 mm) and 18 inches (457.2 mm) vertically. Cable quantities are based on trays being full per NEC fill limits as follows:

- Low Voltage >4/0 (large cable), the limit is a single layer

- Low Voltage 4/0 or smaller – (20% of tray area) 42in^2 (27,096.72mm^2)
- Instrument and Control Cables – (50% of tray area) 108in^2 (69,677.28mm^2)

The cable used for the preliminary calculations is based on data from typical IEEE 383 cable data sheets.

The representative large cable is a 3 conductor 500mcm cable with the following characteristics:

- Outer Diameter – 3.060 inches (77.724 millimeters)
- Cable weight – 7.99lbs/ft (11.890kg/m)
- Copper weight – 4.55lbs/ft (6.771kg/m)
- Insulation weight – 3.44lbs/ft (5.119kg/m)
- Maximum cables in tray (36/3.060) – 11
- Insulation weight (tray – 11 X 3.44) – 37.84lbs/ft(56.28kg/m)

The representative small cable is a 3 conductor #8 cable with the following characteristics:

- Outer Diameter – 0.65 inches (16.51 millimeters)
- Cable weight – 0.287lbs/ft (0.427kg/m)
- Copper weight – 0.169lbs/ft (0.251kg/m)
- Insulation weight – 0.118lbs/ft (0.176kg/m)
- Cross sectional area (cable) – 0.33in^2 (212.902mm^2)
- Maximum cables in tray (42/0.33) – 127
- Insulation weight (tray – 127 X 0.118) – 14.99lbs/ft (22.35kg/m)

The representative instrument and control cable is a 12 conductor #12 cable with the following characteristics:

- Outer Diameter – 1.01 inches (25.654 millimeters)
- Cable weight – 0.69lbs/ft (1.027kg/m)
- Copper weight – 0.228lbs/ft (0.339kg/m)
- Insulation weight – 0.462lbs/ft (0.688kg/m)
- Cross sectional area (cable) – 0.801in^2 (516.773mm^2)
- Maximum cables in tray (108/0.801) – 134
- Insulation weight (tray – 134 X 0.462) – 61.9lbs/ft (92.19kg/m)

Electrical cable insulation in either solid metal enclosed raceways or concrete duct banks does is not considered to contribute to a combustible fire load of an area and is excluded from the combustible loading calculation.

Equipment Loads

The following table contains equipment heat of combustion data from specific equipment from another nuclear power generation plant. The table documents the range of the data collected and the value used for this preliminary evaluation.

Table 4.4.2.4-2 – Heat of Combustion for Equipment

Equipment	**Heat of Combustion – Range (MJ)**	**Heat of Combustion Value Used (MJ)**
Power Center	7100- 12,800	Varies
Motor Control Center	650-1408	1050
Distribution Panel	332- 677	Varies
CVCF Panel (UPS)	2500	2500
Battery (Flooded or VRLA)	-	150
Step–Down Transformer (480/120)	-	650
Service Panel	-	99
Low Voltage Rack	-	500
Pump Controller	90 - 1900	1000
Pump/Motor Assembly	120-250	200
AHU	4980	5000
Exhaust Fan	12.4	15
Fan Coil Unit	50	50

The quantities of cables and other combustibles in the room, and the fire load of various pieces of equipment are estimates. These will be verified as the design progresses.

Offices (Occupancy of Low Fire Load)

The NFPA Fire Protection Handbook- 20th Edition (Section 18, Table 18.1.2) identifies a mean fire load for a general office area to be 7.7lbs/ft^2, with a heat of combustion of ordinary combustibles identified as 8000Btu/lb. The fire load of offices in this analysis is considered 61,600Btu/ft^2 (698.5MJ/m^2).

Workshops (Occupancy of Moderate Fire Load)

The NFPA Fire Protection Handbook - 20th Edition (Section 18) identifies fire load for an Occupancy of Moderate Fire Load. Examples are listed as retail shops, factories, and workshops, similar to an Ordinary Hazard Occupancy loading as defined in NFPA 13. The range is from 1134 MJ/m^2 to 2268 MJ/m^2 with limited isolated loading of 4540 MJ/m^2.

Transient Loads

The loading calculations include the introduction of transient combustibles to any area of the plant, subject to administrative controls. With the exception of the control room, storage rooms and office areas, a minimum fire loading of 40 MJ/m^2 was added to each area as a transient combustible allowance. This approximates one 210 liter (55 gallon) drum of lube oil for every 200 m² of floor space. This allowance conservatively accounts for typical transients and activities that have been identified and observed at other nuclear facilities.

Combustible Load Margin

In addition to the aforementioned transients, loading calculations include a margin for other combustibles. A fire loading of 10 MJ/m^2 was added to each area.

4.5.2.5 Fire Impact

Cumulative damage (property loss) and restoration from fire initiation and suppression activities, but excluding replacement power costs, is subjectively categorized as follows. Goals for loss prevention will be defined at the discretion of the plant licensee. Values are in USD.

- Negligible: Less than $5000
- Minor: Less than $50,000
- Moderate: Less than $2 million
- Significant: Greater than $2 million

Cumulative plant operational effects from fire initiation and suppression activities are categorized as follows:

- None: No effect to any power production or plant equipment
- Power Reduction: Event could require or cause reduction in turbine output, due to reduced steam flow rate resulting from loss of some equipment
- Reactor Scram: Event could require operators to scram the reactor, achieve hot shutdown or stable shutdown condition, and continue to cold shut down condition if necessary

4.5.2.6 Combustible Load Calculation Assumptions

1) The combustible load calculations are based on the room contents illustrated on the background drawings and any additional information provided by the design team. The known contents are identified on the data sheets. An additional 10MJ/m^2 has been added to the calculations for incidental and unknown contents.
2) A value of approximately 10 MJ of combustible loading is a threshold level for considering a piece of equipment as being an “incidental combustible”. The 10 MJ combustible loading equates to approximately 1 pound of paper products, ½ pound of a hydrocarbon grease, less than 1 pint of lubricating oil or fuel oil, or ½ pound of a typical plastic material.
3) Electrical cable insulation, which is contained in either solid bottom, solid cover cable trays or in conduits is not considered to represent a combustible fire hazard.
4) Small motors (below 10 hp) are considered to have an insignificant amount of combustibles (e.g. motors on motor operated valves (MOV’s), small fan motors, etc.) and are not individually included in these preliminary calculations.
5) All batteries, except large batteries in the Reactor Building, are considered to be Lithium-ion per GE direction. The number/size of batteries will need to be revisited as design proceeds.
6) Exit stair enclosures and elevator hoistways are constructed and finished in accordance with the NBCC , NFPA 101 and ANSI A17.1 and thus have minimal combustibles. Room data sheets have not been provided except for freight and service elevators which prescriptively require sprinklers due to transient loading.

4.5.3 Analysis

4.5.3.1 Site Buildings, Structures and Equipment

The fire protection requirements for the site structures and buildings will be based on CSA N293 prescriptive requirements, and evaluation of the combustible loading of each room or area and its associated fire separations (barriers) to determine the need for sprinklers and detection.

A. Fire Pump Enclosure

CSA N293 requires the fire pumps to be provided in accordance with CSA N293 and NFPA 20. NFPA 20 requires sprinkler protection for diesel engine driven pumps. Dry pipe sprinkler protection is recommended throughout the fire pump building due to the critical nature of the pumps.

The sprinkler protection will be designed for aa density of 12.2 mm/min (0.30 gpm/ft^2) over the diesel pump room area and 6.1 mm/min (0.15 gpm/ft^2) over the electric pump room area. The fire areas shall segregate electrical equipment, electrical motor driven fire pump(s), and diesel engine driven fire pump(s). The areas shall be separated using three (3) hour rated fire barriers between the individual pump assemblies as well as the electrical equipment. The diesel engine driven pump room(s) will include the associated engine's diesel fuel day tank.

Room Data Sheets for the Fire Pump Building, detailing the combustibles, room features and level of protection for each room will be provided in Table 4.5.3.1 when details are available.

B. Transformers (GSU and Auxiliary)

CSA N293 requires sprinklers for these transformers.

Room Data Sheets for each transformer, detailing the combustible loading and fire walls, is in Table 4.5.3.1 below. The oil capacity of transformers are unknown at this time and thus will be further evaluated for spacing and fire walls as additional information is available. The nearest transformer is 50 feet back from the Plant Services Area and thus a fire wall protecting the building from the transformers will not be required.

Transformer spray protection is prescriptively required by CSA N293 due to the combustible nature of the transformer oil, proximity to each other, and proximity to the Bus. Automatic deluge spray protection is recommended. Each system will be designed for a density of 10.19 mm/min (0.25 gpm/ft^2) over the transformer's surface area. The recommended system density over the open pit is 6.1 mm/min (0.15 gpm/ft^2). CSA N293 requires 950 L/min (250 gpm) for hose streams where fire separations are provided and 2850 L/min (750 gpm) where fire separations are not provided.

The Room Data Sheets for the transformers, detailing the preliminary known information regarding combustibles, exposures, fire walls and level of protection for each transformer is in Table 4.5.3.1 below and illustrated on the Site Fire Area Drawing.

Table 4.5.3.1 – Site Building Room Data Sheets

Room Data Sheet

Fire Area:	N/A	Description:	Outdoors - GSU Transformer - Phase A	Const. Type: N/A
Building:	Outdoors		Gross Area (m2):	N/A
		Applicable codes:	CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 15, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U72-FG2001K		Building Code Occupancy Classification:	N/A
			Electrical Classification: Safety-related divisional equipment or cables:	N/A
			Nonsafety - related redundant trains, equipment or cables:	N/A
		Surrounded by fire barriers rated at:	2 hours where provided	
		Except:		

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
0.0	N/A	Mineral Oil - quantity unknown	Heat Detectors	Electric Remote Release (Plant Services)	Automatic Deluge System	Yard Hydrants
			System Waterflow			Fire Extinguishers
					Other Fire Protection	
					Open pit sized for transformer oil plus 30 minutes of firefighting water discharge	

>700	Anticipated combustible load, MJ/m2
N/A	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	Transformer isolation / turbine shutdown
Radiological release:	None, no radiological materials present
Manual firefighting:	Yard hydrants for manual attack
Property loss:	Moderate
Hazardous Substances:	None, containment pits provided below transformers

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts upon ignition of an oil leak or a rupture. The fire continues until the oil is consumed. Transformers is located greater than 50 feet away from the Plant Services Building and separated from one another by spacial separation and/or fire walls (TBD). Analysis of event will be developed when design has progressed. Fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	N/A	Description:	Outdoors - GSU Transformer - Phase B
Building:	Outdoors		
		Applicable codes:	CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 15, CSA C22.1, ULC-S524
Associated Drawings or Figures:	407081-U72-FG2001K		

Const. Type: N/A
Gross Area (m2): N/A
Building Code Occupancy Classification: N/A
Electrical Classification: Safety-related divisional equipment or cables: N/A
Nonsafety - related redundant trains, equipment or cables: N/A

Surrounded by fire barriers rated at: 2 hours where provided
Except:

Consisting of the following Rooms:

EL	Rm#	Potential Combustibles	Fire Alarm Input Devices: Primary	Fire Alarm Input Devices: Backup	Fire Suppression: Primary	Fire Suppression: Backup
0.0	N/A	Mineral Oil - quantity unknown	Heat Detectors	Electric Remote Release (Plant Services)	Automatic Deluge System	Yard Hydrants
			System Waterflow			Fire Extinguishers
					Other Fire Protection	
					Open pit sized for transformer oil plus 30 minutes of firefighting water discharge	

>700	Anticipated combustible load, MJ/m2
N/A	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	Transformer isolation / turbine shutdown
Radiological release:	None, no radiological materials present
Manual firefighting:	Yard hydrants for manual attack
Property loss:	Moderate
Hazardous Substances:	None, containment pits provided below transformers

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts upon ignition of an oil leak or a rupture. The fire continues until the oil is consumed. Transformers is located greater than 50 feet away from the Plant Services Building and separated from one another by spacial separation and/or fire walls (TBD). Analysis of event will be developed when design has progressed. Fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	N/A	Description:	Outdoors - GSU Transformer - Phase C	Const. Type: N/A
Building:	Outdoors		Gross Area (m2):	N/A
		Applicable codes:	CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 15, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U72-FG2001K		Building Code Occupancy Classification:	N/A
			Electrical Classification: Safety-related divisional equipment or cables:	N/A
			Nonsafety - related redundant trains, equipment or cables:	N/A
		Surrounded by fire barriers rated at:	2 hours where provided	
		Except:		

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
0.0	N/A	Mineral Oil - quantity unknown	Heat Detectors	Electric Remote Release (Plant Services)	Automatic Deluge System	Yard Hydrants
			System Waterflow			Fire Extinguishers
					Other Fire Protection	
					Open pit sized for transformer oil plus 30 minutes of firefighting water discharge	

>700	Anticipated combustible load, MJ/m2
N/A	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	Transformer isolation / turbine shutdown
Radiological release:	None, no radiological materials present
Manual firefighting:	Yard hydrants for manual attack
Property loss:	Moderate
Hazardous Substances:	None, containment pits provided below transformers

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts upon ignition of an oil leak or a rupture. The fire continues until the oil is consumed. Transformers is located greater than 50 feet away from the Plant Services Building and separated from one another by spacial separation and/or fire walls (TBD). Analysis of event will be developed when design has progressed. Fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	N/A	Description:	Outdoors - GSU Transformer - Spare
Building:	Outdoors		
		Applicable codes:	CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 15, CSA C22.1, ULC-S524
Associated Drawings or Figures:	407081-U72-FG2001K		

Const. Type: N/A	
Gross Area (m2):	N/A
Building Code Occupancy Classification:	N/A
Electrical Classification: Safety-related divisional equipment or cables:	N/A
Nonsafety - related redundant trains, equipment or cables:	N/A

Surrounded by fire barriers rated at: 2 hours where provided

Except:

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
0.0	N/A	Mineral Oil - quantity unknown	Heat Detectors	Electric Remote Release (Plant Services)	Automatic Deluge System	Yard Hydrants
			System Waterflow			Fire Extinguishers
					Other Fire Protection	
					Open pit sized for transformer oil plus 30 minutes of firefighting water discharge	

>700	Anticipated combustible load, MJ/m2
N/A	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	Transformer isolation / turbine shutdown
Radiological release:	None, no radiological materials present
Manual firefighting:	Yard hydrants for manual attack
Property loss:	Moderate
Hazardous Substances:	None, containment pit provided below transformer

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts upon ignition of an oil leak or a rupture. The fire continues until the oil is consumed. Transformers is located greater than 50 feet away from the Plant Services Building and separated from one another by spacial separation and/or fire walls (TBD). Analysis of event will be developed when design has progressed. Fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	N/A	Description:	Outdoors - Auxiliary Transformer
Building:	Outdoors		
		Applicable codes:	CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 15, CSA C22.1, ULC-S524
Associated Drawings or Figures:	407081-U72-FG2001K		

Const. Type: N/A	
Gross Area (m2):	N/A
Building Code Occupancy Classification:	N/A
Electrical Classification: Safety-related divisional equipment or cables:	N/A
Nonsafety - related redundant trains, equipment or cables:	N/A

Surrounded by fire barriers rated at:	2 hours where provided
Except:	

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
0.0	N/A	Mineral Oil - quantity unknown	Heat Detectors	Electric Remote Release (Plant Services)	Automatic Deluge System	Yard Hydrants
			System Waterflow			Fire Extinguishers
					Other Fire Protection	
					Open pit sized for transformer oil plus 30 minutes of firefighting water discharge	

>700	Anticipated combustible load, MJ/m2
N/A	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	Transformer isolation / transfer to reserve auxiliary transformer
Radiological release:	None, no radiological materials present
Manual firefighting:	Yard hydrants for manual attack
Property loss:	Moderate
Hazardous Substances:	None, containment pit provided below transformer

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts upon ignition of an oil leak or a rupture. The fire continues until the oil is consumed. Transformers are located 50 feet away from the Plant Services Building and separated from one another by spacial separation and/or fire walls (TBD). Fire spread will be limited to the transformer of fire origin. Analysis of event will be developed when design has progressed. Fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	N/A	Description:	Outdoors - Reserve Auxiliary Transformer
Building:	Outdoors		
		Applicable codes:	CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 15, CSA C22.1, ULC-S524
Associated Drawings or Figures:	407081-U72-FG2001K		

		Const. Type: N/A	
		Gross Area (m2):	N/A
		Building Code Occupancy Classification:	N/A
		Electrical Classification: Safety-related divisional equipment or cables:	N/A
		Nonsafety - related redundant trains, equipment or cables:	N/A
		Surrounded by fire barriers rated at:	2 hours where provided
		Except:	

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
0.0	N/A	Mineral Oil - quantity unknown	Heat Detectors	Electric Remote Release (Plant Services)	Automatic Deluge System	Yard Hydrants
			System Waterflow			Fire Extinguishers
					Other Fire Protection	
					Open pit sized for transformer oil plus 30 minutes of firefighting water discharge	

>700	Anticipated combustible load, MJ/m2
N/A	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	Transformer isolation / transfer to reserve auxiliary transformer
Radiological release:	None, no radiological materials present
Manual firefighting:	Yard hydrants for manual attack
Property loss:	Moderate
Hazardous Substances:	None, containment pit provided below transformer

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts upon ignition of an oil leak or a rupture. The fire continues until the oil is consumed. Transformers are located 50 feet away from the Plant Services Building and separated from one another by spacial separation and/or fire walls (TBD). Fire spread will be limited to the transformer of fire origin. Analysis of event will be developed when design has progressed. Fire does not affect safe shutdown.

4.5.3.2 Reactor Building

The fire protection requirements for the Reactor Building will be based on CSA N293 prescriptive requirements, and evaluation of the combustible loading of each room and its associated fire separations (barriers) to determine the need for sprinklers and detection.

Design of the Reactor Building includes five levels below grade, which are defined as basements by the NBCC. Each level has fire separated areas no greater than 600 square meters (excluding primary containment), as limited by NBCC Article 3.2.1.5(1)(b). No additional fire protection is required by the NBCC.

Pressurized stair enclosures are provided to meet protection of paths between control rooms and also serves as improved access for firefighting. The Secondary Control Room will be pressurized under off normal conditions. Means of activation of the system will include detection of smoke on the -8.5 m Level.

Standpipes (Class I) are required in the two exit enclosures to meet spacing requirements. These are illustrated on the Fire Area Drawings. Firefighting inside Primary Containment can be achieved with 30.48 m (100 feet) of hose from Stair A, via the hatch into Primary Containment. The Reactor Building is supplied with fire protection water from two separate connections from the site loop. The fire loop will feed the Reactor Building on the east side, through the exit passageway extending through the Plant Services Area, and directly into Stair A. The fire loop will feed the Reactor Building on the west side, through the Rad Waste and Control Building, to Stair B. A main will extend through the Reactor Building, between the two stair enclosures, on the south side, for redundancy of supplies. See the Fire Area drawing ([[ ]]) for the general routing, and the Piping and Instrument Diagrams (P&ID) for the schematic layout.

The major internal and external fire hazards associated with the Reactor Building are summarized as follows:

- Electrical Rooms – The electrical rooms will house switchgear and associated cables. No oil filled electrical equipment will be provided. These rooms are 3-hour rated enclosures. The quantity of cables and thus the fuel load will be quantified and evaluated as the design proceeds. The rooms are provided with smoke detectors for early warning of a fire event. Class C fire extinguishers will be provided outside the door(s) to these rooms for manual firefighting.
- Battery Rooms –Division 1, 2 and 3 Battery Rooms are located on Level -14.5 of the Reactor Building. Each room is separated from the remainder of the building by 3-hour rated barriers. The batteries are understood to be lead-acid type. Hydrogen gasses are liberated from these batteries during normal charging conditions. Hydrogen detection is provided in the room as well as high level exhaust ventilation. Smoke detection is provided for early warning of a fire condition in this room. Sprinkler protection is the NFPA 855 preferred suppression method at this time. Automatic preaction sprinkler protection is provided for this room.

Recommended fire suppression systems are identified on the room data sheets and illustrated on the Fire Area Drawings, however, are summarized as follows:

- Level -34 – ERO Storage Room 1102 – Wet Pipe Sprinkler
- Level -29 – ERO Storage Room 1202 – Wet Pipe Sprinkler

- Level -14.5 – Division 1 Battery Room 1410 – Preaction Sprinkler
- Level -14.5 – Division 2 Battery Room 1420 – Preaction Sprinkler
- Level -14.5 – Division 3 Battery Room 1430 – Preaction Sprinkler
- Level -8.5 – Corridor -8.5 1502 – Preaction Sprinkler*
- Level 0.0 – Truck Bay 1600 - Wet Pipe Sprinkler
- Level 2.5 – Elevator Machine Room A 1680 - Wet Pipe Sprinkler
- Level 16 – ERO Storage Room 1801 – Wet Pipe Sprinkler

* See notes on Room Data Sheet

Primary containment has been provided with nitrogen inerting to maintain the oxygen level below that needed for combustion. This system, unlike fire extinguishing systems, is active (area inerted) at all times, with the exception of plant outages where primary containment area access is needed. At this time, outages are anticipated every one or two years, for an estimated 10-day period. Smoke detection is recommended in primary containment in this report, primarily for the outage time however may be of benefit in detecting a potential off normal electrical condition involving overheating of cables during an operating condition.

A fire alarm system with automatic voice occupant notification is provided throughout the building. Devices and appliances are provided as follows:

- Manual fire alarm boxes (manual pull stations) are provided at each stair door on each level and at each building exit.
- Waterflow alarms and supervision is provided on automatic suppression systems.
- Smoke detection is provided in areas as noted on the room data sheets.
- Smoke and heat detectors are provided for service elevator.
- Occupant notification is provided throughout the building. Strobe only appliances are provided in the Secondary Control Room to avoid interference with operators performance of emergency operations.

Cable tray drawings have not been developed for the Reactor Building. In this preliminary stage, rooms with multiple safety trains are limited to Primary Containment and the Secondary Control Room. Consideration to spatial separation is still necessary in primary containment as overheating of conductors due to an electrical condition such as overcurrent, shorting or ground faults can still occur in the inerted environment and affect adjacent cables. Further evaluation of separation will be needed as the design proceeds.

All cable in the Secondary Control Room is assumed to be in conduit for this preliminary assessment. Cable traveling between adjacent equipment cabinets in the Control Room shall be fire stopped.

Fire areas in the Reactor Building that house redundant safety shutdown systems have fan coil units (FCU's) dedicated to that fire area for room conditioning. As a result, ductwork does not penetrate the fire barriers. Two trains of chilled water are provided in the Reactor Building. The two trains and associated FCU's are provided to critical high heat load rooms. The trains are additionally assigned to the safety shutdown system divisions to maintain the redundancy.

See Reactor Building Fire Area Drawings:

[[	]]	EL -34.0m
[[	]]	EL -29.0m
[[	]]	EL -21.0m
[[	]]	EL -14.5m
[[	]]	EL -8.5m
[[	]]	EL 0.0m
[[	]]	EL 4.9m
[[	]]	EL 13.0m
[[	]]	El 16.0m

The Room Data Sheets for the Reactor Building, detailing the combustibles, room features and level of protection for each room is in Table 4.5.3.2 below. Additional information and analysis is as follows:

1. Level -34m – ERO Storage Room 1102 – This room is understood to be used for storage of combustibles (Class III) on shelves. The assumed height is assumed to be less than 12 feet to allow access without ladders. Per NFPA 13, Table 4.3.1.7.1, OH2 - 8.2mm/min (0.20gpm/ft^2) over room area.

   The room and contents do not affect safe shutdown or generation and thus detection other than the sprinklers is not deemed necessary.

2. Level -34m – FMCRD Group 1 Controls Room 1110 – This room has combustibles, and equipment is safe shutdown related, although redundant. Smoke detection is warranted.

3. Level -34m – FMCRD Group 2 Controls Room 1120 – This room has combustibles, and equipment is safe shutdown related, although redundant. Smoke detection is warranted.

4. Level -34m – FMCRD Group 3 Controls Room 1130 – This room has combustibles, and equipment is safe shutdown related, although redundant. Smoke detection is warranted.

5. Level -34m – FMCRD Group 4 Controls Room 1140 – This room has combustibles, and equipment is safe shutdown related, although redundant. Smoke detection is warranted.

6. Level -29m – ERO Storage Room 1202 – This room is understood to be used for storage of combustibles (Class III) on shelves. The assumed height is assumed to be less than 12 feet to allow access without ladders. Per NFPA 13, Table 4.3.1.7.1, OH2 - 8.2mm/min (0.20gpm/ft^2) over room area.

   The room and contents do not affect safe shutdown or generation and thus detection other than the sprinklers is not deemed necessary.

7. Level -29m – HCU Group 1 Room 1210 – This room has combustibles, and equipment is safe shutdown related, although redundant. Smoke detection is warranted.

8. Level -29m – HCU Group 2 Room 1220 – This room has combustibles, and equipment is safe shutdown related, although redundant. Smoke detection is warranted.

9. Level -29m – HCU Group 3 Room 1230 – This room has combustibles, and equipment is safe shutdown related, although redundant. Smoke detection is warranted.

10. Level -29m – HCU Group 4 Room 1240 – This room has combustibles, and equipment is safe shutdown related, although redundant. Smoke detection is warranted.

11. Level -21m – Div1 DCIS Switchgear Room 1310 – This room has combustibles, and electrical equipment is safe shutdown related, although redundant. Smoke detection is warranted.

12. Level -21m – Div2 DCIS Switchgear Room 1320 – This room has combustibles, and electrical equipment is safe shutdown related, although redundant. Smoke detection is warranted.

13. Level -21m – Div3 DCIS Switchgear Room 1330 – This room has combustibles, and electrical equipment is safe shutdown related, although redundant. Smoke detection is warranted.

14. Level -21m – SDC Pump A Room 1350 – This room has combustibles, and pump is redundant. Smoke detection is warranted.

15. Level -21m – SDC Pump B Room 1360 – This room has combustibles, and pump is redundant. Smoke detection is warranted.

16. Level -14.5m – Div1 Battery Room 1410 – Per GE direction, this room contains lead-acid batteries. NFPA 855 (Stationary Energy Storage Systems) has been recently created to provide guidance and requirements regarding energy storage associated with green generation stations. The committee has determined that automatic sprinklers are appropriate fire protection and has developed a threshold for when they are required. The standard will likely be referenced by NFPA 804 in the near future. The lead-acid batteries in this room exceed the thresholds and thus sprinkler protection is recommended. The sprinkler density recommended is 12.2mm/min (0.30gpm/ft^2) over the room area. Clean agent alternates are allowed based on favorable large scale testing results.

    The batteries are associated with safe shutdown and are redundant. Smoke and hydrogen detection is warranted. High level exhaust ventilation is recommended as hydrogen gasses are liberated from these batteries during normal charging conditions.

17. Level -14.5m – Div2 Battery Room 1420 – See recommendations above.

18. Level -14.5m – Div3 Battery Room 1430 – See recommendations above.

19. Level -14.5m – SDC Evaporator A Room 1451 – This room has combustibles, and pump is redundant. Smoke detection is warranted where cable tray is located.

20. Level -14.5m – SDC Evaporator B Room 1461 – This room has combustibles, and pump is redundant. Smoke detection is warranted where cable tray is located.

21. Level -8.5m – Secondary Control Room 1570 – Current drawings show this room as a single room with exclusively control room equipment (no equipment room, cable room, break room etc.) Based on this drawing, active protection is limited to very early warning smoke detectors.

Table 4.5.3.2 – Reactor Building Room Data Sheets

Room Data Sheet

Fire Area:	F1100	Description:	Room 1100 - Entry -34.0 / Room 1100A - Sump 1	Const. Type: II 000
Building:	Reactor Building		Gross Area (m2):	92.9
		Applicable codes:	CSA N293, NBCC, NFCC, NFPA 10, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U71-FG2101A		Building Code Occupancy Classification:	Group F, Division 3
			Electrical Classification: Safety-related divisional equipment or cables:	N/A
			Nonsafety - related redundant trains, equipment or cables:	Load Group A to Sump Pump
			Surrounded by fire barriers rated at:	
			Except:	

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
-34.0	1100	Transients	Smoke detector at Stair Door (Stair Pressurization)	Manual Fire Alarm Box	Hose Streams	Fire Extinguishers
-34.0	1100	Cable				
-34.0	1100A	2 pumps and controllers				

<700	Anticipated combustible load, MJ/m2	Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:
700	Unsprinklered combustible load limit, MJ/m2	

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None
Radiological release:	Hose Discharge drains to containment
Manual firefighting:	Access via stairwell and interior doors
Property loss:	Minor
Hazardous Substances:	None

Fire starts in transient combustibles and consumes transients and cables in cable tray. Fire spread is limited to room by 3-hour rated barriers to safety shutdown and primary containment fire areas. Fire does not spread vertically due to limited combustibles in the room and noncombustible continuous floor construction and hatch above. Rooms 1100 and 1100A are considered a fire zone. Not more than one safety shut down cable train anticipated in this room. Fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	F1101	Description:	Room 1101 - Service -34 / Room 1101A - Sump 2
Building:	Reactor Building	Gross Area (m2):	69.55
Associated Drawings or Figures:	407081-U71-FG2101A	Applicable codes:	CSA N293, NBCC, NFCC, NFPA 10, NFPA 14, CSA C22.1, ULC-S524
		Building Code Occupancy Classification:	Group F, Division 3
		Electrical Classification: Safety-related divisional equipment or cables:	N/A
		Nonsafety - related redundant trains, equipment or cables:	Load Group B to Sump Pump
		Surrounded by fire barriers rated at:	
		Except:	

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
-34.0	1101	Transients	Smoke detector at Stair Door (Stair Pressurization) and Elevator	Manual Fire Alarm Box	Hose Streams	Fire Extinguishers
-34.0	1101	Cable				
-34.0	1101A	2 pumps and controllers				

<700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None
Radiological release:	Hose Discharge drains to containment
Manual firefighting:	Access via stairwell and interior doors
Property loss:	Minor
Hazardous Substances:	None

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts in transient combustibles and consumes transients and cables in cable tray. Fire spread is limited to room by 3-hour rated barriers to safety shutdown and primary containment fire areas. Fire does not spread vertically due to limited combustibles in the room and noncombustible continuous floor construction and hatch above. Rooms 1101 and 1101A are considered a fire zone.Not more than one safety shut down cable train anticipated in this room. Fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	F1102	Description:	Room 1102 - ERO Storage	Const. Type: II 000
Building:	Reactor Building		Gross Area (m2):	12.73
		Applicable codes:	CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U71-FG2101A		Building Code Occupancy Classification:	Group F, Division 3
			Electrical Classification: Safety-related divisional equipment or cables:	N/A
			Nonsafety - related redundant trains, equipment or cables:	N/A
		Surrounded by fire barriers rated at:	2 hour fire barrier to Service Room	
		Except:		

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
-34.0	1102	Shelf storage not exceeding 12 feet in height of ordinary (Class III maximum) combustibles	Sprinkler Waterflow	Manual Fire Alarm Box	Wet Pipe Sprinklers	Hose Streams Fire Extinguishers

>700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None
Radiological release:	None, no radiological materials present
Manual firefighting:	Access via stairwell and interior doors
Property loss:	Minor
Hazardous Substances:	Minimal to None

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts in storage shelves and consumes all combustibles in room. Fire spread is limited to room by 3-hour rated barriers to safety shutdown and safety related rooms and by 2-hour barriers to Service Room -34 and Elevator A. Fire does not spread vertically due to limited combustibles in the room and noncombustible continuous floor construction above. Room 1102 is considered a fire zone. Fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	F1110	Description:	Room 1110 - Fine Motion Control Rod Drive (FMCRD) Group 1 Control / Room 1110A Sump 3
Building:	Reactor Building		Gross Area (m2): 109.69
		Applicable codes:	CSA N293, NBCC, NFCC, NFPA 10, NFPA 14, CSA C22.1, ULC-S524
Associated Drawings or Figures:	407081-U71-FG2101A		Building Code Occupancy Classification: Group F, Division 3
			Electrical Classification: Safety-related divisional equipment or cables: R20 Load Group A
			Nonsafety - related redundant trains, equipment or cables: N/A
		Surrounded by fire barriers rated at:	3 hours (Safety Related Equipment)
		Except:	Exterior wall not rated. Floor construction above not required to be rated due to related Group 1 equipment in room above.

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
-34.0	1110	Switchgear/ Motor control/UPS/batteries	Smoke Detectors	Manual Fire Alarm Box	Hose Streams	Fire Extinguishers
-34.0	1110	Cable Tray				
-34.0	1110	Fan Coil Unit				
-34.0	1110	2 sump pumps and controllers				

<1400	Anticipated combustible load, MJ/m2
1400	Unsprinklered combustible load limit, MJ/m2

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts within controllers and spreads to all cable and adjacent equipment in room (Complete room burnout). Fire spread is limited to room by 3-hour rated barriers. Fire does not spread vertically due to limited combustibles in the room and noncombustible continuous floor construction above. Room 1110 is considered a fire zone. Equipment and cable in room is limited to Group 1 controls and thus does not affect safe shutdown.

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	Power Reduction
Radiological release:	Hose Discharge drains to containment
Manual firefighting:	Access via stairwell and interior doors
Property loss:	Moderate
Hazardous Substances:	None

Room Data Sheet

Fire Area:	F1120	Description:	Room 1120 - Fine Motion Control Rod Drive (FMCRD) Group 2 Control
Building:	Reactor Building	Gross Area (m2):	109.69
		Applicable codes:	CSA N293, NBCC, NFCC, NFPA 10, NFPA 14, CSA C22.1, ULC-S524
Associated Drawings or Figures:	407081-U71-FG2101A	Building Code Occupancy Classification:	Group F, Division 3
		Electrical Classification: Safety-related divisional equipment or cables:	R20 Load Group B
		Nonsafety - related redundant trains, equipment or cables:	N/A
		Surrounded by fire barriers rated at:	3 hours (Safety Related Equipment)
		Except:	Exterior wall not rated. Floor construction above not required to be rated due to related Group 2 equipment in room above.

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
-34.0	1120	Switchgear/ Motor control/UPS/batteries	Smoke Detectors	Manual Fire Alarm Box	Hose Streams	Fire Extinguishers
-34.0	1120	Cable Tray				
-34.0	1120	Fan Coil Unit				

<1400	Anticipated combustible load, MJ/m2
1400	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	Power Reduction
Radiological release:	Hose Discharge drains to containment
Manual firefighting:	Access via stairwell and interior doors
Property loss:	Moderate
Hazardous Substances:	None

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts within controllers and spreads to all cable and adjacent equipment in room (Complete room burnout). Fire spread is limited to room by 3-hour rated barriers. Fire does not spread vertically due to limited combustibles in the room and noncombustible continuous floor construction above. Room 1120 is considered a fire zone. Equipment and cable in room is limited to Group 2 controls and thus does not affect safe shutdown.

Room Data Sheet

Fire Area:	F1130	Description:	Room 1130 - Fine Motion Control Rod Drive (FMCRD) Group 3 Control
Building:	Reactor Building	Gross Area (m2):	109.69
		Applicable codes:	CSA N293, NBCC, NFCC, NFPA 10, NFPA 14, CSA C22.1, ULC-S524
Associated Drawings or Figures:	407081-U71-FG2101A	Building Code Occupancy Classification:	Group F, Division 3
		Electrical Classification: Safety-related divisional equipment or cables:	R20 Load Group A
		Nonsafety - related redundant trains, equipment or cables:	N/A
		Surrounded by fire barriers rated at:	3 hours (Safety Related Equipment)
		Except:	Exterior wall not rated. Floor construction above not required to be rated due to related Group 3 equipment in room above.

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
-34.0	1130	Switchgear/ Motor control/UPS/batteries	Smoke Detectors	Manual Fire Alarm Box	Hose Streams	Fire Extinguishers
-34.0	1130	Cable Tray				
-34.0	1130	Fan Coil Unit				

<1400	Anticipated combustible load, MJ/m2
1400	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	Power Reduction
Radiological release:	Hose Discharge drains to containment
Manual firefighting:	Access via stairwell and interior doors
Property loss:	Moderate
Hazardous Substances:	None

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts within controllers and spreads to all cable and adjacent equipment in room (Complete room burnout). Fire spread is limited to room by 3-hour rated barriers. Fire does not spread vertically due to limited combustibles in the room and noncombustible continuous floor construction above. Room 1130 is considered a fire zone. Equipment and cable in room is limited to Group 3 controls and thus does not affect safe shutdown.

Room Data Sheet

Fire Area:	F1140	Description:	Room 1140 - Fine Motion Control Rod Drive (FMCRD) Group 4 Control
Building:	Reactor Building	Gross Area (m2):	109.69
		Applicable codes:	CSA N293, NBCC, NFCC, NFPA 10, NFPA 14, CSA C22.1, ULC-S524
Associated Drawings or Figures:	407081-U71-FG2101A	Building Code Occupancy Classification:	Group F, Division 2
		Electrical Classification: Safety-related divisional equipment or cables:	R20 Load Group B
		Nonsafety - related redundant trains, equipment or cables:	N/A
		Surrounded by fire barriers rated at:	3 hours (Safety Related Equipment)
		Except:	Exterior wall not rated. Floor construction above not required to be rated due to related Group 4 equipment in room above.

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
-34.0	1140	Switchgear/ Motor control/UPS/batteries	Smoke Detectors	Manual Fire Alarm Box	Hose Streams	Fire Extinguishers
-34.0	1140	Cable Tray				
-34.0	1140	Fan Coil Unit				

<1400	Anticipated combustible load, MJ/m2
1400	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	Power Reduction
Radiological release:	Hose Discharge drains to containment
Manual firefighting:	Access via stairwell and interior doors
Property loss:	Moderate
Hazardous Substances:	None

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts within controllers and spreads to all cable and adjacent equipment in room (Complete room burnout). Fire spread is limited to room by 3-hour rated barriers. Fire does not spread vertically due to limited combustibles in the room and noncombustible continuous floor construction above. Room 1140 is considered a fire zone. Equipment and cable in room is limited to Group 4 controls and thus does not affect safe shutdown.

Room Data Sheet

Fire Area:	F1170	Description:	Room 1170 - Primary Containment Area - Volume 9208.83m3
Building:	Reactor Building		Gross Area (m2): 239.15
		Applicable codes:	CSA N293, NBCC, NFCC, NFPA 10, NFPA 14, CSA C22.1, ULC-S524
Associated Drawings or Figures:	407081-U71-FG2101A Through 407081-U71-FG2101F		Building Code Occupancy Classification: Group F, Division 3
			Electrical Classification: Safety-related divisional equipment or cables: All divisions
			Nonsafety - related redundant trains, equipment or cables: N/A
		Surrounded by fire barriers rated at:	3 hours
		Except:	

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
-34 thru 0	1170	Cable in cable trays - quantity unknown	Smoke Detectors may be considered to supervise the area during maintenance activities	Manual Fire Alarm Box	Nitrogen Inerting System - Constant	Hose streams
						Fire Extinguishers

Unknown	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	Fire cannot occur with nitrogen inerting in place. Heat from electrical overcurrent, shorts, grounds, etc.can occur and cause damage limited to a single train with adequate spacial separation.
Radiological release:	No release during plant operation
Manual firefighting:	Area not occupiable during operation, but no fire.
Manual firefighting:	Room 1170 is accessed through two hatches
Hazardous Substances:	None

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

During normal operation of the plant, primary containment is inerted with nitrogen and thus a fire cannot occur. The inerting of the space allows the cable from all three divisions to be in the same area and not impact safe shutdown. The assumption of the assessment is that the unit will procedurally not be allowed to operate without the nitrogen inerting. If the inerting is not in place and a fire occurs, safe shutdown will not be impacted as the unit will not be operating.

During a maintenance outage, fire occurs in transient materials brought in during reactor shutdown and spreads to cable tray and other combustibles in the room. Fire is limited to primary containment by the surrounding fire barriers if the hatches are closed. All safety shut down cable trains are routed through this area. Fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	F1100	Description:	Room 1200 - Entry -29.0 / Equipment Hatch to Primary Containment
Building:	Reactor Building	Gross Area (m2):	83.87
		Applicable codes:	CSA N293, NBCC, NFCC, NFPA 10, NFPA 14, CSA C22.1, ULC-S524
Associated Drawings or Figures:	407081-U71-FG2101B	Building Code Occupancy Classification:	Group F, Division 3
		Electrical Classification: Safety-related divisional equipment or cables:	N/A
		Nonsafety - related redundant trains, equipment or cables:	N/A
		Surrounded by fire barriers rated at:	
		Except:	

Const. Type: II 000

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
-29.0	1200	Cable	Smoke detector at Stair Door (Stair Pressurization)	Manual Fire Alarm Box	Hose Streams	Fire Extinguishers
-29.0	1200	Transients				
-29.0	1200	Electrical Panels				

<1400	Anticipated combustible load, MJ/m2
1400	Unsprinklered combustible load limit, MJ/m2

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts in transient combustibles and consumes transients and cables in cable tray. Fire spread is limited to room by 3-hour rated barriers to safety shutdown and primary containment fire areas. Fire does not spread vertically due to limited combustibles in the room and noncombustible continuous floor construction above and below. Room 1200 is considered a fire zone. Not more than one safety shut down cable train anticipated in this room. Fire does not affect safe shutdown.

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None
Radiological release:	Hose Discharge drains to containment
Manual firefighting:	Access via stairwell and interior doors
Property loss:	Minor
Hazardous Substances:	None

Room Data Sheet

Fire Area:	F1101	Description: Room 1201 - Service -29	Const. Type: II 000
Building:	Reactor Building	Gross Area (m2):	69.56
		Applicable codes: CSA N293, NBCC, NFCC, NFPA 10, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U71-FG2101B	Building Code Occupancy Classification:	Group F, Division 3
		Electrical Classification: Safety-related divisional equipment or cables:	N/A
		Nonsafety - related redundant trains, equipment or cables:	N/A
		Surrounded by fire barriers rated at:	
		Except:	

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
-29.0	1201	Transients	Smoke detector at Stair Door (Stair Pressurization) and Elevator	Manual Fire Alarm Box	Hose Streams	Fire Extinguishers
-29.0	1201	Cable				
-29.0	1201	Electrical Panels				

<700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None
Radiological release:	Hose Discharge drains to containment
Manual firefighting:	Access via stairwell and interior doors
Property loss:	Minor
Hazardous Substances:	None

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts in transient combustibles and consumes transients and cables in cable tray. Fire spread is limited to room by 3-hour rated barriers to safety shutdown and primary containment fire areas. Fire does not spread vertically due to limited combustibles in the room and noncombustible continuous floor construction above and below. Room 1201 is considered a fire zone. Not more than one safety shut down cable train anticipated in this room. Fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	F1102	Description: Room 1202 - ERO Storage	Const. Type: II 000
Building:	Reactor Building	Gross Area (m2):	12.73
		Applicable codes: CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U71-FG2101B	Building Code Occupancy Classification:	Group F, Division 3
		Electrical Classification: Safety-related divisional equipment or cables:	N/A
		Nonsafety - related redundant trains, equipment or cables:	N/A
		Surrounded by fire barriers rated at:	2 hour fire barrier to Service Room
		Except:	

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
-29.0	1202	Shelf storage not exceeding 12 feet in height of ordinary (Class III maximum) combustibles	Sprinkler Waterflow	Manual Fire Alarm Box	Wet Pipe Sprinklers	Hose Stations Fire Extinguishers

>700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts in storage shelves and consumes all combustibles in room. Fire spread is limited to room by 3-hour rated barriers to safety shutdown and safety related rooms and by a 2 hour barrier to Service Room -29 and Elevator A. Fire does not spread vertically due to limited combustibles in the room and noncombustible continuous floor construction above and below. Room 1202 is considered a fire zone. Fire does not affect safe shutdown.

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None
Radiological release:	None, no radiological materials present
Manual firefighting:	Access via stairwell and interior doors
Property loss:	Minor
Hazardous Substances:	Minimal to None

Room Data Sheet

Fire Area:	F1110	Description: Room 1210 - HCU Group 1	Const. Type: II 000
Building:	Reactor Building	Gross Area (m2):	107.24
		Applicable codes: CSA N293, NBCC, NFCC, NFPA 10, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U71-FG2101B	Building Code Occupancy Classification:	Group F, Division 3
		Electrical Classification: Safety-related divisional equipment or cables:	R20 Load Group A
		Nonsafety - related redundant trains, equipment or cables:	N/A
		Surrounded by fire barriers rated at:	3 hours (Safety Related Equipment)
		Except:	Exterior wall not rated. Floor construction below not required to be rated due to related Group 1 equipment in room below.

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
-29.0	1210	HCU Pump	Smoke Detectors	Manual Fire Alarm Box	Hose Streams	Fire Extinguishers
-29.0	1210	Pneumatic Valves				
-29.0	1210	Electrical Panels				
-29.0	1210	Cable				
-29.0	1210	Fan Coil Unit				

<1400	Anticipated combustible load, MJ/m2
1400	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	Power Reduction
Radiological release:	Hose Discharge drains to containment
Manual firefighting:	Access via stairwell and interior doors
Property loss:	Moderate
Hazardous Substances:	None

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts within controllers and spreads to all cable and adjacent electrical equipment in room (Complete room burnout). Fire does not damage pump or piping. Fire spread is limited to room by 3-hour rated barriers. Fire does not spread vertically due to limited combustibles in the room and noncombustible continuous floor construction below. Room 1210 is considered a fire zone. Equipment and cable in room is limited to Group 1 controls and thus does not affect safe shutdown.

Room Data Sheet

Fire Area:	F1120	Description: Room 1220 - HCU Group 2	Const. Type: II 000
Building:	Reactor Building	Gross Area (m2):	107.24
		Applicable codes: CSA N293, NBCC, NFCC, NFPA 10, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U71-FG2101B	Building Code Occupancy Classification:	Group F, Division 3
		Electrical Classification: Safety-related divisional equipment or cables:	R20 Load Group B
		Nonsafety - related redundant trains, equipment or cables:	N/A
		Surrounded by fire barriers rated at:	3 hours (Safety Related Equipment)
		Except:	Exterior wall not rated. Floor construction below not required to be rated due to related Group 2 equipment in room below.

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
-29.0	1220	HCU Pump	Smoke Detectors	Manual Fire Alarm Box	Hose Streams	Fire Extinguishers
-29.0	1220	Pneumatic Valves				
-29.0	1220	Electrical Panels				
-29.0	1220	Cable				
-29.0	1220	Fan Coil Unit				

<1400	Anticipated combustible load, MJ/m2
1400	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	Power Reduction
Radiological release:	Hose Discharge drains to containment
Manual firefighting:	Access via stairwell and interior doors
Property loss:	Moderate
Hazardous Substances:	None

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts within controllers and spreads to all cable and adjacent electrical equipment in room (Complete room burnout). Fire does not damage pump or piping. Fire spread is limited to room by 3-hour rated barriers. Fire does not spread vertically due to limited combustibles in the room and noncombustible continuous floor construction below. Room 1220 is considered a fire zone. Equipment and cable in room is limited to Group 2 controls and thus does not affect safe shutdown.

Room Data Sheet

Fire Area:	F1130	Description: Room 1230 - HCU Group 3	Const. Type: II 000
Building:	Reactor Building	Gross Area (m2):	107.24
		Applicable codes: CSA N293, NBCC, NFCC, NFPA 10, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U71-FG2101B	Building Code Occupancy Classification:	Group F, Division 3
		Electrical Classification: Safety-related divisional equipment or cables:	R20 Load Group A
		Nonsafety - related redundant trains, equipment or cables:	N/A
		Surrounded by fire barriers rated at:	3 hours (Safety Related Equipment)
		Except:	Exterior wall not rated. Floor construction below not required to be rated due to related Group 3 equipment in room below.

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
-29.0	1230	HCU Pump	Smoke Detectors	Manual Fire Alarm Box	Hose Streams	Fire Extinguishers
-29.0	1230	Pneumatic Valves				
-29.0	1230	Electrical Panels				
-29.0	1230	Cable				
-29.0	1230	Fan Coil Unit				

<1400	Anticipated combustible load, MJ/m2
1400	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	Power Reduction
Radiological release:	Hose Discharge drains to containment
Manual firefighting:	Access via stairwell and interior doors
Property loss:	Moderate
Hazardous Substances:	None

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts within controllers and spreads to all cable and adjacent electrical equipment in room (Complete room burnout). Fire does not damage pump or piping. Fire spread is limited to room by 3-hour rated barriers. Fire does not spread vertically due to limited combustibles in the room and noncombustible continuous floor construction below. Room 1230 is considered a fire zone. Equipment and cable in room is limited to Group 3 controls and thus does not affect safe shutdown.

Room Data Sheet

Fire Area:	F1140	Description: Room 1240 - HCU Group 4	Const. Type: II 000
Building:	Reactor Building	Gross Area (m2):	107.24
		Applicable codes: CSA N293, NBCC, NFCC, NFPA 10, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U71-FG2101B	Building Code Occupancy Classification:	Group F, Division 3
		Electrical Classification: Safety-related divisional equipment or cables:	R20 Load Group B
		Nonsafety - related redundant trains, equipment or cables:	N/A
		Surrounded by fire barriers rated at:	3 hours (Safety Related Equipment)
		Except:	Exterior wall not rated. Floor construction below not required to be rated due to related Group 4 equipment in room below.

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
-29.0	1240	HCU Pump	Smoke Detectors	Manual Fire Alarm Box	Hose Streams	Fire Extinguishers
-29.0	1240	Pneumatic Valves				
-29.0	1240	Electrical Panels				
-29.0	1240	Cable				
-29.0	1240	Fan Coil Unit				

<1400	Anticipated combustible load, MJ/m2
1400	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	Power Reduction
Radiological release:	Hose Discharge drains to containment
Manual firefighting:	Access via stairwell and interior doors
Property loss:	Moderate
Hazardous Substances:	None

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts within controllers and spreads to all cable and adjacent electrical equipment in room (Complete room burnout). Fire does not damage pump or piping. Fire spread is limited to room by 3-hour rated barriers. Fire does not spread vertically due to limited combustibles in the room and noncombustible continuous floor construction below. Room 1240 is considered a fire zone. Equipment and cable in room is limited to Group 4 controls and thus does not affect safe shutdown.

Room Data Sheet

Fire Area:	F1100	Description: Room 1300 - Entry -21.0	Const. Type: II 000
Building:	Reactor Building	Gross Area (m2):	83.87
		Applicable codes: CSA N293, NBCC, NFCC, NFPA 10, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U71-FG2101C	Building Code Occupancy Classification:	Group F, Division 3
		Electrical Classification: Safety-related divisional equipment or cables:	N/A
		Nonsafety - related redundant trains, equipment or cables:	N/A
		Surrounded by fire barriers rated at:	
		Except:	

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
-21.0	1300	Cable (1 pwr /2 Control trays)	Smoke detector at Stair Door (Stair Pressurization)	Manual Fire Alarm Box	Hose Streams	Fire Extinguishers
-21.0	1300	Transients				
-21.0	1300	Electrical Panels				

<700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None
Radiological release:	None, no radiological materials present
Manual firefighting:	Access via stairwell and interior doors
Property loss:	Minor
Hazardous Substances:	None

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts in transient combustibles and consumes transients and cables in cable tray. Fire spread is limited to room by 3-hour rated barriers to safety shutdown and primary containment fire areas. Fire does not spread vertically due to limited combustibles in the room and noncombustible continuous floor construction above and below. Room 1300 is considered a fire zone. Not more than one safety shut down cable train anticipated in this room. Fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	F1101	Description: Room 1301 - Service -21.0	Const. Type: II 000
Building:	Reactor Building	Gross Area (m2):	83.8
		Applicable codes: CSA N293, NBCC, NFCC, NFPA 10, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U71-FG2101C	Building Code Occupancy Classification:	Group F, Division 3
		Electrical Classification: Safety-related divisional equipment or cables:	N/A
		Nonsafety - related redundant trains, equipment or cables:	N/A
		Surrounded by fire barriers rated at:	
		Except:	

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
-21.0	1301	Cable (1 pwr /2 Control trays)	Smoke detector at Stair Door (Stair Pressurization) and Elevator	Manual Fire Alarm Box	Hose Streams	Fire Extinguishers
-21.0	1301	Transients				
-21.0	1301	Electrical Panels				

<700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None
Radiological release:	None, no radiological materials present
Manual firefighting:	Access via stairwell and interior doors
Property loss:	Minor
Hazardous Substances:	None

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts in transient combustibles and consumes transients and cables in cable tray. Fire spread is limited to room by 3-hour rated barriers to safety shutdown and primary containment fire areas. Fire does not spread vertically due to limited combustibles in the room and noncombustible continuous floor construction above and below. Room 1301 is considered a fire zone. Not more than one safety shut down cable train anticipated in this room. Fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	F1310	Description:	Room 1310 - Div 1 DCIS & Switchgear
Building:	Reactor Building		Gross Area (m2): 109.69
		Applicable codes:	CSA N293, NBCC, NFCC, NFPA 10, NFPA 14, CSA C22.1, ULC-S524
Associated Drawings or Figures:	407081-U71-FG2101C		Building Code Occupancy Classification: Group F, Division 3
			Electrical Classification: Safety-related divisional equipment or cables: R10 Division I
			Nonsafety - related redundant trains, equipment or cables: N/A
			Const. Type: II 000
		Surrounded by fire barriers rated at:	3 hours (Safety Shutdown Div 1 Equipment)
		Except:	Exterior wall not rated. Floor construction above not required to be rated due to related Division 1 equipment in room above.

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
-21.0	1310	Electrical Panels	Smoke Detectors	Manual Fire Alarm Box	Hose Streams	Fire Extinguishers
-21.0	1310	Cable (most in conduit)				
-21.0	1310	Fan Coil Units				

<1400	Anticipated combustible load, MJ/m2
1400	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None - Fire is limited by manual response - 1 of 3 Divisions
Radiological release:	None
Manual firefighting:	Access via stairwell and interior doors
Property loss:	Moderate
Hazardous Substances:	None

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts within electrical panels and spreads to all cable in tray to adjacent electrical equipment in room (Complete room burnout). Fire spread is limited to room by 3-hour rated barriers. Fire does not spread vertically due to limited combustibles in the room and noncombustible continuous floor construction above. Room 1310 is considered a fire zone. Equipment and cable in room is limited to Division 1 controls and thus does not affect safe shutdown.

Room Data Sheet

Fire Area:	F1320	Description: Room 1320 - Div 2 DCIS & Switchgear	Const. Type: II 000
Building:	Reactor Building	Gross Area (m2):	109.69
		Applicable codes: CSA N293, NBCC, NFCC, NFPA 10, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U71-FG2101C	Building Code Occupancy Classification:	Group F, Division 3
		Electrical Classification: Safety-related divisional equipment or cables:	R10 Division 2
		Nonsafety - related redundant trains, equipment or cables:	N/A
		Surrounded by fire barriers rated at:	3 hours (Safety Shutdown Div 2 Equipment)
		Except:	Exterior wall not rated. Floor construction above not required to be rated due to related Division 2 equipment in room above.

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
-21.0	1320	Electrical Panels	Smoke Detectors	Manual Fire Alarm Box	Hose Streams	Fire Extinguishers
-21.0	1320	Cable (most in conduit)				
-21.0	1320	Fan Coil Units				

<1400	Anticipated combustible load, MJ/m2
1400	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None - Fire is limited by manual response - 1 of 3 Divisions
Radiological release:	None
Manual firefighting:	Access via stairwell and interior doors
Property loss:	Moderate
Hazardous Substances:	None

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts within electrical panels and spreads to all cable in tray to adjacent electrical equipment in room (Complete room burnout). Fire spread is limited to room by 3-hour rated barriers. Fire does not spread vertically due to limited combustibles in the room and noncombustible continuous floor construction above. Room 1320 is considered a fire zone. Equipment and cable in room is limited to Division 2 controls and thus does not affect safe shutdown.

Room Data Sheet

Fire Area:	F1330	Description:	Room 1330 - Div 3 DCIS & Switchgear
Building:	Reactor Building		Gross Area (m2): 109.69
		Applicable codes:	CSA N293, NBCC, NFCC, NFPA 10, NFPA 14, CSA C22.1, ULC-S524
Associated Drawings or Figures:	407081-U71-FG2101C		Building Code Occupancy Classification: Group F, Division 3
			Electrical Classification: Safety-related divisional equipment or cables: R10 Division 3
			Nonsafety - related redundant trains, equipment or cables: N/A
		Surrounded by fire barriers rated at:	3 hours (Safety Shutdown Div 3 Equipment)
		Except:	Exterior wall not rated. Floor construction above not required to be rated due to related Division 3 equipment in room above.

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
-21.0	1330	Electrical Panels	Smoke Detectors	Manual Fire Alarm Box	Hose Streams	Fire Extinguishers
-21.0	1330	Cable (most in conduit)				
-21.0	1330	Fan Coil Units				

<1400	Anticipated combustible load, MJ/m2
1400	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None - Fire is limited by manual response - 1 of 3 Divisions
Radiological release:	None
Manual firefighting:	Access via stairwell and interior doors
Property loss:	Moderate
Hazardous Substances:	None

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts within electrical panels and spreads to all cable in tray to adjacent electrical equipment in room (Complete room burnout). Fire spread is limited to room by 3-hour rated barriers. Fire does not spread vertically due to limited combustibles in the room and noncombustible continuous floor construction above. Room 1330 is considered a fire zone. Equipment and cable in room is limited to Division 3 controls and thus does not affect safe shutdown.

Room Data Sheet

Fire Area:	F1350	Description: Room 1350 - SDC Pump A	Const. Type: II 000
Building:	Reactor Building	Gross Area (m2):	53.65
		Applicable codes: CSA N293, NBCC, NFCC, NFPA 10, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U71-FG2101C	Building Code Occupancy Classification:	Group F, Division 3
		Electrical Classification: Safety-related divisional equipment or cables:	N/A
		Nonsafety - related redundant trains, equipment or cables:	Load Group A

Surrounded by fire barriers rated at: 3 hours (Redundant Pump)

Except: Exterior wall not rated. Floor construction above not required to be rated due to related Group A equipment in room above.

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
-21.0	1350	SDC Pump (Shutdown Cooling Pump)	Smoke Detectors	Manual Fire Alarm	Hose Streams	Fire Extinguishers
-21.0	1350	Cable		Box		

<700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None
Radiological release:	None, Contaminated water in metalic piping and tubing not compromised by fire event. Hose Discharge drains to
Manual firefighting:	Access via stairwell and interior doors
Property loss:	Moderate
Hazardous Substances:	None

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts in transient combustibles and consumes transients and cables in cable tray. Fire spread is limited to room by 3-hour rated barriers to adjacent fire areas. Fire does not spread vertically due to limited combustibles in the room and noncombustible continuous floor construction above. Room 1350 is considered a fire zone. Not more than one safety shut down cable train anticipated in this room. The pump is redundant. Fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	F1360	Description: Room 1360 - SDC Pump B	Const. Type: II 000
Building:	Reactor Building	Gross Area (m2):	53.65
		Applicable codes: CSA N293, NBCC, NFCC, NFPA 10, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U71-FG2101C	Building Code Occupancy Classification:	Group F, Division 3
		Electrical Classification: Safety-related divisional equipment or cables:	N/A
		Nonsafety - related redundant trains, equipment or cables:	Load Group B
		Surrounded by fire barriers rated at:	3 hours (Redundant Pump)
		Except:	Exterior wall not rated. Floor construction above not required to be rated due to related Group B equipment in room above.

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
-21.0	1360	SDC Pump (Shutdown Cooling Pump)	Smoke Detectors	Manual Fire Alarm	Hose Streams	Fire Extinguishers
-21.0	1360	Cable		Box		

<700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None
Radiological release:	None, Contaminated water in metalic piping and tubing not compromised by fire event. Hose Discharge drains to
Manual firefighting:	Access via stairwell and interior doors
Property loss:	Moderate
Hazardous Substances:	None

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts in transient combustibles and consumes transients and cables in cable tray. Fire spread is limited to room by 3-hour rated barriers to adjacent fire areas. Fire does not spread vertically due to limited combustibles in the room and noncombustible continuous floor construction above. Room 1360 is considered a fire zone. Not more than one safety shut down cable train anticipated in this room. The pump is redundant. Fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	F1100	Description:	Room 1400 - Entry -14.5	Const. Type: II 000
Building:	Reactor Building		Gross Area (m2):	83.87
		Applicable codes:	CSA N293, NBCC, NFCC, NFPA 10, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U71-FG2101D		Building Code Occupancy Classification:	Group F, Division 3
			Electrical Classification: Safety-related divisional equipment or cables:	N/A
			Nonsafety - related redundant trains, equipment or cables:	N/A
			Surrounded by fire barriers rated at:	
			Except:	

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
-14.5	1400	Cable (1 pwr /2 Control trays)	Smoke detector at Stair Door (Stair Pressurization)	Manual Fire Alarm Box	Hose Streams	Fire Extinguishers
-14.5	1400	Transients				

<700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None
Radiological release:	None, no radiological materials present however hose discharge drains to containment.
Manual firefighting:	Access via stairwell and interior doors
Property loss:	Minor
Hazardous Substances:	None

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts in transient combustibles and consumes transients and cables in cable tray. Fire spread is limited to room by 3-hour rated barriers to safety shutdown and primary containment fire areas. Fire does not spread vertically due to limited combustibles in the room and noncombustible continuous floor construction above and below. Room 1400 is considered a fire zone. Not more than one safety shut down cable train anticipated in this room. Fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	F1101	Description:	Room 1401 - Service -14.5	Const. Type: II 000
Building:	Reactor Building		Gross Area (m2):	83.8
		Applicable codes:	CSA N293, NBCC, NFCC, NFPA 10, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U71-FG2101D		Building Code Occupancy Classification:	Group F, Division 3
			Electrical Classification: Safety-related divisional equipment or cables:	N/A
			Nonsafety - related redundant trains, equipment or cables:	N/A
		Surrounded by fire barriers rated at:		
		Except:		

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
-14.5	1401	Cable (1 pwr /2 Control trays)	Smoke detector at Stair Door (Stair Pressurization) and Elevator	Manual Fire Alarm Box	Hose Streams	Fire Extinguishers
-14.5	1401	Transients				

<700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts in transient combustibles and consumes transients and cables in cable tray. Fire spread is limited to room by 3-hour rated barriers to safety shutdown and primary containment fire areas. Fire does not spread vertically due to limited combustibles in the room and noncombustible continuous floor construction above and below. Room 1401 is considered a fire zone. Not more than one safety shut down cable train anticipated in this room. Fire does not affect safe shutdown.

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None
Radiological release:	None, no radiological materials present however hose discharge drains to containment.
Manual firefighting:	Access via stairwell and interior doors
Property loss:	Minor
Hazardous Substances:	None

Room Data Sheet

Fire Area:	F1350	Description: Room 1402 - SDC Entry & Room 1451 - SDC Heat Exchanger A	Const. Type: II 000
Building:	Reactor Building	Gross Area (m2):	48.69
		Applicable codes: CSA N293, NBCC, NFCC, NFPA 10, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U71-FG2101D	Building Code Occupancy Classification:	Group F, Division 3
		Electrical Classification: Safety-related divisional equipment or cables:	N/A
		Nonsafety - related redundant trains, equipment or cables:	Load Group A
		Surrounded by fire barriers rated at:	3 hours (Redundant Equipment)
		Except:	Exterior wall not rated. Floor construction above and below not required to be rated due to related equipment in rooms above and below.

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
-14.5	1451	Transients	Smoke Detectors	Manual Fire Alarm Box	Hose Streams	Fire Extinguishers
-14.5	1402	Electrical Panels & Cable Tray				
-14.5	1402	Transients				

<700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None - Fire is limited by manual response - 1 of 2 Redundant Pumps
Radiological release:	None, Contaminated water in metalic piping, tank and tubing not compromised by fire event. Hose Discharge drains to containment.
Manual firefighting:	Access via stairwell and interior doors
Property loss:	Moderate
Hazardous Substances:	None

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts in transient combustibles and consumes transients and cables in cable tray in entry. Fire spread is limited to room by 3-hour rated barriers to adjacent fire areas. Fire does not spread vertically due to limited combustibles in the room and noncombustible continuous floor construction above and below. Rooms 1402 and 1451 are considered a fire zone. Not more than one safety shut down cable train anticipated in this room. Fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	F1360	Description:	Room 1403 - SDC Entry B & Room 1461 - SDC Heat Exchanger B	Const. Type: II 000
Building:	Reactor Building		Gross Area (m2):	48.69
		Applicable codes:	CSA N293, NBCC, NFCC, NFPA 10, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U71-FG2101D		Building Code Occupancy Classification:	Group F, Division 3
			Electrical Classification: Safety-related divisional equipment or cables:	N/A
			Nonsafety - related redundant trains, equipment or cables:	Load Group B
		Surrounded by fire barriers rated at:	3 hours (Redundant Equipment)	
		Except:	Exterior wall not rated. Floor construction above and below not required to be rated due to related equipment in rooms above and below.	

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
-14.5	1461	Transients	Smoke Detectors	Manual Fire Alarm Box	Hose Streams	Fire Extinguishers
-14.5	1403	Electrical Panels & Cable Tray				
-14.5	1403	Transients				

<700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None - Fire is limited by manual response - 1 of 2 Redundant Pumps
Radiological release:	None, Contaminated water in metalic piping, tank and tubing not compromised by fire event. Hose Discharge drains to containment.
Manual firefighting:	Access via stairwell and interior doors
Property loss:	Moderate
Hazardous Substances:	None

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts in transient combustibles and consumes transients and cables in cable tray in entry. Fire spread is limited to room by 3-hour rated barriers to adjacent fire areas. Fire does not spread vertically due to limited combustibles in the room and noncombustible continuous floor construction above and below. Rooms 1403 and 1461 are considered a fire zone. Not more than one safety shut down cable train anticipated in this room. Fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	F1310	Description:	Room 1410 - Div 1 Battery
Building:	Reactor Building		Gross Area (m2): 109.69
		Applicable codes:	CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 14, CSA C22.1, ULC-S524
Associated Drawings or Figures:	407081-U71-FG2101D		Building Code Occupancy Classification: Group F, Division 3
			Electrical Classification: Safety-related divisional equipment or cables: R10 Division 1
			Nonsafety - related redundant trains, equipment or cables: N/A
		Surrounded by fire barriers rated at:	3 hours (Safety Shutdown Div 1 Equipment)
		Except:	Exterior wall not rated. Floor construction below not required to be rated due to related Division 1 equipment in room below.

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
-14.5	1410	Battery cases	Smoke Detectors & Hydrogen Detectors	Manual Fire Alarm Box	Preaction Sprinklers	Hose Streams
-14.5	1410	Cable				Fire Extinguishers
-14.5	1410	Electrical Cabinet				
			Sprinkler Waterflow		Other Fire Protection	
					High level exhaust	

>700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None - Fire is limited by manual response - 1 of 3 Divisions
Radiological release:	None, no radiological materials present
Manual firefighting:	Access via stairwell and interior doors
Property loss:	Moderate
Hazardous Substances:	Battery acid spill

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Cable fire. Fire spreads to battery cases and transients. Fire is limited to room by 3-hour rated barriers. Fire does not spread vertically due to limited combustibles in the room and noncombustible continuous floor construction below. Room 1410 is considered a fire zone. Not more than one safety shut down cable train anticipated in this room. Fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	F1320	Description:	Room 1420 - Div 2 Battery	Const. Type: II 000
Building:	Reactor Building		Gross Area (m2):	109.69
		Applicable codes:	CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U71-FG2101D		Building Code Occupancy Classification:	Group F, Division 3
			Electrical Classification: Safety-related divisional equipment or cables:	R10 Division 2
			Nonsafety - related redundant trains, equipment or cables:	N/A
		Surrounded by fire barriers rated at:	3 hours (Safety Shutdown Div 2 Equipment)	
		Except:	Exterior wall not rated. Floor construction below not required to be rated due to related Division 2 equipment in room below.	

Consisting of the following Rooms:			Fire Detection		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
-14.5	1420	Battery cases	Smoke Detectors & Hydrogen Detectors	Manual Fire Alarm Box	Preaction Sprinklers	Hose Streams
-14.5	1420	Cable				Fire Extinguishers
-14.5	1420	Electrical Cabinet				
			Sprinkler Waterflow		Other Fire Protection	
					High level exhaust	

>1400	Anticipated combustible load, MJ/m2
1400	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None - Fire is limited by sprinklers manual response - 1 of 3 Divisions
Radiological release:	None, no radiological materials present
Life safety:	Travel distance limits to exits meet LS Requirements
Manual firefighting:	Access via stairwell and interior doors
Property loss:	Moderate
Hazardous Substances:	Battery acid spill

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Cable fire. Fire spreads to battery cases and transients. Fire is limited to room by 3-hour rated barriers. Fire does not spread vertically due to limited combustibles in the room and noncombustible continuous floor construction below. Room 1420 is considered a fire zone. Not more than one safety shut down cable train anticipated in this room. Fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	F1330	Description:	Room 1430 - Div 3 Battery
Building:	Reactor Building		Gross Area (m2): 109.69
		Applicable codes:	CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 14, CSA C22.1, ULC-S524
Associated Drawings or Figures:	407081-U71-FG2101D		Building Code Occupancy Classification: Group F, Division 3
			Electrical Classification: Safety-related divisional equipment or cables: R10 Division 3
			Nonsafety - related redundant trains, equipment or cables: N/A
		Surrounded by fire barriers rated at:	3 hours (Safety Shutdown Div 3 Equipment)
		Except:	Exterior wall not rated. Floor construction below not required to be rated due to related Division 3 equipment in room below.

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
-14.5	1430	Battery cases	Smoke Detectors & Hydrogen Detectors	Manual Fire Alarm Box	Preaction Sprinklers	Hose Streams
-14.5	1430	Cable				Fire Extinguishers
-14.5	1430	Electrical Cabinet				
			Sprinkler Waterflow		Other Fire Protection	
					High level exhaust	

>700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None - Fire is limited by manual response - 1 of 3 Divisions
Radiological release:	None, no radiological materials present
Manual firefighting:	Access via stairwell and interior doors
Property loss:	Moderate
Hazardous Substances:	Battery acid spill

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Cable fire. Fire spreads to battery cases and transients. Fire is limited to room by 3-hour rated barriers. Fire does not spread vertically due to limited combustibles in the room and noncombustible continuous floor construction below. Room 1430 is considered a fire zone. Not more than one safety shut down cable train anticipated in this room. Fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	F1100	Description: Room 1500 - Entry -8.5 / Service Hatch to Primary Containment	Const. Type: II 000
Building:	Reactor Building	Gross Area (m2):	66.06
		Applicable codes: CSA N293, NBCC, NFCC, NFPA 10, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U71-FG2101E	Building Code Occupancy Classification:	Group F, Division 3
		Electrical Classification: Safety-related divisional equipment or cables:	N/A
		Nonsafety - related redundant trains, equipment or cables:	N/A
		Surrounded by fire barriers rated at:	
		Except:	

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
-8.5	1500	Cable (1 pwr /2 Control trays)	Smoke detector at Stair Door (Stair Pressurization)	Manual Fire Alarm Box	Hose Streams	Fire Extinguishers
-8.5	1500	Transients				

<700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None
Radiological release:	Hose Discharge drains to containment
Manual firefighting:	Access via stairwell and interior doors
Property loss:	Minor
Hazardous Substances:	None

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts in transient combustibles and consumes transients and cables in cable tray. Fire spread is limited to room by 3-hour rated barriers to safety shutdown and primary containment fire areas. Fire does not spread vertically due to limited combustibles in the room and noncombustible continuous floor construction above and below. Room 1500 is considered a fire zone. Not more than one safety shut down cable train anticipated in this room. Fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	F1101	Description: Room 1501 - Boron Injection	Const. Type: II 000
Building:	Reactor Building	Gross Area (m2):	76.41
		Applicable codes: CSA N293, NBCC, NFCC, NFPA 10, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U71-FG2101E	Building Code Occupancy Classification:	Group F, Division 3
		Electrical Classification: Safety-related divisional equipment or cables:	N/A
		Nonsafety - related redundant trains, equipment or cables:	N/A
		Surrounded by fire barriers rated at:	
		Except:	

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
-8.5	1501	Boron Injection Skid	Smoke detector at Stair Door (Stair Pressurization) and Elevator	Manual Fire Alarm Box	Hose Streams	Fire Extinguishers
-8.5	1501	Electrical panels				
-8.5	1501	Cable Tray - 1pwr / 2 Control				
-8.5	1501	Transients				

<700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None
Radiological release:	Hose Discharge drains to containment
Manual firefighting:	Access via stairwell and interior doors
Property loss:	Minor
Hazardous Substances:	None

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts in transient combustibles and consumes transients and cables in cable tray. Fire spread is limited to room by 3-hour rated barriers to Control Room, FP Equip Rm and primary containment fire areas. Fire does not spread vertically due to limited combustibles in the room and noncombustible continuous floor construction above and below. Room 1501 is considered a fire zone. Not more than one safety shut down cable train anticipated in this room. Fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	F1502	Description: Room 1502 - Corridor -8.5	Const. Type: II 000
Building:	Reactor Building	Gross Area (m2):	36.42
		Applicable codes: CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U71-FG2101E	Building Code Occupancy Classification:	Group F, Division 3
		Electrical Classification: Safety-related divisional equipment or cables:	N/A
		Nonsafety - related redundant trains, equipment or cables:	Load Group A or B
		Surrounded by fire barriers rated at:	
		Except:	

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
-8.5	1502	Cable Trays	Smoke Detectors	Manual Fire Alarm Box	Preaction Sprinklers - Provided due to estimated cable tray in relatively small space. Will be re-evaluated when cable tray details are available	Hose Streams
-8.5	1502	Transients				Fire Extinguishers

>700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None - Redundant Train
Radiological release:	Hose Discharge drains to containment
Manual firefighting:	Access via stairwell and interior doors
Property loss:	Minor
Hazardous Substances:	None

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts in transient combustibles and consumes transients and cables in cable tray. Minor smoke damage to FP Equip Room. Fire spread is limited to room by 3-hour rated barriers to adjacent fire areas and substantial construction to FP Equip Room and Mezzanine. Not more than one safety shut down cable train anticipated in this room. Fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	F1350	Description: Room 1550 - SDC Piping	Const. Type: II 000
Building:	Reactor Building	Gross Area (m2):	95.84
		Applicable codes: CSA N293, NBCC, NFCC, NFPA 10, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U71-FG2101E	Building Code Occupancy Classification:	Group F, Division 3
		Electrical Classification: Safety-related divisional equipment or cables:	N/A
		Nonsafety - related redundant trains, equipment or cables:	TBD
		Surrounded by fire barriers rated at:	3 hours
		Except:	Exterior wall not rated. Floor construction above not required to be rated due to related equipment in room above.

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
-8.5	1550	Cable 2pwr/2 control	Smoke Detectors	Manual Fire Alarm	Hose Streams	Fire Extinguishers
-8.5	1550	Electrical equipment		Box		

<700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts in transient combustibles and consumes transients. Fire spread is limited to room due to minimal combustible loading, lack of continuity of combustibles and substantial walls and doors to adjacent rooms. Vertical fire spread is limited by noncombustible continuous floor construction above and below. Room 1550 is considered a fire zone. Damage to piping not expected. Fire does not affect safe shutdown.

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	Impact on plant operation under evaluation
Radiological release:	Hose Discharge drains to containment
Manual firefighting:	Access via stairwell and interior doors
Property loss:	Minor
Hazardous Substances:	None

Room Data Sheet

Fire Area:	F1502	Description: Room 1553 - Fuel Pool (FP) Equip & Room 1556 FP Equip Mezz	Const. Type: II 000
Building:	Reactor Building	Gross Area (m2):	48.87
		Applicable codes: CSA N293, NBCC, NFCC, NFPA 10, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U71-FG2101E	Building Code Occupancy Classification:	Group F, Division 3
		Electrical Classification: Safety-related divisional equipment or cables:	N/A
		Nonsafety - related redundant trains, equipment or cables:	Likely A & B
		Surrounded by fire barriers rated at:	
		Except:	

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
-8.5	1553	Filters	Smoke Detectors for redundant pumps in one room	Manual Fire Alarm Box	Hose Streams	Fire Extinguishers
-8.4	1553	Transients				
-8.4	1556	Pumps and controllers				

<700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None
Radiological release:	Hose Discharge drains to containment
Manual firefighting:	Early warning and access via stairs and corridor
Property loss:	Moderate
Hazardous Substances:	None

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts in transient combustibles and consumes transients and cables in cable tray. Both pump assemblies could be damaged. Fire spread is limited to fire area by 3-hour rated barriers to adjacent fire areas and substantial construction to Corridor 1502. Fire does not spread vertically due to limited combustibles in the room and noncombustible continuous floor construction above. Rooms 1553 and 1556 are considered a fire zone. Not more than one safety shut down cable train anticipated in this area. Fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	F1560	Description: Room 1560 - Electrical Distribution	Const. Type: II 000
Building:	Reactor Building	Gross Area (m2):	95.84
		Applicable codes: CSA N293, NBCC, NFCC, NFPA 10, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U71-FG2101E	Building Code Occupancy Classification:	Group F, Division 3
		Electrical Classification: Safety-related divisional equipment or cables:	N/A
		Nonsafety - related redundant trains, equipment or cables:	TBD
		Surrounded by fire barriers rated at:	3 hours
		Except:	Exterior wall not rated. Floor construction above not required to be rated due to related equipment in room above.

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
-8.5	1560	Cable 2pwr/2 control	Smoke Detectors	Manual Fire Alarm	Hose Streams	Fire Extinguishers
-8.5	1560	Electrical equipment		Box		

<1400	Anticipated combustible load, MJ/m2
1400	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	Impact on plant operation under evaluation
Radiological release:	None
Manual firefighting:	Access via stairwell and interior doors
Property loss:	Moderate
Hazardous Substances:	None

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts within electrical panels and spreads to all cable in tray to adjacent electrical equipment in room (Complete room burnout). Fire spread is limited to room by 3-hour rated barriers. Fire does not spread vertically due to limited combustibles in the room and noncombustible continuous floor construction above. Room 1130 is considered a fire zone. Fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	F1570	Description:	Room 1570 - Secondary Control Room
Building:	Reactor Building		Gross Area (m2): 95.84
		Applicable codes:	CSA N293, NBCC, NFCC, NFPA 10, NFPA 14, CSA C22.1, ULC-S524
Associated Drawings or Figures:	407081-U71-FG2101E		Building Code Occupancy Classification: Group F, Division 3
			Electrical Classification: Safety-related divisional equipment or cables: Division 1, 2 &3
			Nonsafety - related redundant trains, equipment or cables: Load Group A & B

Const. Type: II 000

Surrounded by fire barriers rated at: 3 hours

Except: Exterior wall not rated

Consisting of the following Rooms:

EL	Rm#	Potential Combustibles
-8.5	1570	Cable - In Conduit
-8.5	1570	Electrical Equipment

Fire Alarm Input Devices	
Primary	Backup
Very early smoke detection	Manual Fire Alarm Box

Fire Suppression	
Primary	Backup
Hose Streams	Fire Extinguishers
Other Active Fire Protection	
Control Room Pressurization - Activated by any smoke detector on Level -8.0	

>700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

For the purpose of this preliminary assessment, it is assumed that all cable outside of control cabinets are in conduit. The room is limited to the control room function (no break room, office, etc.) Fire starts in transient combustibles and consumes transients. Fire spread is limited to room by 3-hour rated barriers to adjacent fire areas. Three safety shut down cable trains anticipated in this room, however in conduit and isolated from main control room. Safe shutdown would be achieved and maintained from the Main Control Room. The operators are already at the Main Control Room.

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None - Use main control room
Radiological release:	None, no radiological materials present
Manual firefighting:	Access via exterior doors and corridor
Property loss:	Moderate
Hazardous Substances:	None

Room Data Sheet

Fire Area:	F1600	Description: Room 1600 - Truck Bay	Const. Type: II 000
Building:	Reactor Building	Gross Area (m2):	56.7
		Applicable codes: CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U71-FG2101F	Building Code Occupancy Classification:	Group F, Division 3
		Electrical Classification: Safety-related divisional equipment or cables:	N/A
		Nonsafety - related redundant trains, equipment or cables:	N/A
		Surrounded by fire barriers rated at:	
		Except:	

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
0.0	1600	Fork Lift	Sprinkler Waterflow	Manual Fire Alarm	Wet Pipe Sprinklers for anticipated uncontrolled	Hose Streams
0.0	1600	Other Transients		Box	materials moving in and out of the Reactor Building	Fire Extinguishers
0.0	1600	Cable Tray				

>700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts in Fork Lift /Cargo, spreads to cable and other transients and burns until consumed. Fire spread is limited to room due to 3 hour barriers to adjacent rooms. Fire does not spread vertically due to limited combustibles in the room and noncombustible continuous floor construction above and below. Room 1600 is considered a fire zone. Fire does not affect safe shutdown.

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None
Radiological release:	None, no radiological materials present
Manual firefighting:	Access via exterior doors
Property loss:	Moderate
Hazardous Substances:	None

Room Data Sheet

Fire Area:	F1502	Description: Room 1602 - Hallway	Const. Type: II 000
Building:	Reactor Building	Gross Area (m2):	39.77
		Applicable codes: CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U71-FG2101F	Building Code Occupancy Classification:	Group F, Division 3
		Electrical Classification: Safety-related divisional equipment or cables:	N/A
		Nonsafety - related redundant trains, equipment or cables:	Load Group A or B
		Surrounded by fire barriers rated at:	
		Except:	

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
0.0	1602	Cable Tray 1 pwr & 1 control	Manual Fire Alarm		Wet Pipe Sprinklers	Hose Streams
0.0	1602	Transients	Box			Fire Extinguishers

<700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None
Radiological release:	Hose Discharge drains to containment
Manual firefighting:	Access via stairwell and interior doors
Property loss:	Minor
Hazardous Substances:	None

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts in transient combustibles and consumes cables and transients. Fire spread is limited to hallway due to fire rated and substantial walls and doors to adjacent rooms. Fire does not spread vertically due to limited combustibles in the room and noncombustible continuous floor construction above and below. Room 1602 is considered a fire zone. Fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	F1350	Description: Room 1650 - ICC Cooling, Room 1601 - Labyrinth A	Const. Type: II 000
Building:	Reactor Building	Gross Area (m2):	100.22
		Applicable codes: CSA N293, NBCC, NFCC, NFPA 10, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U71-FG2101F	Building Code Occupancy Classification:	Group F, Division 3
		Electrical Classification: Safety-related divisional equipment or cables:	N/A
		Nonsafety - related redundant trains, equipment or cables:	Load Group A & B to pumps
			Load Group A or B in Tray
		Surrounded by fire barriers rated at:	
		Except:	

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
0.0	1650	Pumps & Contollers	Smoke Detectors for redundant pumps in one room	Manual Fire Alarm Box	Hose Streams	Fire Extinguishers
0.0	1650	Cable Tray				
0.0	1650	Transients				

<700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None
Radiological release:	Hose Discharge drains to containment
Manual firefighting:	Early warning and access via stairs and interior doors
Property loss:	Minor
Hazardous Substances:	None

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts in transient combustibles and consumes transients and cables in trays. Fire spread is limited to room due to minimal combustible loading, lack of continuity of combustibles, fire barrier to Truck Bay and substantial walls and doors to MS / FW Piping Room. Vertical fire spread is limited due to noncombustible continuous floor construction above and below. Rooms 1650 and 1601 are considered a fire zone. Minor damage to pumps. Piping damage not expected. Fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	F1350	Description: Room 1660 Services 0 A	Const. Type: II 000
Building:	Reactor Building	Gross Area (m2):	75.41
		Applicable codes: CSA N293, NBCC, NFCC, NFPA 10, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U71-FG2101F	Building Code Occupancy Classification:	Group F, Division 3
		Electrical Classification: Safety-related divisional equipment or cables:	N/A
		Nonsafety - related redundant trains, equipment or cables:	Load Group A or B
		Surrounded by fire barriers rated at:	
		Except:	

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
0.0	1660	Cable Tray 1 pwr & 1 Control	Smoke detector at Stair Door (Stair Pressurization) and Elevator	Manual Fire Alarm Box	Hose Streams	Fire Extinguishers
0.0	1660	Transients				

<700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts in transient combustibles and consumes transients and cables in cable tray. Fire spread is limited to room due to minimal combustible loading, lack of continuity of combustibles and substantial walls and doors to adjacent rooms. Vertical fire spread is limited due to noncombustible continuous floor construction above and below. Room 1660 is considered a fire zone. Not more than one safety shut down cable train anticipated in this room. Fire does not affect safe shutdown.

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None
Radiological release:	Hose Discharge drains to containment
Manual firefighting:	Access via stairwell and interior doors
Property loss:	Minor
Hazardous Substances:	None

Room Data Sheet

Fire Area:	F1350	Description: Room 1661 - Services 0 B, Room 1603 Labyrinth B	Const. Type: II 000
Building:	Reactor Building	Gross Area (m2):	100.22
		Applicable codes: CSA N293, NBCC, NFCC, NFPA 10, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U71-FG2101F	Building Code Occupancy Classification:	Group F, Division 3
		Electrical Classification: Safety-related divisional equipment or cables:	N/A
		Nonsafety - related redundant trains, equipment or cables:	Load Group A or B
		Surrounded by fire barriers rated at:	
		Except:	

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
0.0	1661	Cable Tray 1 pwr & 1 Control	Manual Fire Alarm Box		Hose Streams	Fire Extinguishers
0.0	1661	Transients				

<700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts in transient combustibles and consumes transients and cables in cable tray. Fire spread is limited to room due to minimal combustible loading, lack of continuity of combustibles and substantial walls and doors to adjacent rooms. Vertical fire spread is limited due to noncombustible continuous floor construction above and below. Rooms 1661 and 1603 are considered a fire zone. Not more than one safety shut down cable train anticipated in this room. Fire does not affect safe shutdown.

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None
Radiological release:	Hose Discharge drains to containment
Manual firefighting:	Access via stairwell and interior doors
Property loss:	Minor
Hazardous Substances:	None

Room Data Sheet

Fire Area:	F1350	Description: Room 1670 - MS/FW Piping	Const. Type: II 000
Building:	Reactor Building	Gross Area (m2):	109.69
		Applicable codes: CSA N293, NBCC, NFCC, NFPA 10, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U71-FG2101F	Building Code Occupancy Classification:	Group F, Division 3
		Electrical Classification: Safety-related divisional equipment or cables:	N/A
		Nonsafety - related redundant trains, equipment or cables:	N/A
		Surrounded by fire barriers rated at:	Deluge water spray in Turbine Buidling at pipe opening
		Except:	

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
0.0	1670	Transients	Manual Fire Alarm Box		Hose Streams	Fire Extinguishers

<700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts in transient combustibles and consumes transients. Fire spread is limited to room due to minimal combustible loading, lack of continuity of combustibles and substantial walls and doors to adjacent rooms. Vertical fire spread is limited due to noncombustible continuous floor construction above and below. Room 1670 is considered a fire zone. Damage to piping not expected. Fire does not affect safe shutdown.

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	Reactor Scram
Radiological release:	Hose Discharge drains to containment
Manual firefighting:	Access via stairwell and interior doors
Property loss:	Minor
Hazardous Substances:	None

Room Data Sheet

Fire Area:	F1192	Description: Room 1680 - Elev Mech Room A & Room 1192 Hoistway	Const. Type: II 000
Building:	Reactor Building	Gross Area (m2):	10.9
		Applicable codes: CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 14, CSA C22.1, ULC-S524, CSA B44	
Associated Drawings or Figures:	407081-U71-FG2101G	Building Code Occupancy Classification:	Group F, Division 3
		Electrical Classification: Safety-related divisional equipment or cables:	N/A
		Nonsafety - related redundant trains, equipment or cables:	Elev on Load Group A
		Surrounded by fire barriers rated at:	2 hour hoistway and machine room
		Except:	

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
2.5	1680	Service Elevator. Equipment. Materials per CSA B44	Smoke & Heat Detectors	Manual Fire Alarm Box	Wet Pipe Sprinklers (per CSA B44) - Machine room and hoistway	Hose Streams
			Sprinkler Waterflow			Fire Extinguishers

>700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None
Radiological release:	None, no radiological materials present
Manual firefighting:	Access via Stair B
Property loss:	Minor
Hazardous Substances:	None

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts in elevator equipment and spreads to cables. Fire burns until combustibles consumed. Fire spread is limited to room due to 2 hour barriers to adjacent room. Fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	F1800	Description: Room 1800 - Operating Deck (Not Including Pools)	Const. Type: II 000
Building:	Reactor Building	Gross Area (m2):	727.1
		Applicable codes: CSA N293, NBCC, NFCC, NFPA 10, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U71-FG2101J	Building Code Occupancy Classification:	Group F, Division 3
		Electrical Classification: Safety-related divisional equipment or cables:	N/A
		Nonsafety - related redundant trains, equipment or cables:	Load Group A
		Surrounded by fire barriers rated at:	
		Except:	

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
13.0	1800	Transients	Manual Fire Alarm Box		Hose Streams	Fire Extinguishers
13.0	1800	Cable Tray				

<700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts in transient combustibles and consumes transients. No other known combustibles in the room. Fire does not affect safe shutdown.

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None
Radiological release:	Hose Discharge drains to containment
Manual firefighting:	Access via exterior doors and stairs
Property loss:	Minor
Hazardous Substances:	None

Room Data Sheet

Fire Area:	F1800	Description: Room 1801 - ERO Storage 16	Const. Type: II 000
Building:	Reactor Building	Gross Area (m2):	4.32
		Applicable codes: CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U71-FG2101K	Building Code Occupancy Classification:	Group F, Division 2
		Electrical Classification: Safety-related divisional equipment or cables:	N/A
		Nonsafety - related redundant trains, equipment or cables:	N/A
		Surrounded by fire barriers rated at:	Assumed to be completely separate fromm Stair B - 2hr construction
		Except:	

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
16.0	1801	Shelf storage not exceeding 12 feet in height of ordinary (Class III maximum) combustibles	Sprinkler Waterflow	Manual Fire Alarm Box	Wet Pipe Sprinklers for room and top of stair	Hose Stations Fire Extinguishers

>700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts in storage shelves and consumes all combustibles in room. Fire does not spread beyond room due to rated walls, floor and ceiling. Fire does not affect safe shutdown.

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None
Radiological release:	None, no radiological materials present
Manual firefighting:	Access via stairwell and interior doors
Property loss:	Minor
Hazardous Substances:	Minimal to None

4.5.3.3 Turbine Building

The fire protection requirements for the Turbine Building will be based on CSA N293 prescriptive requirements, and evaluation of the combustible loading of each room and its associated fire separations (barriers) to determine the need for sprinklers and detection.

CSA N293 requires sprinklers in the turbine generator underfloor area. This area is generally the entire area of the turbine building on the two levels below the operating floor. In the nuclear plant the steam turbine is within a radiation shield which forms a boundary for the lube and control oil piping within the shield. All areas within the shield, below the operating floor are provided with complete sprinkler protection. The lube oil system continues out of the shielded area to the bearings associated with the generator. The mezzanine floor area under and within 6.1M (20 feet) (of the lube oil lines is grated flooring and thus oil spread across this level does not occur. The Electro-hydraulic Control Unit (EHC) unit is within a three-hour rated enclosure on the mezzanine level and thus does not add to the combustible loading of the larger fire area on this level. The generator is air /water cooled. The sprinklered area on the mezzanine level has been extended beyond the 20 feet minimum distance to the north wall, Column Row TBB to the east and Column Row TBE to the west. On the ground floor the same area has been sprinklered. Additionally, the general combustible loading of the ground floor (without considering the lube oil) exceeds the 700MJ/m2 loading, mostly due to the cable loading. The general loading and consideration to redundant load groups and cable within this space lead to providing sprinkler protection throughout the ground floor area.

Standpipes (Class I) are required in the four exit enclosures to meet spacing requirements. These are illustrated on the Fire Area Drawings. The Turbine Building is supplied with fire protection water from three separate connections from the site loop. They feed into Stair C, B and A. An interior supply main, inside the building, connects the stair risers for redundancy to the four standpipes and suppression system risers. See the Fire Area drawing ([[ ]]) for the general routing, and the P&ID for the schematic layout.

The major internal and external fire hazards associated with the Turbine Building are summarized as follows:

- Lube oil system for the steam turbine/generator bearings – The lube oil system includes the reservoir, pumps, filters, and piping to the bearings. The reservoir, pumps and filters are located on the ground floor of the building within a 3-hour rated room. Automatic sprinkler protection is provided in the room. Spill control is under design for the room to contain a complete spill and fire protection discharge. The lube oil piping system incorporates a guarded piping system (double wall pipe) to contain and direct spilled oil back to the reservoir. The area below the piping and postulated spill on the Ground Floor and Mezzanine Floor is protected by an automatic sprinkler system. Additionally, an automatic preaction spray system is provided for protection at the bearings.
- Control Oil System - The control oil system includes a reservoir, pumps, filters, and piping. Fyrquel EHC fluid is provided for the control oil system. The oil, while combustible, has a higher flash point to reduce the chance of a fire associated with a piping failure. The reservoir pumps and filters are located on the mezzanine floor of the building within a 3- hour rated room. Automatic sprinkler protection is provided in the room. Spill control is under design for the room to contain a complete spill and fire protection discharge. The piping layout will be reviewed when available, however is likely within the currently proposed sprinklered areas of the building.

- Diesel Fuel Oil (Generators) – The Load Group A and B standby generators are located in the Turbine Building. Each generator is located in a 3-hour rated enclosure on the ground floor. Each generator has a large belly tank, as a part of the skid. The design for the generators is underway however the exact size of the generators and the tank has not been determined. The tank is understood to contain approximately 10,000 gallons. The tank is a double wall tank to minimize the chance of a fuel spill in the room. While not shown on the current drawings, it is anticipated that each room's door will be to the outside, and thus any spill will naturally drain outside the building. Additionally automatic sprinkler protection will be provided in each room, designed to control a fuel oil spill.
- Electrical Rooms – The electrical rooms will house switchgear and associated cables. No oil filled electrical equipment will be provided. The Turbine Building has two major switchgear room for the two generators. These rooms are 3-hour rated enclosures and located on the mezzanine level. The quantity of cables and thus the fuel load will be quantified and evaluated as the design proceeds. The rooms are provided with smoke detectors for early warning of a fire event. Class C fire extinguishers will be provided outside the door(s) to these rooms for manual firefighting.
- Hydrogen Gas – The generator is air cooled and thus the hydrogen in the building is limited to two 2.5lb cylinders located in the sprinklered ground floor area.
- Battery Room – The Division C Battery Room is located on the ground floor of the Turbine Building. The room is separated from the remainder of the building by 3-hour rated barriers. The batteries are understood to be lithium-ion type. Flammable gasses are liberated from these batteries in a thermal runaway condition. Hydrogen detection is provided in the room as well as high level exhaust ventilation. Smoke detection is provided for early warning of a fire condition in this room. Sprinkler protection is the NFPA 855 preferred suppression method at this time. Automatic preaction sprinkler protection is provided for this room. The need for explosion relief will be evaluated as the design proceeds.

Recommended fire suppression systems are identified on the room data sheets and illustrated on the Fire Area Drawings, however, are summarized as follows:

- Ground Floor – Open Ground Floor Area – Room 2170 – Wet Pipe Sprinkler
- Ground Floor – Steam Tunnel Deluge Sprinkler
- Ground Floor – Turbine Lube Oil Module – Room 2181 – Wet Pipe Sprinkler
- Ground Floor – Diesel Generator A – Room 2150 – Dry Pipe Sprinkler
- Ground Floor – Diesel Generator B – Room 2160 – Dry Pipe Sprinkler
- Ground Floor – Division C Batteries – Room 2182 – Preaction Sprinkler
- Mezzanine Floor – Open Mezzanine Floor Area (Under Operating Floor) – Room 2270 – Wet Pipe Sprinkler
- Mezzanine Floor – EHC Unit – Room 2280 – Wet Pipe Sprinkler
- Freight Elevator Hoistway and Machine Room – Wet Pipe Sprinklers
- Operating Floor – Turbine/Generator Bearings – Preaction Spray

A fire alarm system with automatic voice occupant notification is provided throughout the building. Devices and appliances are provided as follows:

- Manual fire alarm boxes (manual pull stations) are provided at each stair door on each level and at building exits.
- Waterflow alarms and supervision is provided on automatic suppression systems.
- Smoke detection is provided in areas as noted on the room data sheets.
- Smoke and heat detectors are provided for freight elevator.
- Occupant notification is provided throughout the building.

Preliminary cable tray layout drawings have been developed for the Turbine Building. In this preliminary stage, the routing of the individual load groups within the trays has not been developed. Further evaluation of separation will be needed as the design proceeds.

See Turbine Building Fire Area Drawings:

[[	]]	Ground Floor
[[	]]	Mezzanine Floor El. 6.1M
[[	]]	Operating Floor EL. 12.2M
[[	]]	Room Levels EL 24.38 and 30.5M

The Room Data Sheets for the Turbine Building, detailing the combustibles, room features and level of protection for each room is in Table 4.5.3.3 below. Additional information and analysis is as follows:

1. Ground Floor – Turbine Underfloor System – N293 prescriptively requires this system and references the FM Global data Sheets for sprinkler densities. The building is heated and makeup air to the area will be tempered. The area of coverage of the sprinkler system is the area of the floor of the mezzanine floor above (solid surface and grated steel), as floor drains are not provided to limit the spill area and a significant amount of cable trays and other combustibles are in the area. A Wet Pipe sprinkler system is recommended. Per FM DS7-101, Figure 9c, the sprinkler density of this system is 16mm/min (0.40gpm/ft^2) over the hydraulically most remote 232m^2 (2500ft^2) area.
2. Ground Floor – Steam Tunnel Deluge System – The steam tunnel connects the Turbine Building and Rad Waste Building. A deluge system is recommended with a density of 37L/min per lineal meter (3gpm/ft^2 per lineal foot) and a spacing of 1.83m (6ft).
3. Ground Floor – Standby Diesel Generators – Each generator has 45,425L of diesel fuel in its belly tank and thus presents a significant hazard and requires sprinkler protection and a manual foam hose rack. Secondary containment is provided by a double wall tank. Dry pipe sprinklers are recommended due to the louvers to the outside for combustion air.
4. Ground Floor – Division C Batteries Room 2182 – NFPA 855 (Stationary Energy Storage Systems) has been recently created to address current lithium-ion battery concerns as well as review energy storage associated with green generation stations. The committeehas determined that automatic sprinklers are appropriate fire protection and

has developed a threshold for when they are required. The standard will likely be referenced by NFPA 804 in the near future. The batteries in this room exceed the thresholds and thus sprinkler protection is recommended. The sprinkler density recommended is 12.2mm/min (0.30gpm/ft^2) over the room area. Clean agent alternates are allowed based on favorable large scale testing results.

The batteries are associated with safe shutdown and are redundant. Smoke and hydrogen detection is warranted as well as high level exhaust.

5. Ground Floor – Lube Oil Equipment Room 2181 – The Lube Oil Reservoir has 47,356L of lube oil and thus presents a significant hazard and requires automatic sprinkler protection. Secondary containment is provided by concrete diking around the equipment.
6. Mezzanine Floor – Mezzanine Underfloor System – N293 prescriptively requires this system and references the FM Global Data Sheets for sprinkler densities. A Wet Pipe sprinkler system is recommended. Per FM DS7-101, Figure 9c and Table 1, the sprinkler density of this system is 16mm/min (0.4gpm/ft^2) over the hydraulically most remote 232m2 (2500ft^2) area.
7. Mezzanine Floor – Room 2250 - Switchgear A – This room has significant combustible loading and electrical arcing potential for an ignition source. Although the electrical is a redundant train, smoke detectors are warranted for early notification.
8. Mezzanine Floor – Room 2260 - Switchgear B – See recommendations for item 10 Room 2250 Switchgear A, above.
9. Mezzanine Floor – EHC Unit Room 2280 – This room contains control oil and other combustibles. A Wet Pipe sprinkler system is recommended with a density of 12.2mm/min (0.3gpm/ft^2) over the room area, which is approximately 25.9m2 (85ft^2). Secondary containment is provided by concrete diking around the equipment.
10. Freight Elevator Hoistway and Machine Room System – These areas contain combustibles associated with elevators per CSA B44. A Wet Pipe system is recommended. The recommended density in the machine room is 6.1mm/min (0.15gpm/ft^2) over the room area, which is approximately 25.6m^2 (84ft^2).
11. Operating Floor Turbine/Generator Bearing Preaction System – The bearings present an oil spray fire hazard. A preaction system is recommended with heads over the bearings and in the generator skirt. Heat detection is recommended for system activation. Sprinklers are not recommended at the ceiling. The ceiling is approximately 18.29m (60ft) above the Operating Floor and is of noncombustible construction. FM 7-101 Section 2.4.3.4.1 and Figure 9e indicate omission of sprinkler coverage at ceilings greater than 9.14m (30ft).

Table 4.5.3.3 – Turbine Building Room Data Sheets

Room Data Sheet

Fire Area:	F2100	Description:	Room 2100 - Freight Elevator Hoistway & 2101 Machine Room	Const. Type: II 000
Building:	Turbine Building		Gross Area (m2):	25.6
		Applicable codes:	CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 14, CSA C22.1, ULC-S524, CSA B44	
Associated Drawings or Figures:	407081-U72-FG2001A & B		Building Code Occupancy Classification:	Group F, Division 2
			Electrical Classification: Safety-related divisional equipment or cables:	N/A
			Nonsafety - related redundant trains, equipment or cables:	Load Group A to Elevator
		Surrounded by fire barriers rated at:	2 hours - Hoistway and equipment room	
		Except:		

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
0.0	2100	Transients & Car Materials per CSA B44	Smoke & Heat	Manual Fire Alarm	Wet Pipe Sprinklers (per CSA B44) - Machine Room and	Hose Streams
6.1	2101	Materials per CSA B44	Detectors	Box	hoistway	Fire Extinguishers
			Sprinkler Waterflow			

<700	Anticipated combustible load, MJ/m2	Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:
700	Unsprinklered combustible load limit, MJ/m2	

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None
Radiological release:	None, no radiological materials present
Manual firefighting:	Class I hose stations in the exit enclosure for manual attack.
Property loss:	Minor
Hazardous Substances:	None

Fire starts in elevator equipment and spreads to cables. Fire burns until combustibles consumed. Fire spread is limited to room and hoistway due to 2 hour barriers. Fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	F2150	Description:	Room 2150 - Diesel Generator Room A	Const. Type: II 000
Building:	Turbine Building		Gross Area (m2):	84.7
		Applicable codes:	CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U72-FG2001A		Building Code Occupancy Classification:	Group F, Division 2
			Electrical Classification: Safety-related divisional equipment or cables:	N/A
			Nonsafety - related redundant trains, equipment or cables:	Load Group A
		Surrounded by fire barriers rated at:	3 hours	
		Except:	Exterior wall not rated	

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
0.0	2150	Diesel generator has a 45,425 liter belly tank.	Sprinkler Waterflow	Manual Fire Alarm Box	Dry Pipe Sprinklers	Hose Streams
						Fire Extinguishers
					Other Fire Protection	
					Double wall tank at generator	

>700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None
Radiological release:	None, no radiological materials present
Manual firefighting:	Access via exterior and interior doors
Property loss:	Moderate
Hazardous Substances:	Fuel oil is contained in outer shell of belly tank

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Room 2150 houses the diesel generator for Electrical Train A (Nonsafety). An unchecked fuel oil fire (ruptured inner and outer shell of belly tank) is expected to engulf and burn out the room. The fire damage outside the rated room is anticipated to be minor due to wall rating and liquid containment. No damage is anticipated on Train B. Fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	F2160	Description: Room 2160 - Diesel Generator Room B	Const. Type: II 000
Building:	Turbine Building	Gross Area (m2):	66.6
		Applicable codes: CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U72-FG2001A	Building Code Occupancy Classification:	Group F, Division 2
		Electrical Classification: Safety-related divisional equipment or cables:	N/A
		Nonsafety - related redundant trains, equipment or cables:	Load Group B
		Surrounded by fire barriers rated at:	3 hours
		Except:	Exterior wall not rated

Consisting of the following Rooms:

EL	Rm#	Potential Combustibles
0.0	2160	Diesel generator has a 45,425 liter belly tank.

Fire Alarm Input Devices	
Primary	Backup
Sprinkler Waterflow	Manual Fire Alarm Box

Fire Suppression	
Primary	Backup
Dry Pipe Sprinklers (required by CSA N293)	Hose Streams
	Fire Extinguishers
Other Fire Protection	
Double wall tank at generator	

>700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None
Radiological release:	None, no radiological materials present
Manual firefighting:	Access via exterior and interior doors
Property loss:	Moderate
Hazardous Substances:	Fuel oil is contained in outer shell of belly tank

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Room 2160 houses the diesel generator for Electrical Train B (Nonsafety Shutdown). An unchecked fuel oil fire (ruptured inner and outer shell of belly tank) is expected to engulf and burn out the room. The fire damage outside the rated room is anticipated to be minor due to wall ratings and liquid containment. No damage is anticipated on Train A. Fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	F2170	Description: Room 2170 - Turbine Building, Ground Floor	Const. Type: II 000
Building:	Turbine Building	Gross Area (m2):	2547.5
		Applicable codes: CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U72-FG2001A	Building Code Occupancy Classification:	Group F, Division 2
		Electrical Classification: Safety-related divisional equipment or cables:	N/A
		Nonsafety - related redundant trains, equipment or cables:	Load Group A & B
		Surrounded by fire barriers rated at:	
		Except:	

Consisting of the following Rooms:

EL	Rm#	Potential Combustibles	Fire Alarm Input Devices: Primary	Fire Alarm Input Devices: Backup	Fire Suppression: Primary	Fire Suppression: Backup
0.0	2170	Turbine Bearings 7-9 - 47,318 L of ISO 32 lube oil		Manual Fire Alarm Box	Wet Pipe Sprinklers (required by CSA N293) covering anticipated spill area from overhead lube oil pipes and general high combustible loading in the space	Hose Streams
0.0	2170	Hydrogen Gas in two "K" cylinders (2.5 lbs.)	Sprinkler Waterflow			Fire Extinguishers
0.0	2170	9 pump assemblies & controllers				
0.0	2170	2 MCCs, 5 FCUs, 3 AHUs			Other Fire Protection	
0.0	2170	Various electrical cabinets & enclosures			Floor drains	

>700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	Reactor Scram
Radiological release:	None, no radiological materials present
Manual firefighting:	Class I hose stations in the four enclosed exit enclosures for manual attack.
Property loss:	Significant
Hazardous Substances:	Oil Spill

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

The postulated fire occurs due to a turbine vibration causing a complete break of a lube oil line. the lube oil is ignited by residual heat on the generator casing, lighting or other hot equipment in the area. If lube oil pumps remain on (as expected for rundown time at a minimum), up to 47,318 liters (12,500 gallons) of mineral oil could spill out on the floor. With a flat floor and no drains (worst case), the pool of oil on the floor will be approximately 18mm (3/4inch) thick, throughout the room area. Burning oil will ignite cable, in tray, in the general area below the generator and worst case, could spread as far as the perimeter of the room (fire area). As cooling of the oil will occur upon contact with the concrete floor, a large oil fire and spread throughout the room is not anticipated. Fire will not spread beyond the room due to the fire barriers. Fire damage will include equipment below the generator and cable/tray in the room. Unit will require shutdown. Fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	F2170	Description: Room 2171 - Turbine Building, Ground Floor Condenser Area	Const. Type: II 000
Building:	Turbine Building	Gross Area (m2):	1052.5
		Applicable codes: CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U72-FG2001A	Building Code Occupancy Classification:	Group F, Division 2
		Electrical Classification: Safety-related divisional equipment or cables:	N/A
		Nonsafety - related redundant trains, equipment or cables:	N/A
		Surrounded by fire barriers rated at:	
		Except:	

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
0.0	2171	Fyrquel EHC Bypass actuators and accumulators - 757 L	Sprinkler Waterflow	Manual Fire Alarm Box	Wet Pipe Sprinklers (required by CSA N293)	Hose Streams
						Fire Extinguishers
0.0	2171	Turbine Bearings 1-6 - 47,318 L of ISO 32 lube oil				
0.0	2171	3 pump assemblies & controllers				
0.0	2171	7 fan coil units				

>700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	Reactor Scram
Radiological release:	Water / steam in closed system
Manual firefighting:	Class I hose stations in two enclosed exit enclosures for manual attack.
Property loss:	Significant
Hazardous Substances:	Lube oil spill

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

The postulated fire occurs due to a turbine vibration causing a complete break of a lube oil line. The lube oil is ignited by the turbine casing and/or steam piping in the area. If lube oil pumps remain on (as expected for rundown time at a minimum), up to 47,318 liters (12,500 gallons) of mineral oil could spill out on the floor. The oil will pool throughout the room area. With fire protection out of service, the spill area (and area of fire) will not be completely limited by room walls as they are not fire rated. Fire will spread into the surrounding room (2170). The fire will be limited to room 2171 and 2170 due to fire rated barriers separating Room 2170 from all adjacent rooms. Unit will require shutdown. Fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	F2170	Description:	Room 2180 - RWCU HX Room (Shielded)	Const. Type: II 000
Building:	Turbine Building		Gross Area (m2):	21
		Applicable codes:	CSA N293, NBCC, NFCC, NFPA 10, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U72-FG2001A		Building Code Occupancy Classification:	Group F, Division 2
			Electrical Classification: Safety-related divisional equipment or cables:	N/A
			Nonsafety - related redundant trains, equipment or cables:	N/A
			Surrounded by fire barriers rated at:	
			Except:	

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
0.0	2180	Transients	Manual Fire Alarm Box		Hose Streams	Fire Extinguishers

<700	Anticipated combustible load, MJ/m2	Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:
700	Unsprinklered combustible load limit, MJ/m2	Fire starts in transients and consumes any combustibles. Not expected to spread to the surrounding Room 2171as fire load is minimal. Fire does not affect safe shutdown.

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None
Radiological release:	Closed piping system
Manual firefighting:	Access via stairwell and interior doors
Property loss:	Moderate
Hazardous Substances:	None

Room Data Sheet

Fire Area:	F2181	Description:	Room 2181 - Lube Oil Equipment Room	Const. Type: II 000
Building:	Turbine Building		Gross Area (m2):	74.5
		Applicable codes:	CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U72-FG2001A		Building Code Occupancy Classification:	Group F, Division 2
			Electrical Classification: Safety-related divisional equipment or cables:	N/A
			Nonsafety - related redundant trains, equipment or cables:	Load Group B
		Surrounded by fire barriers rated at:	3 hours	
		Except:		

Consisting of the following Rooms:

EL	Rm#	Potential Combustibles	Fire Alarm Input Devices: Primary	Fire Alarm Input Devices: Backup	Fire Suppression: Primary	Fire Suppression: Backup
0.0	2181	47,356 L of ISO 32 Lube Oil in Lube oil system equipment.	Sprinkler Waterflow	Manual Fire Alarm Box	Wet Pipe Sprinklers	Hose Streams
						Fire Extinguishers
0.0	2181	Cable			Other Fire Protection	
					Concrete diking around equipment	

>700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	Reactor Scram
Radiological release:	None, no radiological materials present
Manual firefighting:	Access via exterior and interior doors
Property loss:	Moderate
Hazardous Substances:	None - lube oil tank diked

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Room 2181 houses the lube oil tank, pumps and associated equipment. An unchecked oil fire is expected to engulf and burn out the room. The reservoir is required to be diked. The fire damage outside the rated room is anticipated to be minor due to the rated enclosure and diking of the fuel oil. Fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	F2182	Description:	Room 2182 - Div C Batteries	Const. Type: II 000
Building:	Turbine Building		Gross Area (m2):	103.2
		Applicable codes:	CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U72-FG2001A		Building Code Occupancy Classification:	Group F, Division 2
			Electrical Classification: Safety-related divisional equipment or cables:	N/A
			Nonsafety - related redundant trains, equipment or cables:	Load Group A & B
		Surrounded by fire barriers rated at:	3 hours	
		Except:	Exterior walls not rated	

Consisting of the following Rooms:

EL	Rm#	Potential Combustibles
0.0	2182	Cable
0.0	2182	Batteries
0.0	2182	Chargers

Fire Alarm Input Devices	
Primary	Backup
Smoke Detectors & Hydrogen Detectors	Manual Fire Alarm Box
Sprinkler Waterflow	

Fire Suppression	
Primary	Backup
Preaction Sprinklers	Hose Streams
	Fire Extinguishers
Other Fire Protection	
High level exhaust	

>1400	Anticipated combustible load, MJ/m2
1400	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None - Redundant equipment
Radiological release:	None, no radiological materials present
Manual firefighting:	Access via stairwell and interior doors
Property loss:	Minor
Hazardous Substances:	None

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Room 2182 houses batteries, chargers and cable for Div C, any of which may be the starting point for a fire. A fire in this room would consume all combustibles. Fire spread is limited by the 3-hour barriers surrounding the room. Fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	F2250	Description:	Room 2250 - Switchgear A	Const. Type: II 000
Building:	Turbine Building		Gross Area (m2):	81.5
		Applicable codes:	CSA N293, NBCC, NFCC, NFPA 10, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U72-FG2001B		Building Code Occupancy Classification:	Group F, Division 2
			Electrical Classification: Safety-related divisional equipment or cables:	N/A
			Nonsafety - related redundant trains, equipment or cables:	Load Group A
		Surrounded by fire barriers rated at:	3 hours (Group A electrical equipment)	
		Except:		

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
6.1	2250	Exposed electrical cable	Smoke Detection	Manual Fire Alarm	Hose Streams	Fire Extinguishers
6.1	2250	Switchgear & transformers		Box		

<1400	Anticipated combustible load, MJ/m2
1400	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	Power Reduction
Radiological release:	None, no radiological materials present
Manual firefighting:	Access via stairwell and interior doors
Property loss:	Minor
Hazardous Substances:	None

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Room 2250 houses switchgear and transformers for Electrical Train A (Nonsafety). The Electrical Train B switchgear room is immediately west. As the equipment is redundant, a fire separation is warranted to maintain the redundant systems. A fire in Room 2250 will consume combustibles in the room. Fire barriers surrounding the room limit fire spread. Fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	F2260	Description:	Room 2260 - Switchgear B	Const. Type: II 000
Building:	Turbine Building		Gross Area (m2):	81.5
		Applicable codes:	CSA N293, NBCC, NFCC, NFPA 10, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U72-FG2001B		Building Code Occupancy Classification:	Group F, Division 2
			Electrical Classification: Safety-related divisional equipment or cables:	N/A
			Nonsafety - related redundant trains, equipment or cables:	Load Group B
		Surrounded by fire barriers rated at:	3 hours (Group B electrical equipment)	
		Except:		

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
6.1	2250	Exposed electrical cable	Smoke Detection	Manual Fire Alarm	Hose Streams	Fire Extinguishers
6.1	2250	Switchgear & transformers		Box		

<1400	Anticipated combustible load, MJ/m2
1400	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	Power Reduction
Radiological release:	None, no radiological materials present
Manual firefighting:	Access via stairwell and interior doors
Property loss:	Minor
Hazardous Substances:	None

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Room 2260 houses switchgear and transformers for Electrical Train B (Nonsafety). The Electrical Train A switchgear room is immediately east. As the equipment is redundant, a fire separation is warranted to maintain the redundant systems. A fire in Room 2260 will consume combustibles in the room. Fire barriers surrounding the room limit fire spread. Fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	F2170	Description: Room 2270 - Turbine Building, Mezzanine Floor	Const. Type: II 000
Building:	Turbine Building	Gross Area (m2):	2751.1
		Applicable codes: CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U72-FG2001B	Building Code Occupancy Classification:	Group F, Division 2
		Electrical Classification: Safety-related divisional equipment or cables:	N/A
		Nonsafety - related redundant trains, equipment or cables:	Load Group A & B
		Surrounded by fire barriers rated at:	
		Except:	

Consisting of the following Rooms:

EL	Rm#	Potential Combustibles	Fire Alarm Input Devices: Primary	Fire Alarm Input Devices: Backup	Fire Suppression: Primary	Fire Suppression: Backup
6.1	2270	Turbine Bearings 7-9 - 47,318 L of ISO 32 lube oil		Manual Fire Alarm	Wet Pipe Sprinklers (required by CSA N293)	Hose Streams
6.1	2270	4 MCCs, 1 fan coil unit, 3 AHUs	Sprinkler Waterflow	Box		Fire Extinguishers
6.1	2270	1 generator circuit breaker				
6.1	2270	Cable Tray				

>700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	Turbine shutdown
Radiological release:	None, no radiological materials present
Manual firefighting:	Class I hose stations in the four enclosed exit enclosures for manual attack.
Property loss:	Moderate
Hazardous Substances:	Lube oil spill

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

The postulated fire occurs due to a turbine vibration causing a complete break of a lube oil line. The lube oil is ignited by residual heat on the generator casing, lighting or other hot equipment in the area. If lube oil pumps remain on (as expected for rundown time at a minimum), up to 47,318 liters (12,500 gallons) of mineral oil could spill out. The spill area (and area of the fire) will be limited by floor openings to the ground floor. Fire will not spread horizontally beyond fire barriers. Unit will require shutdown. Fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	F2170	Description:	Room 2271 - Turbine Building, Mezzanine Floor Condenser Area	Const. Type: II 000
Building:	Turbine Building		Gross Area (m2):	1071.5
		Applicable codes:	CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U72-FG2001B		Building Code Occupancy Classification:	Group F, Division 2
			Electrical Classification: Safety-related divisional equipment or cables:	N/A
			Nonsafety - related redundant trains, equipment or cables:	N/A
			Surrounded by fire barriers rated at:	
			Except:	

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
6.1	2271	Fyrquel EHC Bypass actuators and accumulators - 200gal	Sprinkler Waterflow	Manual Fire Alarm Box	Wet Pipe Sprinklers (required by CSA N293)	Hose Streams
						Fire Extinguishers
6.1	2271	Turbine Bearings 1-6 - 47,318 L of ISO 32 lube oil				
6.1	2271	9 fan coil units				

>700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	Reactor Scram
Radiological release:	None, closed piping system
Manual firefighting:	Class I hose stations in the enclosed exit enclosure for manual attack.
Property loss:	Moderate
Hazardous Substances:	Lube oil spill

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

The postulated fire occurs due to a turbine vibration causing a complete break of a lube oil line. The lube oil is ignited by the turbine casing and/or steam piping in the area. If lube oil pumps remain on (as expected for rundown time at a minimum), up to 47,318 liters (12,500 gallons) of mineral oil could spill out. The spill area (and area of fire) will be limited by openings to the ground floor and enclosure walls. Unit will require shutdown. Fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	F2280	Description: Room 2280 - EHC Unit Room	Const. Type: II 000
Building:	Turbine Building	Gross Area (m2):	25.9
		Applicable codes: CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U72-FG2001B	Building Code Occupancy Classification:	Group F, Division 2
		Electrical Classification: Safety-related divisional equipment or cables:	N/A
		Nonsafety - related redundant trains, equipment or cables:	Load Group A & B
		Surrounded by fire barriers rated at:	3 hours
		Except:	

Consisting of the following Rooms:

EL	Rm#	Potential Combustibles	Fire Alarm Input Devices: Primary	Fire Alarm Input Devices: Backup	Fire Suppression: Primary	Fire Suppression: Backup
6.1	2280	1,514 L of Fryquel (high Flashpoint) Control Oil in EHC Unit	Sprinkler Waterflow	Manual Fire Alarm Box	Wet Pipe Sprinklers	Hose Streams
						Fire Extinguishers
6.1	2280	Control Oil pump assembly				
6.1	2280	Cable			Other Fire Protection	
					Concrete diking around equipment	

>700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	Reactor Scram
Radiological release:	None, no radiological materials present
Manual firefighting:	Access via stairwell and interior doors
Property loss:	Minor
Hazardous Substances:	Minimal oil - Reservoir in dike

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Room 2280 houses the EHC reservior, pumps and associated equipment. An unchecked oil fire, if started (sustained electrical arcing) is expected to engulf and burn out the room. The reservoir will be diked and/or drained. The fire damage outside the rated room is anticipated to be minor based on the fire rated enclosure. Unit will require shutdown. Fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	F2290	Description:	Room 2290 - Breaker Shop	Const. Type: II 000
Building:	Turbine Building		Gross Area (m2):	75.5
		Applicable codes:	CSA N293, NBCC, NFCC, NFPA 10, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U72-FG2001B		Building Code Occupancy Classification:	Group F, Division 2
			Electrical Classification: Safety-related divisional equipment or cables:	N/A
			Nonsafety - related redundant trains, equipment or cables:	Load Group A & B
		Surrounded by fire barriers rated at:	3 hours (Group A & B electrical equipment)	
		Except:		

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
6.1	2290	Exposed electrical cable	Smoke Detection	Manual Fire Alarm Box	Hose Streams	Fire Extinguishers

<1400	Anticipated combustible load, MJ/m2
1400	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None, anticipated that only one Group will be serviced at a time
Radiological release:	None, no radiological materials present
Manual firefighting:	Access via stairwell and interior doors
Property loss:	Minor
Hazardous Substances:	None

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Room 2290 houses equipment to service switchgear and transformers for Electrical Trains A & B (Nonsafety). It is anticipated that only one Train will be serviced at a time for redundancy. The Electrical Trains A & B switchgear rooms are immediately north. A fire separation is warranted to maintain the systems. A fire in Room 2290 will consume combustibles in the room. Fire barriers surrounding the room limit fire spread. Fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	F2170	Description:	Room 2370 - Turbine Building, Operating Floor	Const. Type: II 000
Building:	Turbine Building		Gross Area (m2):	959.7
		Applicable codes:	CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 14, NFPA 15, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U72-FG2001C		Building Code Occupancy Classification:	Group F, Division 2
			Electrical Classification: Safety-related divisional equipment or cables:	N/A
			Nonsafety - related redundant trains, equipment or cables:	N/A
		Surrounded by fire barriers rated at:		
		Except:		

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
12.2	2370	Turbine Bearings 7-9 - 47,318 L of ISO 32 lube oil	Heat Detectors on bearings	Manual Fire Alarm Box	Preaction Spray on Bearings & Sprinklers in turbine skirt & exposed lube oil piping	Hose Streams
						Fire Extinguishers
			Sprinkler Waterflow			

>700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	Turbine shutdown
Radiological release:	None, no radiological materials present
Manual firefighting:	Class III hose stations in the two enclosed exit enclosures for manual attack.
Property loss:	Moderate
Hazardous Substances:	Lube oil spill

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

The postulated fire occurs due to a turbine vibration causing a complete break of a lube oil line. The lube oil is ignited by resudial heat from the steam turbine on the generator shell, lighting or other hot equipment in the area. If lube oil pumps remain on (as expected for rundown time at a minimum), up to 47,318 liters (12,500 gallons) of mineral oil could spill out. The spill area (and area of fire) will be limited by floor openings. Oil drainage to lower floors and fire barriers will limit the fire to the fire area. Unit will require shutdown. Fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	F2170	Description:	Room 2371 - Turbine Building, Operating Floor Generator Area	Const. Type: II 000
Building:	Turbine Building		Gross Area (m2):	1122
		Applicable codes:	CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 14, NFPA 15, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U72-FG2001C		Building Code Occupancy Classification:	Group F, Division 2
			Electrical Classification: Safety-related divisional equipment or cables:	N/A
			Nonsafety - related redundant trains, equipment or cables:	N/A
		Surrounded by fire barriers rated at:		
		Except:		

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
12.2	2371	Fyrquel EHC Stop/Control/CIV actuators - 100galOil	Heat Detectors on bearings	Manual Fire Alarm Box	Preaction Spray on Bearings & Sprinklers in turbine skirt & exposed lube oil piping	Hose Streams Fire Extinguishers
12.2	2371	Turbine Bearings 1-6 - 47,318 L of ISO 32 lube oil	Sprinkler Waterflow			

>700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	Turbine shutdown
Radiological release:	None, water in closed system
Manual firefighting:	Class III hose stations in the enclosed exit enclosure for manual attack.
Property loss:	Moderate
Hazardous Substances:	Lube oil spill

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

The postulated fire occurs due to a turbine vibration causing a complete break of a lube oil line. The lube oil is ignited by the turbine casing and/or steam piping in the area. If lube oil pumps remain on (as expected for rundown time at a minimum), up to 47,318 liters (12,500 gallons) of mineral oil could spill out. Spill area (and area of fire) will be limited by floor openings. Fire will be limited to shielded area due to drainage of oil to areas below. Unit will require shutdown. Fire does not affect safe shutdown.

4.5.3.4 Plant Services Area

The fire protection requirements for the Plant Services Area will be based on CSA N293 prescriptive requirements, and evaluation of the combustible loading of each room and its associated fire barriers to determine the need for sprinklers and detection.

Standpipes (Class I) are prescriptively required in the power block building. In the one-story buildings such as the Plant Services Area, this means hose outlets at the building exit doors, supplied by the horizontal standpipe. The locations of the outlets and the connection to the standpipe are illustrated on the Fire Area Drawing.

The Plant Services Area occupancy is understood to be typical to a facility maintenance shop area for an industrial facility except the equipment may be contaminated. This area would typically be a sprinklered area due to a variety of maintenance operations utilizing ignitable parts cleaners, lubricating oils, finishes and generally involving grinding and welding. A workshop, as identified above, has a combustible load range from 1134 MJ/m^2 to 2268 MJ/m^2 with limited isolated loading of 4540 MJ/m^2. As these operations and materials are expected to exceed the combustible loading limit of 700 MJ/m^2 (61,660 Btu/ft^2), wet pipe sprinklers are being provided throughout. The sprinkler system design density for this building will be in accordance with the requirements for an Ordinary Hazard, Group 2 Occupancy (8.2 mm/min (0.20gpm/ft^2) over the most remote 140m^2 (1500ft^2) area).

A fire alarm system with automatic voice occupant notification is provided throughout the building. Devices and appliances are provided as follows:

- Manual fire alarm boxes (manual pull stations) are provided at each building exit.
- Waterflow alarms and supervision is provided on the automatic suppression system.
- Occupant notification is provided throughout the building.

Internal and external fire hazards associated with the Plant Services Area are under evaluation.

Preliminary cable tray layout drawings have been developed for the Plant Services Area. In this preliminary stage, the routing of the individual trains within the trays has not been developed. Further evaluation of separation will be needed as the design proceeds.

See Plant Services Area Fire Area Drawing:

[[ ]]

The Room Data Sheets for the Plant Services Area, detailing the fire hazard assessment and level of protection for each room (Table 4.5.3.4) follows.

Table 4.5.3.4 – Plant Services Area Room Data Sheets

Room Data Sheet

Fire Area:	F5180	Description:	Room 5180 - Office Space	Const. Type: II 000
Building:	Plant Services Area		Gross Area (m2):	65.4
		Applicable codes:	CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U72-FG2001G		Building Code Occupancy Classification:	Group F, Division 3
			Electrical Classification: Safety-related divisional equipment or cables:	N/A
			Nonsafety - related redundant trains, equipment or cables:	N/A
		Surrounded by fire barriers rated at:		
		Except:		

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
0.0	5180	Typical Office Area	Sprinkler Waterflow	Manual Fire Alarm Box	Wet Pipe Sprinklers	Hose Streams Fire Extinguishers

700	Anticipated combustible load, MJ/m2	Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:
700	Unsprinklered combustible load limit, MJ/m2	Fire starts in office and consumes all combustibles in room. Fire spread beyond office is limited due to low combustible loading in the hallway. Smoke is anticipated to spread to suite of rooms. Fire does not affect safe shutdown.

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None
Radiological release:	None, no radiological materials present
Manual firefighting:	Access via stairwell and cabinets at exterior doors
Property loss:	Minor
Hazardous Substances:	None

Room Data Sheet

Fire Area:	F5180	Description: Room 5181 - I&C Calibration Area	Const. Type: II 000
Building:	Plant Services Area	Gross Area (m2):	22.4
		Applicable codes: CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U72-FG2001G	Building Code Occupancy Classification:	Group F, Division 3
		Electrical Classification: Safety-related divisional equipment or cables:	N/A
		Nonsafety - related redundant trains, equipment or cables:	N/A
		Surrounded by fire barriers rated at:	
		Except:	

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
0.0	5181	Typical Shop Area	Sprinkler Waterflow	Manual Fire Alarm Box	Wet Pipe Sprinklers	Hose Streams
						Fire Extinguishers

>700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None
Radiological release:	None, drainage of sprinkler discharge to containment
Manual firefighting:	Access via stairwell and cabinets at exterior doors
Property loss:	Minor
Hazardous Substances:	May release hazardous materials associated with typical shop areas

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts in shop and consumes all combustibles in room. Fire spread beyond shop is limited due to low combustible loading in the hallway. Smoke is anticipated to spread to suite of rooms. Fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	F5180	Description: Room 5182 - Contaminated Part/Tool Storage	Const. Type: II 000
Building:	Plant Services Area	Gross Area (m2):	64
		Applicable codes: CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U72-FG2001G	Building Code Occupancy Classification:	Group F, Division 3
		Electrical Classification: Safety-related divisional equipment or cables:	N/A
		Nonsafety - related redundant trains, equipment or cables:	N/A
		Surrounded by fire barriers rated at:	
		Except:	

Consisting of the following Rooms:

EL	Rm#	Potential Combustibles	Fire Alarm Input Devices: Primary	Fire Alarm Input Devices: Backup	Fire Suppression: Primary	Fire Suppression: Backup
0.0	5182	Typical Shop Area	Sprinkler Waterflow	Manual Fire Alarm Box	Wet Pipe Sprinklers	Hose Streams
						Fire Extinguishers

>700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None
Radiological release:	None, drainage of sprinkler discharge to containment
Manual firefighting:	Access via stairwell and cabinets at exterior doors
Property loss:	Minor
Hazardous Substances:	May release hazardous materials associated with typical shop areas

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts at storage (shelves, etc.) and consumes all combustibles in room. Fire spread beyond storage room is limited due to low combustible loading in the hallway. Smoke is anticipated to spread to suite of rooms. Fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	F5180	Description:	Room 5183 - Decontamination Area	Const. Type: II 000
Building:	Plant Services Area		Gross Area (m2):	64.9
		Applicable codes:	CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U72-FG2001G		Building Code Occupancy Classification:	Group F, Division 3
			Electrical Classification: Safety-related divisional equipment or cables:	N/A
			Nonsafety - related redundant trains, equipment or cables:	N/A
		Surrounded by fire barriers rated at:		
		Except:		

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
0.0	5183	Typical Shop Area	Sprinkler Waterflow	Manual Fire Alarm Box	Wet Pipe Sprinklers	Hose Streams
						Fire Extinguishers

>700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None
Radiological release:	None, drainage of sprinkler discharge to containment
Manual firefighting:	Access via stairwell and cabinets at exterior doors
Property loss:	Moderate
Hazardous Substances:	None

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts at storage (shelves, etc.) and consumes all combustibles in room. Fire spread beyond this room is limited due to low combustible loading in the hallway. Smoke is anticipated to spread to suite of rooms. Fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	F5180	Description: Room 5185 - Hot Machine Shop	Const. Type: II 000
Building:	Plant Services Area	Gross Area (m2):	546.7
		Applicable codes: CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U72-FG2001G	Building Code Occupancy Classification:	Group F, Division 3
		Electrical Classification: Safety-related divisional equipment or cables:	N/A
		Nonsafety - related redundant trains, equipment or cables:	Load Group A or B
		Surrounded by fire barriers rated at:	
		Except:	

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
0.0	5185	Typical Shop Area, Cable Trays	Sprinkler Waterflow	Manual Fire Alarm Box	Wet Pipe Sprinklers	Hose Streams
						Fire Extinguishers

>700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None
Radiological release:	None, drainage of sprinkler discharge to containment
Manual firefighting:	Access via stairwell and cabinets at exterior doors
Property loss:	Moderate
Hazardous Substances:	May release hazardous materials associated with typical shop areas

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts at a bench and consumes all combustibles in the immediate area. Fire spread to adjacent benches will be limited due to general lack of continuity of combustibles between benches. Fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	F5180	Description: Room 5187 - RCA Access Control Room	Const. Type: II 000
Building:	Plant Services Area	Gross Area (m2):	6.4
		Applicable codes: CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U72-FG2001G	Building Code Occupancy Classification:	Group F, Division 3
		Electrical Classification: Safety-related divisional equipment or cables:	N/A
		Nonsafety - related redundant trains, equipment or cables:	N/A
		Surrounded by fire barriers rated at:	
		Except:	

Consisting of the following Rooms:

EL	Rm#	Potential Combustibles	Fire Alarm Input Devices: Primary	Fire Alarm Input Devices: Backup	Fire Suppression: Primary	Fire Suppression: Backup
0.0	5187	Typical Office Area	Sprinkler Waterflow	Manual Fire Alarm Box	Wet Pipe Sprinklers	Hose Streams
						Fire Extinguishers

>700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None
Radiological release:	None, no radiological materials present
Manual firefighting:	Access via stairwell and cabinets at exterior doors
Property loss:	Minor
Hazardous Substances:	None

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts in control office and consumes all combustibles in room. Fire does not spread out the door due to fire door to exit passageway. Fire is stopped from spreading to Turbine, Reactor, Rad Waste, and Control Buildings by 3-hour fire barriers. Fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	F5187	Description: Room 5188 - Truck Space (Cask Removal)	Const. Type: II 000
Building:	Plant Services Area	Gross Area (m2):	222.5
		Applicable codes: CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U72-FG2001G	Building Code Occupancy Classification:	Group F, Division 3
		Electrical Classification: Safety-related divisional equipment or cables:	N/A
		Nonsafety - related redundant trains, equipment or cables:	Load Group A or B
		Surrounded by fire barriers rated at:	
		Except:	

Consisting of the following Rooms:

EL	Rm#	Potential Combustibles	Fire Alarm Input Devices: Primary	Fire Alarm Input Devices: Backup	Fire Suppression: Primary	Fire Suppression: Backup
0.0	5188	Some Transients Including Vehicles		Manual Fire Alarm	Wet Pipe Sprinklers	Hose Streams
			Sprinkler Waterflow	Box		Fire Extinguishers

>700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None
Radiological release:	None, drainage of sprinkler discharge to containment
Manual firefighting:	Access via cabinets at exterior doors
Property loss:	Moderate
Hazardous Substances:	May release hazardous substances associated with vehicle staging

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts at vehicle and consumes all combustibles in room. Fire does not spread, except to the storage area, due to rated barriers. Fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	F5187	Description: Room 5189 - Storage Area (New Fuel, FMCRD, B25 Box)	Const. Type: II 000
Building:	Plant Services Area	Gross Area (m2):	234.4
		Applicable codes: CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U72-FG2001G	Building Code Occupancy Classification:	Group F, Division 3
		Electrical Classification: Safety-related divisional equipment or cables:	N/A
		Nonsafety - related redundant trains, equipment or cables:	N/A
		Surrounded by fire barriers rated at:	
		Except:	

Consisting of the following Rooms:

EL	Rm#	Potential Combustibles	Fire Alarm Input Devices: Primary	Fire Alarm Input Devices: Backup	Fire Suppression: Primary	Fire Suppression: Backup
0.0	5189	Transients	Sprinkler Waterflow	Manual Fire Alarm Box	Wet Pipe Sprinklers	Hose Streams
						Fire Extinguishers

<700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None
Radiological release:	None, drainage of sprinkler discharge to containment
Manual firefighting:	Access via cabinets at exterior doors
Property loss:	Moderate
Hazardous Substances:	May release hazardous substances

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts at transients and consumes all combustibles in room. Fire spreads to adjacent room Truck Space (Cask Removal) but is stopped from spreading to Turbine, Reactor, Rad Waste, and Control Buildings by a 3-hour fire barrier. A 2-hour fire barrier stops fire from spreading north of Truck Space (Cask Removal). Fire does not affect safe shutdown.

4.5.3.5 Control Building

The fire protection requirements for the Control Building will be based on CSA N293 prescriptive requirements, and evaluation of the combustible loading and critical nature of each room and its associated fire barriers, to determine the need for sprinklers and detection.

The Control Room Complex, defined as the Main Control Room, Shift Supervisor Room, Shift Technical Assistant Desk, Toilet and Panel Room will be pressurized under off normal conditions. Means of activation of the system will include detection of smoke in the Control Building, outside the Control Complex.

Standpipes (Class I) are prescriptively required in the power block building. In the one story buildings such as the Control Building, this means hose outlets at the building exit doors, supplied by the horizontal standpipe. The locations of the outlets and the connection to the standpipe are illustrated on the Fire Area Drawings. The Control Building standpipe and sprinkler riser are supplied with fire protection water from two directions, one through the Rad Waste Building and one from the site loop on the south side of the building. See the Fire Area drawing ([[ ]]) for the general routing, and the P&ID for the schematic layout.

The major internal and external fire hazards associated with the Control Building are summarized as follows:

- Electrical Rooms – The electrical rooms will house switchgear and associated cables. No oil filled electrical equipment will be provided. These rooms are 3-hour rated enclosures. The quantity of cables and thus the fuel load will be quantified and evaluated as the design proceeds. The rooms are provided with smoke detectors for early warning of a fire event. Class C fire extinguishers will be provided outside the door(s) to these rooms for manual firefighting.
- Battery Rooms – Battery rooms 4152 and 4162 are located in the Control Building. The rooms are separated from the remainder of the building by 3-hour rated barriers. The batteries are understood to be Lithium-ion type. Flammable gasses are liberated from these batteries in a thermal runaway condition. Hydrogen detection is provided in the room as well as high level exhaust ventilation. Smoke detection is provided for early warning of a fire condition in this room. Sprinkler protection is the NFPA 855 preferred suppression method at this time. Automatic preaction sprinkler protection is provided for this room. The need for explosion relief will be evaluated as the design proceeds.

Sprinklers are recommended throughout the building (Control Complex) (with exception of the Control Room) based on the general combustible loading, proximity of the different safety related and redundant electrical load groups, critical equipment, and the main control room. A double interlock preaction sprinkler system is recommended. This system under standby conditions has only low pressure air in the piping system (approximately 1 bar). Loss of system air pressure (due to an open sprinkler) and smoke detector activation is required for actuation of the preaction valve. This system will be used to further minimize the potential for inadvertent operation of the fire suppression system. If additional protection is desired, a clean agent system could be provided in specific rooms, in addition to the sprinkler system. The clean agent system would activate earlier, and if successful would not allow temperatures in the room that would fuse (open) a sprinkler. The clean agent system is generally not considered an equal (or substitute) to the sprinkler system as it has a limited supply of agent and relies on a maintained tight room).

A fire alarm system with automatic voice occupant notification is provided throughout the building. Devices and appliances are provided as follows:

- Manual fire alarm boxes (manual pull stations) are provided at each building exit.
- Waterflow alarms and supervision is provided on the automatic suppression system.
- Smoke detection is provided throughout the building (every room).
- Occupant notification is provided throughout the building.

Preliminary cable tray layout drawings have been developed for the Control Building. The general configuration of tray within a given room has been considered on the room data sheets, however the trunk routing of the load groups within the building will require further evaluation as the design proceeds.

It is recommended that spaces with cable trays above the ceiling be provided with smoke detection and sprinklers both above and below the ceiling. It is understood the following spaces have ceilings:

Room 4101 Conference Room

Room 4102 Women's Room

Room 4103 Men's Room

Room 4105 HP and RCA Access Area

Room 4107 Break Room Kitchenette

Room 4171 Shift Technical Assistant Desk

Room 4172 Shift Supervisor Room

Room 4173 Toilet

Room 4174 DCIS Maintenance and Cyber Security Room

Room 4180 Operations and Technical Support Centers (OSC & TSC)

Lithium-ion Batteries are being provided for the uninterruptible power supply (UPS) systems. Refer to NFPA 855 for additional safety requirements, including explosion control.

See Control Building Fire Area Drawing:

[[ ]] Level 0.0

The Room Data Sheets for the Control Building, detailing the combustibles, room features and level of protection for each room is in Table 4.5.3.5 below. Additional information and analysis is as follows:

1. Conference Room 4101 – This area is considered a typical conference room. The sprinkler system density within this room will be in accordance with requirements for a light hazard Occupancy (4.1 mm/min (0.10gpm/ft^2) over the room area).
2. Main Control Room 4170 – N293 Elimination of the sprinkler system in the control room is specifically addressed in N293, based on the understanding that the room is constantly occupied, and thus incipient manual response to a fire, by fire brigade and/or trained operators, will be immediate with handheld fire extinguishers. N293 additionally requires very early warning technology smoke detection in this room.

Cable serving controls in the Control Room are routed in the enclosed floor trenches. Electrical cable in the space above the Control Room ceiling will be limited to lighting power in conduit. Cable running between adjacent cabinets in the Control Room will have blocking provided in the cable openings.

Smoke management is also required in this room as detailed in N293.

3. Panel Room 4178 – This area is located immediately north of the Control Room and houses numerous cable trays and cabinets serving the Control Room. The high density of exposed cable in this space and exposure to the control room warrants sprinkler protection. This area will be designed for a density of 12.2mm/min (0.3gpm/ft^2) over the room area. A area of the very early warning smoke detection system will serve this room. At least two smoke obscuration levels shall be provided. One equal to the control room and one at an obscuration for a standard smoke detector. The higher level shall activate the building preaction sprinkler system.
4. HP and RCA Access Area Room 4105 – This area is the primary personnel entrance to the radiologically controlled area. It is understood to be typical office spaces, turnstiles, pickup location for radiation detection equipment and a gathering area for briefs. The sprinkler system design density for this area will be in accordance with the requirements for light hazard Occupancy (4.1 mm/min (0.10gpm/ft^2) over the room area).
5. Access Room 4106 – This room is understood to be accommodations personnel office and security equipment for the plant. The sprinkler system design density for this room will be in accordance with the requirements for light hazard Occupancy (4.1 mm/min (0.10gpm/ft^2) over the room area).
6. Break Room 4107 – This room is a typical break room. The sprinkler system design density for this room will be in accordance with the requirements for light hazard Occupancy (4.1 mm/min (0.10gpm/ft^2) over the room area).
7. LG Electrical Equipment Rooms and Motor Control Center (MCC) Rooms 4150/4160 and 4151/4161 – These rooms are considered a typical electrical room with a reasonably high density of exposed cables. The sprinkler system design density for these rooms will be in accordance with the requirements for an Ordinary Hazard, Group 2 Occupancy (8.2 mm/min (0.20gpm/ft^2) over the room area).
8. Battery Rooms 4152/4162 – NFPA 855 (Stationary Energy Storage Systems) has been recently created to address current lithium-ion battery concerns as well as review energy storage associated with green generation stations. The committee has determined that automatic sprinklers are appropriate fire protection and has developed a threshold for when they are required. The standard will likely be referenced by NFPA 804 in the near future. The batteries in this room exceed the thresholds and thus sprinkler protection is recommended. The sprinkler density recommended is 12.2mm/min (0.30gpm/ft^2) over the room area.
9. DL Rooms, Communications Room C30 Room 4153/4163, 4175 and 4176 – These rooms are understood to be low-voltage electrical rooms with a reasonably high loading of exposed electrical cables. The sprinkler system design density for these rooms will be inaccordance with the requirements for an Ordinary Hazard, Group 2 Occupancy (8.2 mm/min (0.20gpm/ft^2) over the room area).

10. DCIS Maintenance and Cyber Security Room 4174 – This room is understood to be a low-voltage electrical equipment maintenance shop. A reasonable amount of storage of replacement electronic boards etc, as well as bench areas is anticipated in this room. The sprinkler system design density for these rooms will be in accordance with the requirements for an Ordinary Hazard, Group 2 Occupancy (8.2 mm/min (0.20gpm/ft^2) over the room area).

Table 4.5.3.5 – Control Building Room Data Sheets

Room Data Sheet

Fire Area:	F4100	Description:	Room 4100 - Janitors Closet	Const. Type: II 000
Building:	Control Building		Gross Area (m2):	2.8
		Applicable codes:	CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U73-FG2301		Building Code Occupancy Classification:	Group F, Division 3
			Electrical Classification: Safety-related divisional equipment or cables:	N/A
			Nonsafety - related redundant trains, equipment or cables:	N/A
		Surrounded by fire barriers rated at:		
		Except:		

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
0.0	4100	Typical cleaning supplies	Smoke Detectors	Manual Fire Alarm Box	Preaction Sprinkler System	Hose Streams
			Sprinkler Waterflow			Fire Extinguishers

>700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None
Radiological release:	None, no radiological materials present
Manual firefighting:	Access via exterior doors and corridor
Property loss:	Negligible
Hazardous Substances:	None

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts in stored combustibles and consumes combustibles in the room. Fire spread may spread to corridor but not beyond. Fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	F4100	Description:	Room 4101 - Conference Room	Const. Type: II 000
Building:	Control Building		Gross Area (m2):	56
		Applicable codes:	CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U73-FG2301		Building Code Occupancy Classification:	Group F, Division 3
			Electrical Classification: Safety-related divisional equipment or cables:	N/A
			Nonsafety - related redundant trains, equipment or cables:	N/A
		Surrounded by fire barriers rated at:		
		Except:		

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
0.0	4101	Typical Conference Room	Smoke Detectors Above & Below Ceiling	Manual Fire Alarm Box	Preaction Sprinklers above and below ceilings	Hose Streams
						Fire Extinguishers
			Sprinkler Waterflow			

700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None
Radiological release:	None, no radiological materials present
Manual firefighting:	Class I hose stations for manual attack
Property loss:	Minor
Hazardous Substances:	None

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts in transient combustibles and consumes combustibles in the room. Fire spread to corridor is not expected due to low combustible loading. Fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	F4100	Description: Rooms 4102 & 4103 - Restrooms	Const. Type: II 000
Building:	Control Building	Gross Area (m2):	82.6
		Applicable codes: CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U73-FG2301	Building Code Occupancy Classification:	Group F, Division 3
		Electrical Classification: Safety-related divisional equipment or cables:	N/A
		Nonsafety - related redundant trains, equipment or cables:	N/A
		Surrounded by fire barriers rated at:	
		Except:	

Consisting of the following Rooms:

EL	Rm#	Potential Combustibles	Fire Alarm Input Devices: Primary	Fire Alarm Input Devices: Backup	Fire Suppression: Primary	Fire Suppression: Backup
0.0	4102	Typical Restroom	Smoke Detectors Above & Below Ceiling; Sprinkler Waterflow	Manual Fire Alarm Box	Preaction Sprinklers above and below ceilings	Hose Streams; Fire Extinguishers
0.0	4103	Typical Restroom				

<700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None
Radiological release:	None, no radiological materials present
Manual firefighting:	Class I hose stations for manual attack
Property loss:	Minor
Hazardous Substances:	None

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts in transient combustibles and consumes combustibles in the room. Fire spread to corridor is not expected due to low combustible loading. Fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	F4100	Description:	Room 4105 - HP and RCA Access Area	Const. Type: II 000
Building:	Control Building		Gross Area (m2):	293
		Applicable codes:	CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U73-FG2301		Building Code Occupancy Classification:	Group F, Division 3
			Electrical Classification: Safety-related divisional equipment or cables:	N/A
			Nonsafety - related redundant trains, equipment or cables:	Load Group A or B
		Surrounded by fire barriers rated at:		
		Except:		

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
0.0	4105	Ordinary Office Type Area Loading	Smoke Detectors Above & Below Ceiling	Manual Fire Alarm Box	Preaction Sprinklers above and below ceiling	Hose Streams
0.0	4105	Cable				Fire Extinguishers
			Sprinkler Waterflow			

>700	Anticipated combustible load, MJ/m2	Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:
700	Unsprinklered combustible load limit, MJ/m2	Fire starts in general or transient combustibles, or exposed cable and consumes combustibles in the room. Fire spread is limited due to full height walls to other control building areas and by 3-hour rated barriers to the Rad Waste Building. Fire does not affect safe shutdown.

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None
Radiological release:	None expected
Manual firefighting:	Class I hose stations for manual attack
Property loss:	Minor
Hazardous Substances:	None

Room Data Sheet

Fire Area:	F4100	Description:	Room 4106 - Access Room - Security Personnel & Equipment	Const. Type: II 000
Building:	Control Building		Gross Area (m2):	26
		Applicable codes:	CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U73-FG2301		Building Code Occupancy Classification:	Group F, Division 3
			Electrical Classification: Safety-related divisional equipment or cables:	N/A
			Nonsafety - related redundant trains, equipment or cables:	Load Group A or B
		Surrounded by fire barriers rated at:		
		Except:		

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
0.0	4106	Security Equipment	Smoke Detectors	Manual Fire Alarm	Preaction Sprinklers	Hose Streams
0.0	4106	Cable		Box		Fire Extinguishers
0.0	4106	Office Equipment	Sprinkler Waterflow			

>700	Anticipated combustible load, MJ/m2	Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:
700	Unsprinklered combustible load limit, MJ/m2	

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None
Radiological release:	None, no radiological materials present
Manual firefighting:	Class I hose stations for manual attack
Property loss:	Moderate
Hazardous Substances:	None

Fire starts in security equipment, transient combustibles or cable and consumes combustibles in the room. Fire may spread beyond room to corridor, breakroom or support center but not to control room due to 2-hour rated barrier. Fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	F4100	Description:	Room 4107 - Break Room	Const. Type: II 000
Building:	Control Building		Gross Area (m2):	40.6
		Applicable codes:	CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U73-FG2301		Building Code Occupancy Classification:	Group F, Division 3
			Electrical Classification: Safety-related divisional equipment or cables:	N/A
			Nonsafety - related redundant trains, equipment or cables:	Load Group B
		Surrounded by fire barriers rated at:		
		Except:		

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
0.0	4107	Typical Break Area	Smoke Detectors Above & Below Ceiling	Manual Fire Alarm Box	Preaction Sprinklers above and below ceiling	Hose Streams
0.0	4107	Cable				Fire Extinguishers
			Sprinkler Waterflow			

>700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None
Radiological release:	None, no radiological materials present
Manual firefighting:	Class I hose stations for manual attack
Property loss:	Minor
Hazardous Substances:	None

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts in furnishings, transient combustibles or cable and consumes combustibles in the room. If fire starts in cable tray, spread outside the room area is likely, but not into control room. Minimal fire spread if fire starts below ceiling. Fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	F4150	Description:	Room 4150 - LG A Electrical Equipment Room - UPS	Const. Type: II 000
Building:	Control Building		Gross Area (m2):	41.1
		Applicable codes:	CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U73-FG2301		Building Code Occupancy Classification:	Group F, Division 3
			Electrical Classification: Safety-related divisional equipment or cables:	N/A
			Nonsafety - related redundant trains, equipment or cables:	Group A
		Surrounded by fire barriers rated at:	3 hours	
		Except:		

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
0.0	4160	Battery Chargers, UPS	Smoke Detectors	Manual Fire Alarm	Preaction Sprinklers	Hose Streams
0.0	4160	Transformer		Box		Fire Extinguishers
0.0	4160	Cable	Sprinkler Waterflow			

>1400	Anticipated combustible load, MJ/m2	Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:
1400	Unsprinklered combustible load limit, MJ/m2	Fire starts in electrical equipment and spreads to adjacent equipment and cables. All combustibles in the room burn until consumed. Fire does not spread beyond room due to 3-hour rated fire barriers. Fire affects one of two groups. Fire does not affect safe shutdown.

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None - Redundant Train
Radiological release:	None, no radiological materials present
Manual firefighting:	Access via exterior doors and corridor
Property loss:	Moderate
Hazardous Substances:	None

Room Data Sheet

Fire Area:	F4151	Description: Room 4151 - MCC A	Const. Type: II 000
Building:	Control Building	Gross Area (m2):	50.8
		Applicable codes: CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U73-FG2301	Building Code Occupancy Classification:	Group F, Division 3
		Electrical Classification: Safety-related divisional equipment or cables:	N/A
		Nonsafety - related redundant trains, equipment or cables:	Group A
		Surrounded by fire barriers rated at:	3 hours
		Except:	Exterior wall not rated

Consisting of the following Rooms:

EL	Rm#	Potential Combustibles	Fire Alarm Input Devices: Primary	Fire Alarm Input Devices: Backup	Fire Suppression: Primary	Fire Suppression: Backup
0.0	4161	Switchgear	Smoke Detectors	Manual Fire Alarm Box	Preaction Sprinklers	Hose Streams
0.0	4161	Cables				Fire Extinguishers
0.0	4161	Transformer	Sprinkler Waterflow			

>1400	Anticipated combustible load, MJ/m2
1400	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None - Redundant Train
Radiological release:	None, no radiological materials present
Manual firefighting:	Access via exterior doors
Property loss:	Moderate
Hazardous Substances:	None

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts in switchgear and spreads to adjacent equipment and cables. All combustibles in the room burn until consumed. Fire does not spread beyond room due to 3-hour rated fire barriers. Fire affects one of two groups. Fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	F4152	Description: Room 4152 - Battery Room Group A	Const. Type: II 000
Building:	Control Building	Gross Area (m2):	91.3
		Applicable codes: CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U73-FG2301	Building Code Occupancy Classification:	Group F, Division 3
		Electrical Classification: Safety-related divisional equipment or cables:	N/A
		Nonsafety - related redundant trains, equipment or cables:	Group A
		Surrounded by fire barriers rated at:	3 hours
		Except:	Exterior wall not rated

Consisting of the following Rooms:

EL	Rm#	Potential Combustibles	Fire Alarm Input Devices – Primary	Fire Alarm Input Devices – Backup	Fire Suppression – Primary	Fire Suppression – Backup
0.0	4152	Lithium-ion batteries	Smoke Detectors & Hydrogen Detectors; Sprinkler Waterflow	Manual Fire Alarm Box	Preaction Sprinklers	Hose Streams; Fire Extinguishers
0.0	4152	Cable				

>1400	Anticipated combustible load, MJ/m2
1400	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None
Radiological release:	None, no radiological materials present
Manual firefighting:	Access via exterior doors and corridor
Property loss:	Moderate
Hazardous Substances:	Batteries - lithium-ion

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts in batteries and spreads to adjacent batteries and cables. All combustibles in the room burn until consumed. Fire does not spread beyond room due to 3-hour rated fire barriers. Fire affects one of two groups. Fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	F4153	Description:	Room 4153 C20 DL 2 - Room A - DCS Equipment Room	Const. Type: II 000
Building:	Control Building		Gross Area (m2):	67.7
		Applicable codes:	CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U73-FG2301		Building Code Occupancy Classification:	Group F, Division 3
			Electrical Classification: Safety-related divisional equipment or cables:	N/A
			Nonsafety - related redundant trains, equipment or cables:	Group A
		Surrounded by fire barriers rated at:	3 hours	
		Except:	Exterior wall not rated	

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
0.0	4163	DCS Equipment	Smoke Detectors	Manual Fire Alarm	Preaction Sprinklers	Hose Streams
0.0	4163	Cables		Box		Fire Extinguishers
			Sprinkler Waterflow			

>1400	Anticipated combustible load, MJ/m2	Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:
1400	Unsprinklered combustible load limit, MJ/m2	Fire starts in an equipment rack and spreads to cables and other equipment racks. All combustibles in the room burn until consumed. Fire does not spread beyond room due to 3-hour rated fire barriers. Fire affects one of two groups. Fire does not affect safe shutdown.

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	Power Reduction
Radiological release:	None, no radiological materials present
Manual firefighting:	Access via exterior doors and corridor
Property loss:	Moderate
Hazardous Substances:	None

Room Data Sheet

Fire Area:	F4160	Description:	Room 4160 - LG B Electrical Equipment Room - UPS
Building:	Control Building		Gross Area (m2): 41.1
Associated Drawings or Figures:	407081-U73-FG2301	Applicable codes:	CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 14, CSA C22.1, ULC-S524
			Building Code Occupancy Classification: Group F, Division 3
			Electrical Classification: Safety-related divisional equipment or cables: N/A
			Nonsafety - related redundant trains, equipment or cables: Group B
		Surrounded by fire barriers rated at:	3 hours
		Except:	

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
0.0	4160	Battery Chargers, UPS	Smoke Detectors	Manual Fire Alarm Box	Preaction Sprinklers	Hose Streams
0.0	4160	Transformer				Fire Extinguishers
0.0	4160	Cable	Sprinkler Waterflow			

>1400	Anticipated combustible load, MJ/m2
1400	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None - Redundant Train
Radiological release:	None, no radiological materials present
Manual firefighting:	Access via exterior doors and corridor
Property loss:	Moderate
Hazardous Substances:	None

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts in electrical equipment and spreads to adjacent equipment and cables. All combustibles in the room burn until consumed. Fire does not spread beyond room due to 3-hour rated fire barriers. Fire affects one of two groups. Fire does not affect safe shutdown.

V

Room Data Sheet

Fire Area:	F4161	Description: Room 4161 - MCC B	Const. Type: II 000
Building:	Control Building	Gross Area (m2):	50.8
		Applicable codes: CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U73-FG2301	Building Code Occupancy Classification:	Group F, Division 3
		Electrical Classification: Safety-related divisional equipment or cables:	N/A
		Nonsafety - related redundant trains, equipment or cables:	Group B
		Surrounded by fire barriers rated at:	3 hours
		Except:	Exterior wall not rated

Consisting of the following Rooms:

EL	Rm#	Potential Combustibles	Fire Alarm Input Devices: Primary	Fire Alarm Input Devices: Backup	Fire Suppression: Primary	Fire Suppression: Backup
0.0	4161	Switchgear	Smoke Detectors	Manual Fire Alarm Box	Preaction Sprinklers	Hose Streams
0.0	4161	Cables				Fire Extinguishers
0.0	4161	Transformer	Sprinkler Waterflow			

>1400	Anticipated combustible load, MJ/m2
1400	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None - Redundant Train
Radiological release:	None, no radiological materials present
Manual firefighting:	Access via exterior doors
Property loss:	Moderate
Hazardous Substances:	None

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts in switchgear and spreads to adjacent equipment and cables. All combustibles in the room burn until consumed. Fire does not spread beyond room due to 3-hour rated fire barriers. Fire affects one of two groups. Fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	F4162	Description: Room 4162 - Battery Room Group B	Const. Type: II 000
Building:	Control Building	Gross Area (m2):	91.3
		Applicable codes: CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U73-FG2301	Building Code Occupancy Classification:	Group F, Division 3
		Electrical Classification: Safety-related divisional equipment or cables:	N/A
		Nonsafety - related redundant trains, equipment or cables:	Group B
		Surrounded by fire barriers rated at:	3 hours
		Except:	Exterior wall not rated

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
0.0	4162	Batteries - lithium-ion	Smoke Detectors & Hydrogen Detectors Sprinkler Waterflow	Manual Fire Alarm Box	Preaction Sprinklers	Hose Streams Fire Extinguishers
0.0	4162	Cable				

>1400	Anticipated combustible load, MJ/m2
1400	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None
Radiological release:	None, no radiological materials present
Manual firefighting:	Access via exterior doors and corridor
Property loss:	Moderate
Hazardous Substances:	Batteries - lithium-ion

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts in batteries and spreads to adjacent batteries and cables. All combustibles in the room burn until consumed. Fire does not spread beyond room due to 3-hour rated fire barriers. Fire affects one of two groups. Fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	F4163	Description:	Room 4163 C20 DL 2 - Room B - DCS Equipment Room	Const. Type: II 000
Building:	Control Building		Gross Area (m2):	67.7
		Applicable codes:	CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U73-FG2301		Building Code Occupancy Classification:	Group F, Division 3
			Electrical Classification: Safety-related divisional equipment or cables:	N/A
			Nonsafety - related redundant trains, equipment or cables:	Group B
		Surrounded by fire barriers rated at:	3 hours	
		Except:	Exterior wall not rated	

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
0.0	4163	DCS Equipment	Smoke Detectors	Manual Fire Alarm	Preaction Sprinklers	Hose Streams
0.0	4163	Cables		Box		Fire Extinguishers
			Sprinkler Waterflow			

>1400	Anticipated combustible load, MJ/m2	Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:
1400	Unsprinklered combustible load limit, MJ/m2	

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	Power Reduction
Radiological release:	None, no radiological materials present
Manual firefighting:	Access via exterior doors and corridor
Property loss:	Moderate
Hazardous Substances:	None

Fire starts in an equipment rack and spreads to cables and other equipment racks. All combustibles in the room burn until consumed. Fire does not spread beyond room due to 3-hour rated fire barriers. Fire affects one of two groups. Fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	F4170	Description:	Room 4170 - Main Control Room	Const. Type: II 000
Building:	Control Building		Gross Area (m2):	99.7
		Applicable codes:	CSA N293, NBCC, NFCC, NFPA 10, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U73-FG2301		Building Code Occupancy Classification:	Group F, Division 3
			Electrical Classification: Safety-related divisional equipment or cables:	Div 1, 2 & 3
			Nonsafety - related redundant trains, equipment or cables:	Trains A & B
		Surrounded by fire barriers rated at:	2 hours	
		Except:	South wall (shared with other Conrol Room Complex areas)	

Consisting of the following Rooms:

EL	Rm#	Potential Combustibles
0.0	4170	Electrical Equipment
0.0	4170	Cable
0.0	4170	Fan Coil Units

Fire Alarm Input Devices	
Primary	Backup
Smoke Detectors Above & Below Ceiling	Manual Fire Alarm Box

Fire Suppression	
Primary	Backup
Hose Streams	Fire Extinguishers
Other Fire Protection	
Control Room Complex Pressurization - Activated by any smoke detector in the Control Building, outside the Control Room Complex	

>700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts in transient combustibles and consumes transients and cables above and below ceiling. Fire spread is limited by 2-hour rated barriers to adjacent fire areas. Three safety shut down cable trains anticipated in this room. Alternate control room has redundant, isolated circuitry. Safe shutdown can be achieved and maintained from the alternate control room.

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None
Radiological release:	None, no radiological materials present
Manual firefighting:	Class III hose stations for manual attack
Property loss:	Moderate
Hazardous Substances:	None

Room Data Sheet

Fire Area:	F4170	Description:	Room 4171 - Technical Assistant Desk, 4172 - Shift Supv, 4173 - Toilet	Const. Type: II 000
Building:	Control Building		Gross Area (m2):	47.6
		Applicable codes:	CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U73-FG2301		Building Code Occupancy Classification:	Group F, Division 3
			Electrical Classification: Safety-related divisional equipment or cables:	N/A
			Nonsafety - related redundant trains, equipment or cables:	N/A
		Surrounded by fire barriers rated at:	2 hours (part of Control Room Complex)	
		Except:	North wall (shared with Room 4170 - Main Control Room)	

Consisting of the following Rooms:

EL	Rm#	Potential Combustibles	Fire Alarm Input Devices: Primary	Fire Alarm Input Devices: Backup	Fire Suppression: Primary	Fire Suppression: Backup
0.0	4173	Typical Restroom - Negligible combustibles	Smoke Detectors Above & Below Ceiling	Manual Fire Alarm Box	Preaction Sprinkler above and below ceiling if cable tray above	Hose Streams
						Fire Extinguishers
					Other Fire Protection	
			Sprinkler Waterflow		Control Room Complex Pressurization - Activated by any smoke detector in the Control Building, outside the Control Room Complex	

<700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts in transient combustibles and consumes combustibles in the room. Fire spread is limited by 2-hour rated barriers to adjacent fire areas. No barrier to main control room. Operators will perform incipient attack or move to secondary control room. Smoke damage anticipated in office and main control room. Fire does not affect safe shutdown.

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None
Radiological release:	None, no radiological materials present
Manual firefighting:	Class III hose stations for manual attack
Property loss:	Moderate
Hazardous Substances:	None

Room Data Sheet

Fire Area:	F4100	Description:	Room 4174 - DCIS Maintenance & Cyber Security Room	Const. Type: II 000
Building:	Control Building		Gross Area (m2):	81
		Applicable codes:	CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U73-FG2301		Building Code Occupancy Classification:	Group F, Division 3
			Electrical Classification: Safety-related divisional equipment or cables:	N/A
			Nonsafety - related redundant trains, equipment or cables:	N/A
		Surrounded by fire barriers rated at:		
		Except:		

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
0.0	4174	Electrical Equipment	Smoke Detectors Above & Below Ceiling	Manual Fire Alarm Box	Preaction Sprinklers above and below ceilings if cable tray present	Hose Streams
						Fire Extinguishers
			Sprinkler Waterflow			

<700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None
Radiological release:	None, no radiological materials present
Manual firefighting:	Class I hose stations for manual attack
Property loss:	Moderate
Hazardous Substances:	None

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts at electrical equipment and consumes combustibles in the room. Fire spread is limited by 2-hour rated barriers to control room complex. Minor fire and smoke spread to adjacent corridors. Fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	F4175	Description:	Room 4175 - C30 Room	Const. Type: II 000
Building:	Control Building		Gross Area (m2):	95.7
		Applicable codes:	CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U73-FG2301		Building Code Occupancy Classification:	Group F, Division 3
			Electrical Classification: Safety-related divisional equipment or cables:	N/A
			Nonsafety - related redundant trains, equipment or cables:	Load Group A & B
		Surrounded by fire barriers rated at:	3 hours	
		Except:	Exterior wall not rated	

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
0.0	4175	Electrical Equipment	Smoke Detectors	Manual Fire Alarm	Preaction Sprinklers	Hose Streams
0.0	4175	Cables	Sprinkler Waterflow	Box		Fire Extinguishers

>1400	Anticipated combustible load, MJ/m2	Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:
1400	Unsprinklered combustible load limit, MJ/m2	Fire starts at electrical equipment and consumes combustibles in the room. Fire spread is limited by 3-hour rated barriers to adjacent fire areas. Fire does not affect safe shutdown.

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	Power Reduction
Radiological release:	None, no radiological materials present
Manual firefighting:	Class III hose stations for manual attack
Property loss:	Moderate
Hazardous Substances:	None

Room Data Sheet

Fire Area:	F4176	Description:	Room 4176 - DL 4A Room - Combined DCS Equipment	Const. Type: II 000
Building:	Control Building		Gross Area (m2):	52
		Applicable codes:	CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U73-FG2301		Building Code Occupancy Classification:	Group F, Division 3
			Electrical Classification: Safety-related divisional equipment or cables:	N/A
			Nonsafety - related redundant trains, equipment or cables:	Load Group A and B
		Surrounded by fire barriers rated at:	3 hours	
		Except:		

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
0.0	4176	Electrical Equipment	Smoke Detectors	Manual Fire Alarm	Preaction Sprinklers	Hose Streams
0.0	4176	Cables		Box		Fire Extinguishers
			Sprinkler Waterflow			

>1400	Anticipated combustible load, MJ/m2	Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:
1400	Unsprinklered combustible load limit, MJ/m2	Fire starts in an equipment rack and spreads to cables and other equipment racks. All combustibles in the room burn until consumed. Fire does not spread beyond room due to 3-hour rated fire barriers. Fire affects two groups. Fire does not affect safe shutdown.

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	Reactor Scram
Radiological release:	None, no radiological materials present
Manual firefighting:	Access via exterior doors and corridor
Property loss:	Moderate
Hazardous Substances:	None

Room Data Sheet

Fire Area:	F4177	Description: Room 4177 - Communications Room	Const. Type: II 000
Building:	Control Building	Gross Area (m2):	45.5
		Applicable codes: CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U73-FG2301	Building Code Occupancy Classification:	Group F, Division 3
		Electrical Classification: Safety-related divisional equipment or cables:	N/A
		Nonsafety - related redundant trains, equipment or cables:	N/A
		Surrounded by fire barriers rated at:	3 hours
		Except:	Exterior wall not rated

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
0.0	4177	Electrical Equipment	Smoke Detectors	Manual Fire Alarm	Preaction Sprinklers	Hose Streams
0.0	4177	Cables	Sprinkler Waterflow	Box		Fire Extinguishers

<1400	Anticipated combustible load, MJ/m2
1400	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None
Radiological release:	None, no radiological materials present
Manual firefighting:	Access via exterior doors
Property loss:	Moderate
Hazardous Substances:	None

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts at electrical equipment and consumes combustibles in the room. Fire spread is limited by 3-hour rated barriers to adjacent fire areas. Fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	F4170	Description:	Room 4178 - Panel Room	Const. Type: II 000
Building:	Control Building		Gross Area (m2):	19.6
		Applicable codes:	CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U73-FG2301		Building Code Occupancy Classification:	Group F, Division 3
			Electrical Classification: Safety-related divisional equipment or cables:	Div 1, 2 & 3
			Nonsafety - related redundant trains, equipment or cables:	Trains A & B
		Surrounded by fire barriers rated at:	2-hours	
		Except:	3-hour to Reactor Building	

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
0.0	4178	Cable	Very Early warning Smoke Detectors	Manual Fire Alarm Box	Preaction Sprinklers Hose Streams	Fire Extinguishers
			Sprinkler Waterflow		Other Fire Protection Control Room Complex Pressurization - Activated by any smoke detector in the Control Building, outside the Control Room Complex	

>700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None
Radiological release:	None, no radiological materials present
Manual firefighting:	Class I hose stations for manual attack
Property loss:	Moderate
Hazardous Substances:	None

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts in cables, which are consumed. Fire spread is limited by 2 and 3-hour rated barriers to adjacent fire areas. Three safety shut down cable trains anticipated in this room. Alternate control room has redundant, isolated circuitry. Safe shutdown can be achieved and maintained from the alternate control room.

Room Data Sheet

Fire Area:	F4100	Description: Room 4180 Technical Support Center - Offices	Const. Type: II 000
Building:	Control Building	Gross Area (m2):	144
		Applicable codes: CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U73-FG2301	Building Code Occupancy Classification:	Group F, Division 3
		Electrical Classification: Safety-related divisional equipment or cables:	N/A
		Nonsafety - related redundant trains, equipment or cables:	N/A
		Surrounded by fire barriers rated at:	
		Except:	

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
0.0	4180	Office Loading	Smoke Detectors Above & Below Ceiling	Manual Fire Alarm Box	Preaction Sprinklers above and below ceiling	Hose Streams
0.0	4180	Cable				Fire Extinguishers
			Sprinkler Waterflow			

>700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None
Radiological release:	None, no radiological materials present
Manual firefighting:	Class I hose stations for manual attack
Property loss:	Minor
Hazardous Substances:	None

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts at power panels and consumes combustibles in the room. Fire spread is limited by 3-hour rated barriers to adjacent buildings on two sides. Other two sides have non rated walls to corridor and Break Room, however fire spread is limited due to limited combustibles. Fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	F4100	Description: Room 4181 - Hallway and 4104 Vestibule	Const. Type: II 000
Building:	Control Building	Gross Area (m2):	373.8
		Applicable codes: CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U73-FG2301	Building Code Occupancy Classification:	Group F, Division 3
		Electrical Classification: Safety-related divisional equipment or cables:	N/A
		Nonsafety - related redundant trains, equipment or cables:	N/A
		Surrounded by fire barriers rated at:	N/A - Not required for hallway/vestibule
		Except:	2-hr barrier for hallway directly west of control room (pathway to secondary control room)

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
0.0	4181	Transients	Smoke Detectors Above & Below Ceiling Sprinkler Waterflow	Manual Fire Alarm Box	Preaction Sprinklers above and below ceilings	Hose Streams Fire Extinguishers

<700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None
Radiological release:	None, no radiological materials present
Manual firefighting:	Class I hose stations for manual attack
Property loss:	Minor
Hazardous Substances:	None

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts in transient combustibles Fire spread is not expected due to low combustible loading. Fire does not affect safe shutdown.

4.5.3.6 Rad Waste Building

The fire protection requirements for the Rad Waste Building will be based on CSA N293 prescriptive requirements, and evaluation of the combustible loading of each room and its associated fire barriers to determine the need for sprinklers and detection.

The majority of the building is considered one fire area due to the tank rooms that span several floor levels and other ventilation needs. The majority of the building, outside the individual tank rooms is sprinklered to mitigate potential fire spread from floor to floor and in anticipation of the high level of transients during maintenance activities.

Standpipes (Class I) are required in the exit enclosure and the adjacent Turbine Building stair enclosure to meet spacing requirements. These are illustrated on the Fire Area Drawings. The Rad Waste Building standpipe and sprinkler riser is supplied with fire protection water from two directions, one through the Reactor Building and one through the Control Building. See the Fire Area drawing ([[ ]]) for the general routing, and the P&ID for the schematic layout.

The major internal and external fire hazards associated with the Rad Waste Building are summarized as follows:

- Charcoal Absorber Vessels – The charcoal absorber vessels for the Turbine Building are located in the Rad Waste Building on an enclosed platform on Level 3M. As the charcoal is subject to fire, the room is enclosed by 3-hour rated construction. Heat detectors are located in each vessel to alert personnel of a fire condition. The fire is most commonly deep seated and thus provided with a deluge suppression system (manually actuated). A drainage system is required to avoid vessel collapse.

Recommended fire suppression systems are identified on the room data sheets and illustrated on the Fire Area Drawings, however, are summarized as follows:

- Level 0 – Dress Out Room 3100– Wet Pipe Sprinkler
- Level 0 – Filtering Skid Area 3173 – Wet Pipe Sprinkler
- Charcoal Absorber Vessels – Manual Deluge System
- Level 6.1 – Second Floor Area 3280 – Wet Pipe Sprinkler
- Level 6.1 – Laboratory Room 3200– Wet Pipe Sprinkler
- Level 13.0 – Chiller Equipment / Piping Area– Wet Pipe Sprinkler
- Level 13.0 – Elevator Machine Room & Hoistway – Wet Pipe Sprinklers

A fire alarm system with automatic voice occupant notification is provided throughout the building. Devices and appliances are provided as follows:

- Manual fire alarm boxes (manual pull stations) are provided at each stair door on each level and at building exits.
- Waterflow alarms and supervision is provided on automatic suppression systems.
- Smoke detection is provided in areas as noted on the room data sheets.
- Smoke and heat detectors are provided for the service elevator.

- Occupant notification is provided throughout the building.

Sprinklers are needed for the Dress Out Room due to combustible loading, potentially hazardous materials (above the Maximum Exempt Amount) in the filtering skids on Level 0, the Lab on Level 6.1, outage activities and combustible loading of the cable trays and electrical equipment on Level, 13.0, and separation of the redundant electrical trains on Level 0 and 13. Wet pipe automatic sprinklers are being provided in most Rad Waste areas except the wet vessel rooms as illustrated on the fire area drawings.

Sprinklers and spatial separation are considered acceptable protection for the redundant cable trays in room 3370 on Level 13. Heavy combustible loading is not anticipated in this room except during maintenance outages, when the unit is down. Vertical routing of the trays between Level 13 and 0, along the south wall is through Room 3280 which has a relatively low combustible loading and is sprinklered. Additionally, the tray is sprinklered per NFPA 804 requirements for vertical tray. Sprinkler protection and a 3-hour rated fire barrier is provided on Level 0 where the trains turn horizontal and extend into the Control Building.

Preliminary cable tray layout drawings have been developed for the Rad Waste Building. In this preliminary stage, the routing of the individual trains within the trays has not been developed. Further evaluation of separation in the chases and across Level 13M will be needed as the design proceeds.

See Rad Waste Building Fire Area Drawings:

[[ ]] Level 0.0

[[ ]] Level 6.1

[[ ]] Level 13.0

[[ ]] Level 24.38 (Roof)

The Room Data Sheets for the Rad Waste Building, detailing the combustibles, room features and level of protection for each room is in Table 4.5.3.6 below. Additional information and analysis is as follows:

1. Level 0M – Dress Out Room 3100 – The room has a supply of EME and Personal Protective Equipment (PPE) for workers. Additionally, one load group of tray comes into this room from Level 13 along the south wall, and turns into the Control Building. - The EME/PPE and personnel functions present a fire exposure to the cable tray and the filtering Skid Area. Wet Pipe Sprinklers are warranted in this space. The Occupancy Classification is considered Ordinary Hazard, Group 1 (6.1mm/min (0.15gpm/ft^2) over the room area). The sprinklers in conjunction with the non-rated wall to the filtering Skid Area mitigates damage to process equipment.

   With sprinkler protection in this area, there is no compelling need for smoke detection.

2. Level 0M – Tanks and Pumps (Rooms 3171, 3172 & 3174 -79) – This area has numerous metallic tanks and pumps for mostly wet processes. As the area has little to no combustible loading in relatively small spaces, there is no need for sprinklers.

   As combustible loading is very low, there is no need for detection.

3. Level 0M – Filtering Skid Area 3173 – This area has a moderate combustible loading of equipment, skids and transients. Sprinklers in the area will control any anticipated fire that could occur as well as provide flexibility with the open space during outages. A wet pipe

sprinkler system is recommended. The Occupancy Classification is considered Ordinary Hazard, Group 1 (6.1mm/min (0.15gpm/ft^2) over the most remote 140m^2 (1500ft^2) area).

With sprinkler protection in this area, there is no compelling need for smoke detection.

4. Level 0M – Sample Collection Tanks (Rooms 3181 -3189) – This area has numerous metallic tanks and pumps for mostly wet processes. As the area has little to no combustible loading in relatively small spaces, there is no need for sprinklers.

   As combustible loading is very low, there is no need for detection.

5. Level 3M – Charcoal Absorber Vessels – Room 3102 – This room has four vessels with charcoal filters (>100 lbs each). A manual wet spray system is recommended for the vessels. A manual valve is located on Level 0 in the adjacent Room 3101.

   Heat detectors are located in the top of the vessels to alert personnel of a fire condition.

6. Level 6.1M – Rad Waste Building 2nd Floor Area 3280 and Laboratory 3200 – This area has a moderate combustible loading of equipment, lab furnishings and transients. Sprinklers in the area will control any anticipated fire that could occur as well as provide flexibility with the open space during outages. A wet pipe sprinkler system is recommended. The Occupancy Classification is considered Ordinary Hazard, Group 1 (6.1mm/min (0.15gpm/ft^2) over the most remote 140m^2 (1500ft^2) area).

   With sprinkler protection in this area, there is no compelling need for smoke detection.

7. Level 13M – Chiller Equipment / Piping Area 3173 – This area has a moderate combustible loading of equipment, switchgear, cable tray (Load Group A & B) and transients. Sprinklers in the area will control any anticipated fire that could occur as well as provide flexibility with the open space during outages. A wet pipe sprinkler system is recommended. The Occupancy Classification is considered Ordinary Hazard, Group 1 (6.1mm/min (0.15gpm/ft^2) over the most remote 140m^2 (1500ft^2) area).

   With sprinkler protection in this area, there is no compelling need for smoke detection.

Table 4.5.3.6 – Rad Waste Building Room Data Sheets

Room Data Sheet

Fire Area:	F3100	Description:	Room 3100 Dress Out	Const. Type: II 000
Building:	Rad Waste Building		Gross Area (m2):	93.6
		Applicable codes:	CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U74-FG2201A		Building Code Occupancy Classification:	Group F, Division 3
			Electrical Classification: Safety-related divisional equipment or cables:	N/A
			Nonsafety - related redundant trains, equipment or cables:	Load Group A or B
		Surrounded by fire barriers rated at:		
		Except:		

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
0.0	3100	EME Equipment	Sprinkler Waterflow	Manual Fire Alarm Box	Wet pipe sprinklers	Hose Streams
0.0	3100	Other Clothing & PPE				Fire Extinguishers
0.0	3100	Exposed cables in tray				

>700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None
Radiological release:	None, drainage of sprinkler discharge to containment
Manual firefighting:	Access via stairwell and interior doors
Property loss:	Minor
Hazardous Substances:	None

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts in EME equipment and spreads throughout room with minor spread to Filtering Skid Area. Significant spread beyond the Dress Out Area is not anticipated due to the wall, although non-rated and lack of combustibles in the adjacent space. One of two redundant electrical tray load groups passes through this room, so both are not affected. The fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	F3100	Description:	Rooms 3171, 3172 & 3174 -79 Tanks & Pumps	Const. Type: II 000
Building:	Rad Waste Building		Gross Area Each (m2):	Varies
		Applicable codes:	CSA N293, NBCC, NFCC, NFPA 10, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U74-FG2201A		Building Code Occupancy Classification:	Group F, Division 3
			Electrical Classification: Safety-related divisional equipment or cables:	N/A
			Nonsafety - related redundant trains, equipment or cables:	N/A
		Surrounded by fire barriers rated at:		
		Except:		

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
0.0	3171/2	Sludge Tanks & Pumps - Wet Process	Manual Fire Alarm		Hose Streams	Fire Extinguishers
0.0	3174/6	Rad Waste Dewatering - Wet Process	Box			
0.0	3177	Sump & Pump - Transients				
0.0	3178	Drum Evaporator - Wet Process				
0.0	3179	Spent Resin Tank & Pump - Wet Process				

<700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None
Radiological release:	None, drainage of hose stream discharge to containment
Manual firefighting:	Access via other buildings and exterior doors
Property loss:	Minor
Hazardous Substances:	None

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Wet processes in tanks. Combustibles are limited to pumps and transients. Spent resin is considered combustible when dry although in a tank. Fire starts in transients in dewatering pump room. Fire is limited to room due to lack of combustibles. Minor smoke damage to remaining rooms. No redundant trains in the area. The fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	F3100	Description:	Room 3173 Filtering Skid Area	Const. Type: II 000
Building:	Rad Waste Building		Gross Area Each (m2):	329.4
		Applicable codes:	CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U74-FG2201A		Building Code Occupancy Classification:	Group F, Division 3
			Electrical Classification: Safety-related divisional equipment or cables:	N/A
			Nonsafety - related redundant trains, equipment or cables:	N/A
		Surrounded by fire barriers rated at:		
		Except:		

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
0.0	3173	General & Transient combustibles		Manual Fire Alarm	Wet pipe sprinklers	Hose Streams
0.0	3173	Filtering skids	Sprinkler Waterflow	Box		Fire Extinguishers

>700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None
Radiological release:	None, drainage of sprinkler discharge to containment
Manual firefighting:	Access via other buildings and exterior doors
Property loss:	Moderate
Hazardous Substances:	Water Treatment Chemicals - drain to containment

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts in filtering skids and spreads throughout skids and transients. Minor smoke and fire damage to remaining areas. Fire is stopped from spreading to other buildings by 3-hour fire barriers. No redundant load group feeders pass through this room. The fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	F3100	Description:	Rooms 3180 & 3192 Entry Rooms to Off Gas Charcoal Absorber Vessels	Const. Type: II 000
Building:	Rad Waste Building		Gross Area (m2):	63
		Applicable codes:	CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U74-FG2201A		Building Code Occupancy Classification:	Group F, Division 3
			Electrical Classification: Safety-related divisional equipment or cables:	N/A
			Nonsafety - related redundant trains, equipment or cables:	N/A
		Surrounded by fire barriers rated at:	3 hours	
		Except:		

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
0.0	3180	Transients	Manual Fire Alarm Box		Hose Streams	Fire Extimguishers
0.0	3192	Transients				

<700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None
Radiological release:	None
Manual firefighting:	Access via stairwell and interior doors
Property loss:	Moderate
Hazardous Substances:	None

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts in transients in either room. Minor smoke and fire damage to adjacent rooms. Fire is stopped from spreading to other buildings by 3-hour fire barriers. No redundant load group feeder trays pass through this area. The fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	F3100	Description:	Rooms 3181, 3182 & 3183, Sample Tanks 3181 - 3189	Const. Type: II 000
Building:	Rad Waste Building		Gross Area (m2):	97.5
		Applicable codes:	CSA N293, NBCC, NFCC, NFPA 10, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U74-FG2201A		Building Code Occupancy Classification:	Group F, Division 3
			Electrical Classification: Safety-related divisional equipment or cables:	N/A
			Nonsafety - related redundant trains, equipment or cables:	N/A
		Surrounded by fire barriers rated at:		
		Except:		

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
0.0	3181	Entry - Transients	Manual Fire Alarm		Hose Streams	Fire Extinguishers
0.0	3182/3	Sample Tanks - Metalic Tank & Pump	Box			
0.0	3184/5	Collection Tanks - Metalic Tank & Pump				
0.0	3186/9	Refueling Water Tanks - Metalic Tank & Pump				

<700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None
Radiological release:	None, drainage of hose stream discharge to containment
Manual firefighting:	Access via other buildings and exterior doors
Property loss:	Moderate
Hazardous Substances:	None

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts in transients in entry room 3181. Minor smoke and fire damage to remaining rooms. Fire is stopped from spreading to other buildings by 3-hour fire barriers. No redundant load group feeder trays pass through this area. The fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	F3193	Description:	Room 3193 Off Gas Charcoal Absorber Vessels	Const. Type: II 000
Building:	Rad Waste Building		Gross Area (m2):	48.3
		Applicable codes:	CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U74-FG2201B		Building Code Occupancy Classification:	Group F, Division 3
			Electrical Classification: Safety-related divisional equipment or cables:	N/A
			Nonsafety - related redundant trains, equipment or cables:	N/A
		Surrounded by fire barriers rated at:	3 hours	
		Except:		

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
3.0	3102	4 Charcoal Absorber vessels (>100 lbs)	Heat Detectors in Charcoal Vessels	Manual Fire Alarm Box	Manual Water Spray (in Vessels)	Hose Streams
						Fire Extimguishers

>700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None - Damage limited to one vessel
Radiological release:	None, drainage of vessels to containment
Manual firefighting:	Access via stairwell and interior doors
Property loss:	Moderate
Hazardous Substances:	None

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire in a vessel is anticipated to destroy the vessel and potentially cause damage to the supports and walls of the other vessels. Fire will not spread beyond the rated walls of the room. Plant shutdown may be required. No other utilities passing through room. Fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	F3195	Description: Room 3195 Reactor Building Egress Pathway	Const. Type: II 000
Building:	Rad Waste Building	Gross Area (m2):	35
		Applicable codes: CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U74-FG2201A	Building Code Occupancy Classification:	Group F, Division 3
		Electrical Classification: Safety-related divisional equipment or cables:	N/A
		Nonsafety - related redundant trains, equipment or cables:	Load Group A or B
		Surrounded by fire barriers rated at:	3 hours - Separation from other buildings & redundant train to west
		Except:	2- hour shaft/hoistway barriers

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
0.0	3195	Circulation space - Transients	Sprinkler Waterflow	Manual Fire Alarm Box	Wet pipe sprinklers	Hose Streams
						Fire Extinguishers

<700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Combustibles are limited to transients. Fire starts in transients. Fire limited to room due to lack of combustibles and barriers. Redundant electrical tray Load Group (A or B) feeders passes through this area. Fire does not affect safe shutdown.

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None
Radiological release:	None, drainage of sprinkler discharge to containment
Manual firefighting:	Access via other buildings and interior doors
Property loss:	Minor
Hazardous Substances:	None

Room Data Sheet

Fire Area:	F3100	Description:	Rooms 3270, 3271 & 3272 Condensate Pre-filters	Const. Type: II 000
Building:	Rad Waste Building		Gross Area (m2):	99.2
		Applicable codes:	CSA N293, NBCC, NFCC, NFPA 10, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U74-FG2201B		Building Code Occupancy Classification:	Group F, Division 3
			Electrical Classification: Safety-related divisional equipment or cables:	N/A
			Nonsafety - related redundant trains, equipment or cables:	N/A
		Surrounded by fire barriers rated at:		
		Except:		

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
6.1	3270	Wet process in tanks - Transients	Manual Fire Alarm Box		Hose Streams	Fire Extinguishers
6.1	3271	Wet process in tanks - Transients				
6.1	3272	Wet process in tanks - Transients				

<700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None - Fire spread beyond tank room of origin unlikely
Radiological release:	None, drainage of hose stream discharge to containment
Manual firefighting:	Access via other buildings and stair enclosure
Property loss:	Moderate
Hazardous Substances:	None

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts in transients in any of three rooms. Fire burns until transients consumed. No redundant load group feeder trays in area. Fire spread to adjacent room unlikely due to lack of continuity of combustibles and low loading. Fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	F3100	Description:	Rooms 3273, 3274 & 3275 Condensate Polishers	Const. Type: II 000
Building:	Rad Waste Building		Gross Area (m2):	145.6
		Applicable codes:	CSA N293, NBCC, NFCC, NFPA 10, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U74-FG2201B		Building Code Occupancy Classification:	Group F, Division 3
			Electrical Classification: Safety-related divisional equipment or cables:	N/A
			Nonsafety - related redundant trains, equipment or cables:	N/A
		Surrounded by fire barriers rated at:		
		Except:		

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
6.1	3273	Wet process in tanks - Transients	Manual Fire Alarm Box		Hose Streams	Fire Extinguishers
6.1	3274	Wet process in tanks - Transients				
6.1	3275	Wet process in tanks - Transients				

<700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None - Fire spread beyond tank room of origin unlikely
Radiological release:	None, drainage of hose stream discharge to containment
Manual firefighting:	Access via other buildings and stair enclosure
Property loss:	Moderate
Hazardous Substances:	None

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts in transients in any of three rooms. Fire burns until transients consumed. No redundant load group feeder trays in area. Fire spread to adjacent room unlikely. Fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	F3100	Description: Rooms 3280 Rad Waste Second Floor Area & 3200 Laboratory	Const. Type: II 000
Building:	Rad Waste Building	Gross Area (m2):	441
		Applicable codes: CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U74-FG2201B	Building Code Occupancy Classification:	Group F, Division 3
		Electrical Classification: Safety-related divisional equipment or cables:	N/A
		Nonsafety - related redundant trains, equipment or cables:	Load Group A or B
		Surrounded by fire barriers rated at:	
		Except:	

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
6.1	3280	Recycle Pump Skid (2 pumps)	Sprinkler Waterflow	Manual Fire Alarm Box	Wet pipe sprinklers	Hose Streams
6.1	3200	Misc Laboratory chemicals / fixtures				Fire Extinguishers
6.1	3280	Vertical Cable Tray				

<700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Fire starts in vertical cable tray and spreads to transients. Smoke and minimal fire damage to remaining areas of room. Fire is stopped from spreading to other buildings by 3-hour fire barriers. One load group feeder tray (A or B) riser in room. Fire does not affect safe shutdown.

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None
Radiological release:	None, drainage of sprinkler discharge to containment
Manual firefighting:	Access via other buildings and interior doors
Property loss:	Moderate
Hazardous Substances:	Laboratory Chemicals - drain to containment

Room Data Sheet

Fire Area:	F3290	Description: Room 3290 Egress Pathway	Const. Type: II 000
Building:	Rad Waste Building	Gross Area (m2):	27.5
		Applicable codes: CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U74-FG2201B	Building Code Occupancy Classification:	Group F, Division 3
		Electrical Classification: Safety-related divisional equipment or cables:	N/A
		Nonsafety - related redundant trains, equipment or cables:	Load Group A or B
		Surrounded by fire barriers rated at:	3 hours - Separation from other buildings & redundant train to west
		Except:	2- hour shaft/hoistway barriers within the room area

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
6.1	3290	Circulation space - Transients	Sprinkler Waterflow	Manual Fire Alarm Box	Wet pipe sprinklers	Hose Streams
						Fire Extinguishers

>700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None
Radiological release:	None, drainage of sprinkler discharge to containment
Manual firefighting:	Access via other buildings and interior doors
Property loss:	Minor
Hazardous Substances:	None

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Combustibles are limited to transients and vertical cable tray. Fire starts incables and spreads to transients. Fire limited to room due to barriers. One load group feeder tray (A or B) riser in room. Fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	F3100	Description: Room 3370 Chiller Equipment & Piping	Const. Type: II 000
Building:	Rad Waste Building	Gross Area (m2):	890.4
		Applicable codes: CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U74-FG2201C	Building Code Occupancy Classification:	Group F, Division 3
		Electrical Classification: Safety-related divisional equipment or cables:	N/A
		Nonsafety - related redundant trains, equipment or cables:	Load Group A&B
		Surrounded by fire barriers rated at:	
		Except:	

Consisting of the following Rooms:

EL	Rm#	Potential Combustibles	Fire Alarm Input Devices: Primary	Fire Alarm Input Devices: Backup	Fire Suppression: Primary	Fire Suppression: Backup
13.0	3370	Sluice Water Pumps (2)		Manual Fire Alarm	Wet pipe sprinklers	Hose Streams
13.0	3370	Blowers (2)	Sprinkler Waterflow	Box		Fire Extinguishers
13.0	3370	Fresh Resin Tank				

>700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	Power Reduction
Radiological release:	None, drainage of sprinkler discharge to containment
Manual firefighting:	Access via other buildings and interior doors
Property loss:	Moderate
Hazardous Substances:	Chemicals - drain to containment

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

During Re-Fuel Outage: Fire starts in refuel laydown area and spreads to east and west cable trays (potentially Load Groups A&B) and switchgear. Fire damage to entire room. Load Group A & B feeders, if in this room are destroyed. Fire does not affect safe shutdown.

During Operation: Fire starts in transients and spreads to west cable tray (assumed to be one Load Group). Smoke damage to electrical switchgar and remainder of room. East cable tray is expected to survive fire due to spatial separation from fire on west side of room and minimal combustibles. Trays have an approximately 20 meter spacing. Fire does not affect safe shutdown.

Room Data Sheet

Fire Area:	F3390	Description: Room 3390 Egress Pathway	Const. Type: II 000
Building:	Rad Waste Building	Gross Area (m2):	25.8
		Applicable codes: CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 14, CSA C22.1, ULC-S524	
Associated Drawings or Figures:	407081-U74-FG2201C	Building Code Occupancy Classification:	Group F, Division 3
		Electrical Classification: Safety-related divisional equipment or cables:	N/A
		Nonsafety - related redundant trains, equipment or cables:	Load Group A or B
		Surrounded by fire barriers rated at:	3-hour rated barriers to Reactor Building and remainder of Rad Waste Building
		Except:	2-hour rated barriers to elevator and stairs

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
13.0	3390	Circulation space - Transients	Sprinkler Waterflow	Manual Fire Alarm Box	Wet pipe sprinklers	Hose Streams
						Fire Extinguishers

>700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Combustibles are limited to transients and vertical cable tray (assumed to be Load Group A or B). Fire starts in transients and spreads to cable tray. Fire limited to room due to fire barriers. Fire does not affect safe shutdown.

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None
Radiological release:	None, drainage of sprinkler discharge to containment
Manual firefighting:	Access via other buildings and interior doors
Property loss:	Moderate
Hazardous Substances:	None

Room Data Sheet

Fire Area:	F3190	Description:	Room 3391 -Service Elevator Machine Room and Room 3190 Hoistway	Const. Type: II 000
Building:	Rad Waste Building		Gross Area (m2):	5.6
		Applicable codes:	CSA N293, NBCC, NFCC, NFPA 10, NFPA 13, NFPA 14, CSA C22.1, ULC-S524, CSA B44	
Associated Drawings or Figures:	407081-U74-FG2201C		Building Code Occupancy Classification:	Group F, Division 3
			Electrical Classification: Safety-related divisional equipment or cables:	N/A
			Nonsafety - related redundant trains, equipment or cables:	Single load group to Elev
		Surrounded by fire barriers rated at:	2 hours	
		Except:		

Consisting of the following Rooms:			Fire Alarm Input Devices		Fire Suppression	
EL	Rm#	Potential Combustibles	Primary	Backup	Primary	Backup
13.0	3391	Materials per CSA B44	Smoke & Heat Detectors	Manual Fire Alarm Box	Wet Pipe Sprinklers (per CSA B44) - Machine room and hoistway	Hose Streams
0.0	3190	Materials per CSA B44				Fire Extinguishers
			Sprinkler Waterflow			

<700	Anticipated combustible load, MJ/m2
700	Unsprinklered combustible load limit, MJ/m2

Assuming operation of installed fire extinguishing equipment, impact of fire upon:

Plant operation:	None
Radiological release:	None, no radiological materials present
Manual firefighting:	Class I hose stations in the exit enclosure for manual attack.
Property loss:	Minor
Hazardous Substances:	None

Assuming automatic & manual FP equipment does not function, impact of design basis fire on safe shutdown:

Combustible loading, hoistway and car finishes limited by CSA B44. Fire starts in transient materials in car with at least smoke damage to elevator machine room equipment. Fire is stopped from spreading to other areas of building by fire barriers. Fire does not affect safe shutdown..

5.0 LIFE SAFETY EGRESS ASSESSMENT BUILDING CODE ANALYSS

Life safety egress conceptual assessment as well as occupancy classification and travel distance content are provided under building analyses documentation:

Plant level specification

- [[ ]] Plant Level Architectural and Life Safety

Building level reports:

- [[ ]] Reactor Building Architectural and Life Safety
- [[ ]] Turbine Building Architectural and Life Safety
- [[ ]] Control Building Architectural and Life Safety
- [[ ]] Waste Building Architectural and Life Safety

6.0 ACRONYMS AND SYMBOLS

6.1 Acronyms

Acronyms	Explanation
AHJ	Authority Having Jurisdiction
CSA	Canadian Standards Association
FHA	Fire Hazard Assessment
LS	Life Safety
NBCC	National Building Code of Canada
NFCC	National Fire Code of Canada
NFPA	National Fire Protection Association

6.2 Symbols

Symbols	Definition
ft	Feet
ft^2	Square Feet
gpm	Gallons per Minute
kPa	Kilopascal
m	Meters
mm	Millimeter
m^2	Square Meters
L	Liter
lbs	Pounds
psi	Pounds per Square Inch

7.0 APPENDIX A – LIST OF FIRE PROTECTION DRAWINGS

Sheet Number	Sheet Name
[[ ]]	FIRE PROTECTION REACTOR BUILDING FLOOR EL. -34.0M
[[ ]]	FIRE PROTECTION REACTOR BUILDING FLOOR EL. -29.0m
[[ ]]	FIRE PROTECTION REACTOR BUILDING FLOOR EL. -21.0M
[[ ]]	FIRE PROTECTION REACTOR BUILDING FLOOR EL. -14.5M
[[ ]]	FIRE PROTECTION REACTOR BUILDING FLOOR EL. -8.5M AND MEZZANINE EL. -4.8M
[[ ]]	FIRE PROTECTION REACTOR BUILDING FLOOR EL. -0.0M
[[ ]]	FIRE PROTECTION REACTOR BUILDING FLOOR EL. -4.9M
[[ ]]	FIRE PROTECTION REACTOR BUILDING FLOOR EL. -13.0M
[[ ]]	FIRE PROTECTION REACTOR BUILDING FLOOR EL. -16.0M
[[ ]]	FIRE PROTECTION TURBINE BUILDING GROUND FLOOR EL. 0.0M
[[ ]]	FIRE PROTECTION TURBINE BUILDING MEZZANINE FLOOR EL. 6.1M
[[ ]]	FIRE PROTECTION TURBINE BUILDING OPERATING FLOOR EL.12.2M
[[ ]]	FIRE PROTECTION TURBINE BUILDING ROOF EL. 30.5M
[[ ]]	FIRE PROTECTION PLANT SERVICES AREA GROUND FLOOR EL. 0.0M
[[ ]]	FIRE PROTECTION TURBINE BUILDING TRANSFORMER AREA
[[ ]]	FIRE PROTECTION CONTROL BUILDING GROUND FLOOR EL. 0.0M
[[ ]]	FIRE PROTECTION CONTROL BUILDING ROOF EL. 10.0M
[[ ]]	FIRE PROTECTION RAD WASTE BUILDING GROUND FLOOR EL. 0.0M
[[ ]]	FIRE PROTECTION RAD WASTE BUILDING FLOOR EL. 6.1M
[[ ]]	FIRE RPROTECTION RAD WASTE BUILDING FLOOR EL. 13.0M
[[ ]]	FIRE PROTECTION RAD WASTE BUILDING ROOF EL. 24.38M