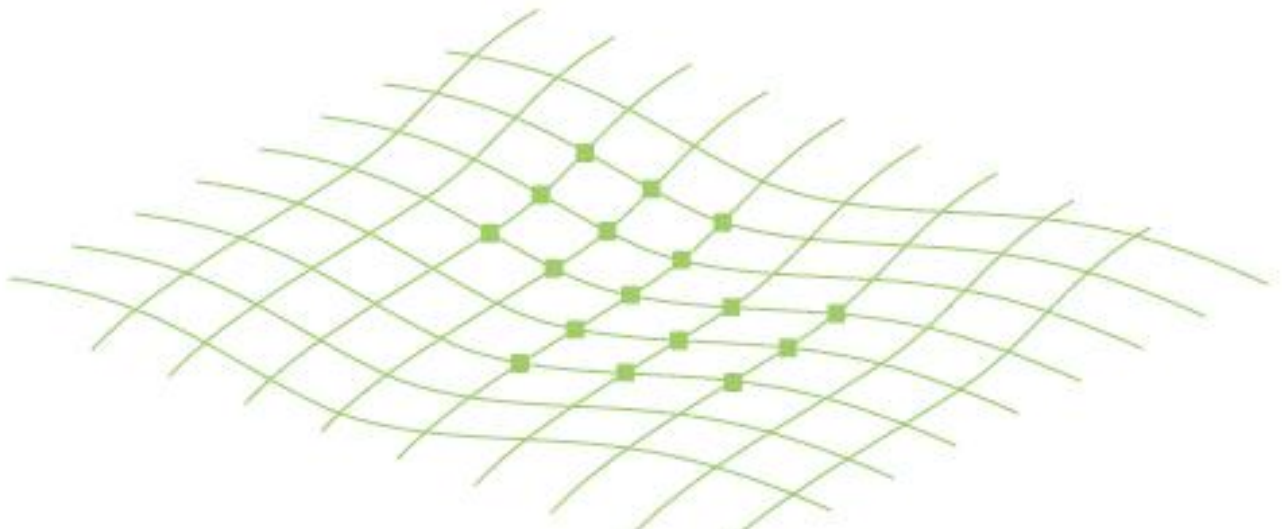


*Manual for Owners and Operators of Special Status Plants  
Risk Assessed and General Supervision*



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# TABLE OF CONTENTS

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<b>SECTION “A”</b> .....	<b>3</b>
Introduction .....	3
General Supervision Staffing Requirements .....	3
Risk Assessed Status Staffing Requirements .....	3
Registration Procedure .....	3
General Supervision .....	4
Risk Assessed Status .....	4
Process Flow Chart .....	6
<b>SECTION “B”</b> .....	<b>7</b>
Minimum Schedule of Controls .....	7
Testing And Maintenance Requirements .....	7
Minimum Requirements of Automatic Control Devices for Boilers .....	8
<i>Low Water Cut-off Control</i> .....	8
Minimum Requirements of Automatic Control Devices for Refrigeration Plants .....	8
<i>High Compressor Discharge Pressure Alarm</i> .....	8
<i>High Level Alarm Suction Trap: Non-Critically-Charged Systems</i> .....	8
<i>Ammonia Monitoring for Safety</i> .....	8
Plant Audit Guideline .....	12
<i>Purpose:</i> .....	12
1. <i>Installation</i> .....	12
2. <i>Training Program</i> .....	12
3. <i>Remote monitoring</i> .....	12
4. <i>Traceability</i> .....	12
5. <i>Maintenance Program</i> .....	12
6. <i>Emergency preparedness</i> .....	12
7. <i>Documentation</i> .....	13
<b>APPENDIX</b> .....	<b>13</b>
References .....	13
<b>DEFINITIONS</b> .....	<b>14</b>

## **SECTION “A”**

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### ***Introduction***

This manual has been developed in order to assist plant owners and operators to prepare for the safety review of their plant when applying for special plant status registration. The purpose of special plant registration is to give owners options for alternative staffing through the use of control technology, effective management and additional training of plant personnel. This manual is not intended to replace or interpret the requirements of the Safety Standards Act, Safety Standards General Regulation and the Power Engineers, Boiler, Pressure Vessel and Refrigeration Safety Regulation, CSA B51 or the ASME Codes. In all cases, the Act and Regulations are to be consulted with regards to specific requirements.

### ***General Supervision Staffing Requirements***

A plant may be registered as a general supervision status plant operation if the plant is not located in an institution or public assembly occupancy premises.

A general supervision status plant operation requires the presence of a power engineer with the appropriate class of certificate of qualification as determined by a plant safety review and as required by a provincial safety manager.

Before registration of a general supervision status plant, a provincial safety manager may direct administrative and technical specifications for that plant to be met.

A plant operating as a general supervision status plant must, as a minimum, have a power engineer with the appropriate class of certificate of qualification who must inspect the plant in accordance with conditions established by a provincial safety manager.

### ***Risk Assessed Status Staffing Requirements***

A plant operating under the risk assessed status plant category must, as a minimum, have a power engineer with the appropriate certificate of qualification who

- (a) Is on the premises of the plant not less than 7 hours per day or such greater time as may be required by a provincial safety manager, and
- (b) Inspects the plant in accordance with conditions established by a provincial safety manager

Before registration of a risk assessed status plant, a provincial safety manager may direct administrative and technical specifications for that plant to be met.

### ***Registration Procedure***

The following procedure must apply in all cases where requests for registration as a General Supervision or a Risk Assessed status plant are made:

1. The capacity of plants eligible for registration are as follows:

## General Supervision

*Applies to:*

- i. a power plant that does not exceed 30 m<sup>2</sup> of boiler capacity,
- ii. a steam heating plant that does not exceed 200 m<sup>2</sup> of boiler capacity,
- iii. a fluid heating or low pressure thermal fluid plant that does not exceed 500 m<sup>2</sup> of boiler capacity,
- iv. a low temperature low pressure fluid plant that does not exceed 2 000 m<sup>2</sup> of boiler capacity,
- v. an unfired plant that does not exceed 1 000 m<sup>2</sup> of boiler capacity, or
- vi. a refrigeration plant that does not exceed a total plant capacity of 1 000 kW prime mover nameplate rating
- vii. meets all the administrative and technical specifications issued by a provincial safety manager after a successful review for the continuity under this program.

## Risk Assessed Status

*Applies to:*

- i. is a fluid heating plant or low pressure thermal fluid plant not exceeding 500 m<sup>2</sup> of boiler capacity,
- ii. is a low temperature low pressure fluid plant that does not exceed 2 000 m<sup>2</sup> of boiler capacity,
- iii. is an unfired plant not exceeding 1 000 m<sup>2</sup> of boiler capacity,
- iv. is a refrigeration plant not exceeding a total plant capacity of 1 000 kW prime mover nameplate rating, or
- v. meets all the administrative and technical specifications issued by a provincial safety manager after a successful review for the continuity under this program.

**Table 1      Table of Conversions**

<b>Metric</b>	<b>Imperial (approx)</b>
103 kPa	15 psi
1100 kPa	160 psi
100°C	212°F
121°C	250°F
30 m <sup>2</sup>	320 ft <sup>2</sup>
200 m <sup>2</sup>	2150 ft <sup>2</sup>
500 m <sup>2</sup>	5300 ft <sup>2</sup>
1000 m <sup>2</sup>	10750 ft <sup>2</sup>
2000 m <sup>2</sup>	21500 ft <sup>2</sup>
1000 kW	1340 hp

2. The owner of the plant must submit an application form with the appropriate fee to the BC Safety Authority, requesting that a plant be certified as a 'General Supervision or Risk Assessed status' operation plant.

The plant owner must state in the request that the plant meets all the requirements outlined in the Safety Standards Act, and Power Engineers, Boiler, Pressure Vessel, and Refrigeration, regulation and those requirements outlined in **Section "B"** of this document, and that all fees and expenses for the documentation, audit, and inspection of the plant and its equipment to establish its eligibility for registration as a 'General Supervision or Risk Assessed Status' operation plant, will be fully paid to the BC Safety Authority.

3. The plant will have a technical review carried out by the BC Safety Authority, to determine that it meets the **minimum** safety code standards and other mandated regulatory, technical, and administrative requirements.

The Boiler Safety Officer responsible for the technical review will record in detail any additional safety controls or procedures required for plant registration, and give a copy of the review report to the owner of the plant.

This first technical review will be carried out by two Boiler Safety Officers.

Where additional requirements are identified in the review report, on completion of the required work, the plant will be re-reviewed by the regional Boiler Safety Officer to ensure that the necessary safety controls or conditions required for plant registration, as listed on the initial review report have been complied with.

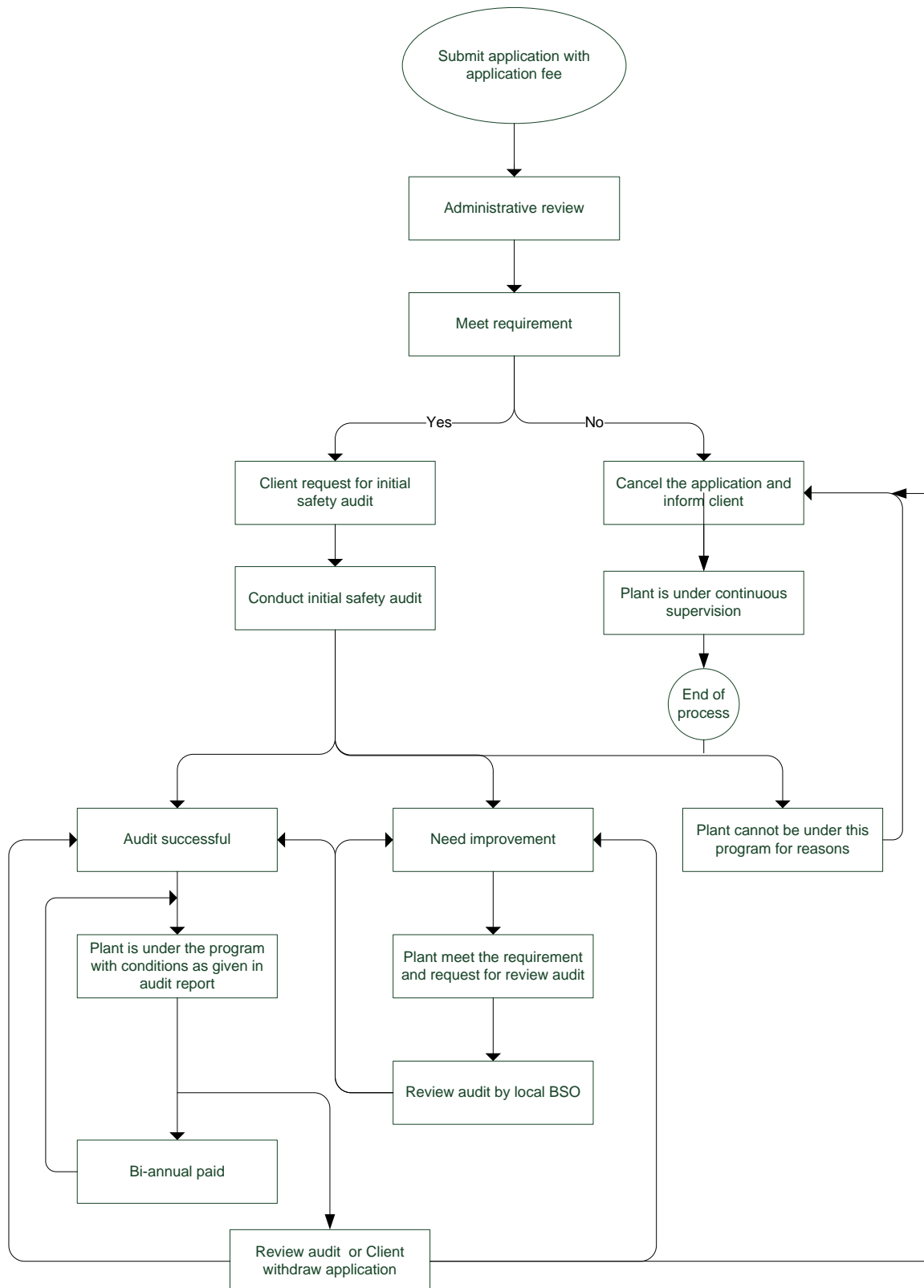
The Boiler Safety Officer may witness the testing of the safety systems to verify satisfactory operation.

4. The Boiler Safety Manager, upon the recommendation of the Boiler Safety Officer, will authorize that the plant be registered as General Supervision or Risk Assessed Status plant operation. A General Supervision or Risk Assessed status plant registration certificate will also be issued at this time.

The plant under General Supervision or Risk Assessed status can operate under terms and conditions as laid out in the review report(s). The plant must meet all those terms and conditions at all times in order to remain under this program.

5. The General supervision or Risk Assessed status plant registration certificate is issued for two years. The plant may be subject to a review prior to the renewal of the registration or at any time if determined as necessary by a Boiler Safety Officer.
6. At the expiry of the plant registration certificate, certificate renewal is required upon payment of renewal fee. This may be done with or without a review.
7. At any time the owner of the plant may withdraw their registration and go back to continuous supervision or BC Safety Authority may cancel the registration for reason(s).
8. The review fees are comprised of:
  - Application processing fee (one time)
  - Initial review fee including travel costs for two inspector plus hourly rate for time spent at site
  - Bi-annual renewal fee
  - Review fees for travel cost plus hourly rate for time spent at site if a review is carried out before registration renewal.

## Process Flow Chart



## **SECTION “B”**

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### ***Minimum Schedule of Controls***

As boilers, pressure vessels, and refrigeration plants vary to a great extent in individual design and operational features, it is not possible to list the exact type, make, or model, of automatic controls and other electronic monitoring devices needed to safeguard all installations.

Based on historical data and practical operating experience of plants, and records indicating principal causes of accidents, minimum mandatory control requirements have been established. These minimum requirements will comprise the main additional safety features when plants are run on automated and/or computerized safety control systems, without full time continuous attendance by power engineers and/or operators. The control and alarm/notification system used in a plant must be acceptable to the review team.

Where audio-visual alarms and/or other approved visual read-out systems are employed, they must be located in the boiler room or refrigeration machinery room, as well as outside an entrance to the room, selected by the owner, which is acceptable to the review team. The plant must have visual and audio alarms that may be equipped with silencing buttons located in their immediate vicinities.

### ***Testing And Maintenance Requirements***

Once a plant is installed and its minimum schedule of controls established for safe operation, periodic testing of all controls and safety devices becomes necessary to determine that they are operating as designed.

To ensure safe operation of the controls, the owner must:

- Plan inspection and testing activities on a periodic basis.
- Inspect and test as planned, recording all results.
- Promptly initiate corrective action in the event of non-conformance or malfunction of any equipment.
- Maintain records, log books, and bound diaries as evidence that tests, inspections and corrective actions are carried out in accordance with the plan, showing the date of test/inspection, non-conformance, basis of acceptance, identity of the items tested and inspected, the action taken and the name of the power engineer or licensed contractor who made the tests, adjustments, or corrective actions.
- Carry out a preventative maintenance program in accordance with the manufacturers' guidelines and all pertinent safety codes. This maintenance shall be done by a power engineer or licensed contractor of the required class.
- Keep records of all maintenance work performed on the plant.
- On approval of General Supervision or Risk Assessed Status operation provide the BC Safety Authority with a letter stating the name and qualifications of the certified individual

or the name and license number of the current British Columbia licensed contractor hired to perform all repairs and major maintenance to the equipment in the plant, or the Registration Number of the qualified person, responsible for the maintenance program if the work is performed by in-house personnel.

The intent of the testing and maintenance requirements is for owners to develop and implement a 'Preventative Maintenance Program' of their own. The exact structure of a maintenance program must be developed based on the type and complexity of the controls and equipment in the plant. Nevertheless, a guideline can be developed allowing owners to recognize the basic minimum mandatory testing and maintenance schedule necessary and vital to prevent where possible, the occurrence of failures, accidents, and explosions. Also, all alarms and controls must be monitored and responded to.

### ***Minimum Requirements of Automatic Control Devices for Boilers***

All boilers must meet the requirements of ASME CSD-1 or NFPA 85 Boiler and Combustion Systems Hazards Code, current editions and in addition have the following additional control devices:

#### **Low Water Cut-off Control**

This low water cut-off device is in addition to, and independent of, the one(s) normally required on a unit of certain size or type and must serve no other purpose but fuel cut-off. The device, in addition to its normal function of burner shut-down, must initiate an audio-visual alarm. The low water cut-off must have a manual reset.

All alarms must be connected to a paging system. The paging system must alert a power engineer(s) with the required certificate of qualification who can respond to the alarm.

### ***Minimum Requirements of Automatic Control Devices for Refrigeration Plants***

A refrigeration plant is also be eligible for registration as a General Supervision or Risk Assessed status operation as specified in Section "A".

The following provides a listing of minimum control and alarm requirements for refrigeration plants. There must be continuous monitoring of refrigerant levels in the machinery room and if the refrigerant is used outside the machinery room, additional refrigerant detectors will be required.

#### **High Compressor Discharge Pressure Alarm**

These alarms must alert locally within the machinery room and to a paging system.

#### **High Level Alarm Suction Trap: Non-Critically-Charged Systems**

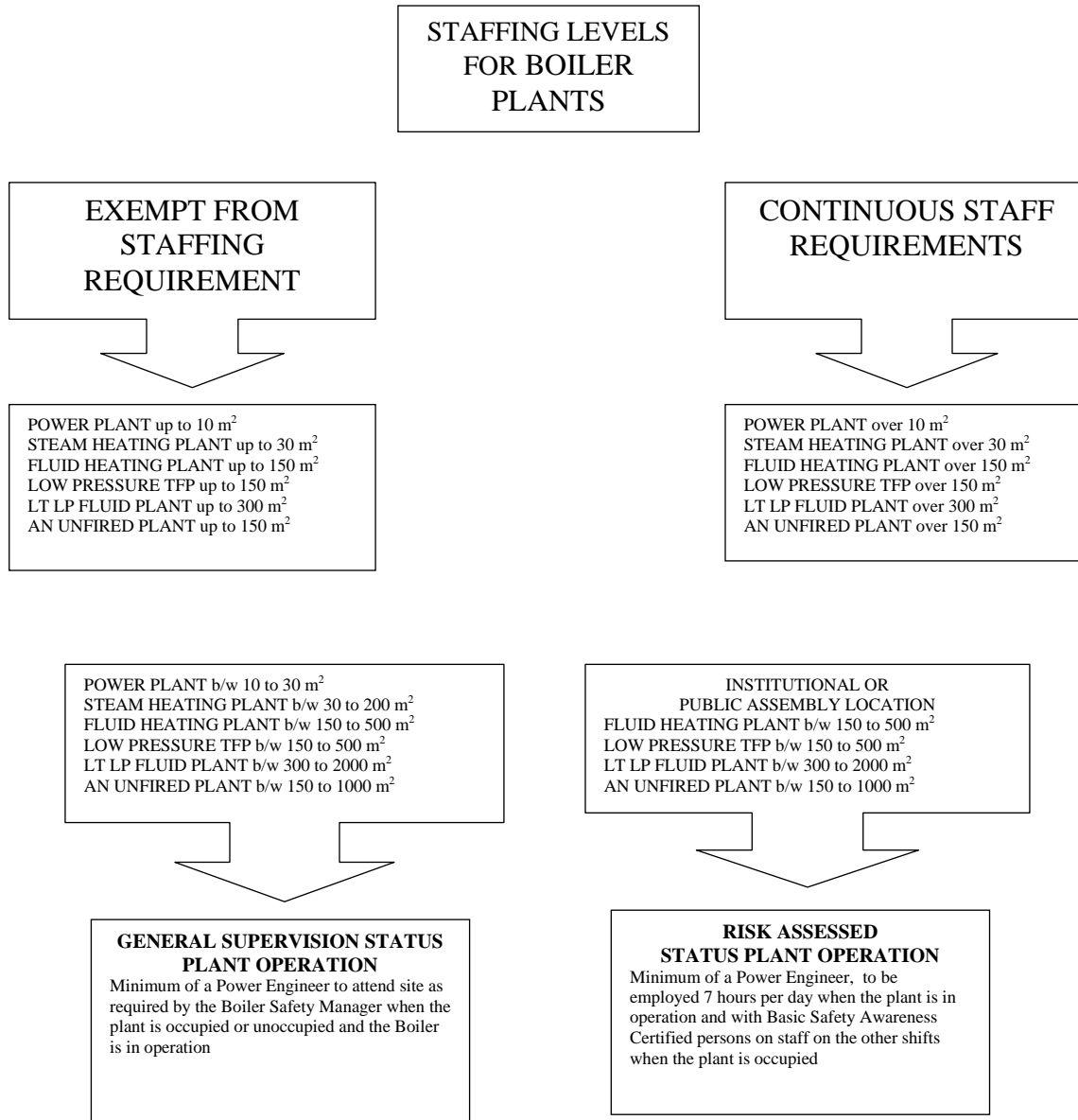
These alarms must alert locally within the machinery room and to a paging system.

#### **Ammonia Monitoring for Safety**

The ventilation system must be equipped with an audio-visual alarm to indicate failure of the system. In continuous operating systems, an air-proving device interlocked to shut down the refrigeration equipment must be used to verify the operation of the ventilation



system. Periodic tests of detector(s), alarm(s), and mechanical ventilating system must be performed in accordance with manufacturers' recommendations and/or requirements of the regulatory authority having jurisdiction. All alarms must be connected to a paging system. The paging system must alert a power engineer(s) with the required certificate of qualification or a refrigeration operator(s).



**NOTES:**

1. Public Assembly Buildings and Facilities may qualify ONLY under the risk assessed plant registration Program.
2. Plants wishing to operate under non-continuous staffing levels must meet the capacity criteria and undergo an audit.
3. A plant audit does not guarantee reduced staffing levels.
4. Plants must maintain the same conditions as demonstrated in the audit in order to maintain their plant registration status.
5. Any changes to plant capacity, operating hours, certified personnel, plant production and other variables must be reported to the British Columbia Safety Authority.
6. When changes do occur, a new audit may be conducted in order to recertify the plant registration.
7. All plants will be audited on a periodic frequency to be established by the Boiler Safety Manager.

**Figure 1**

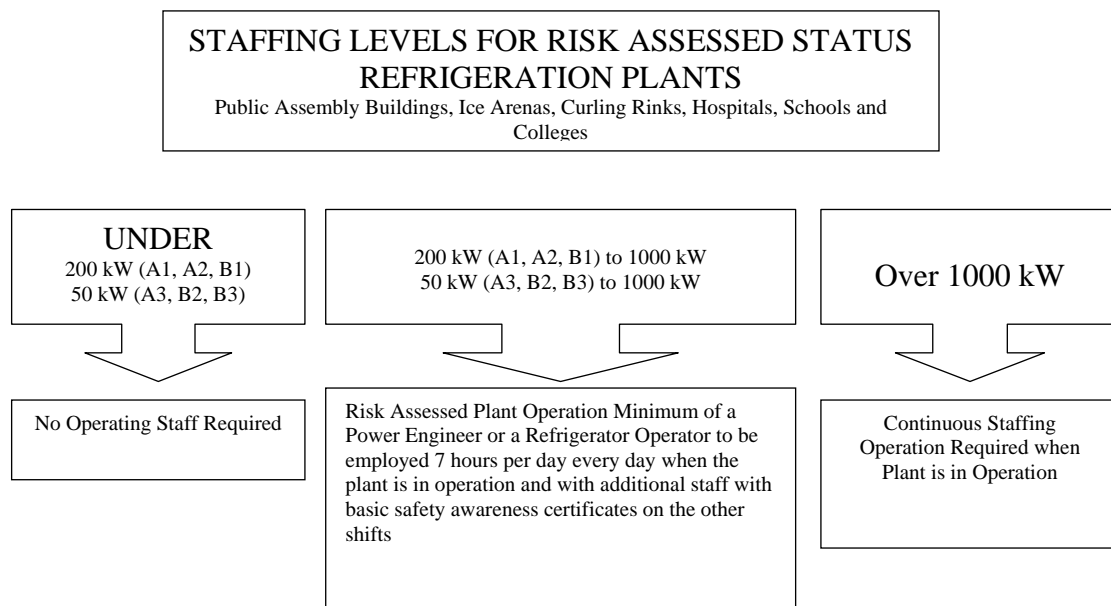
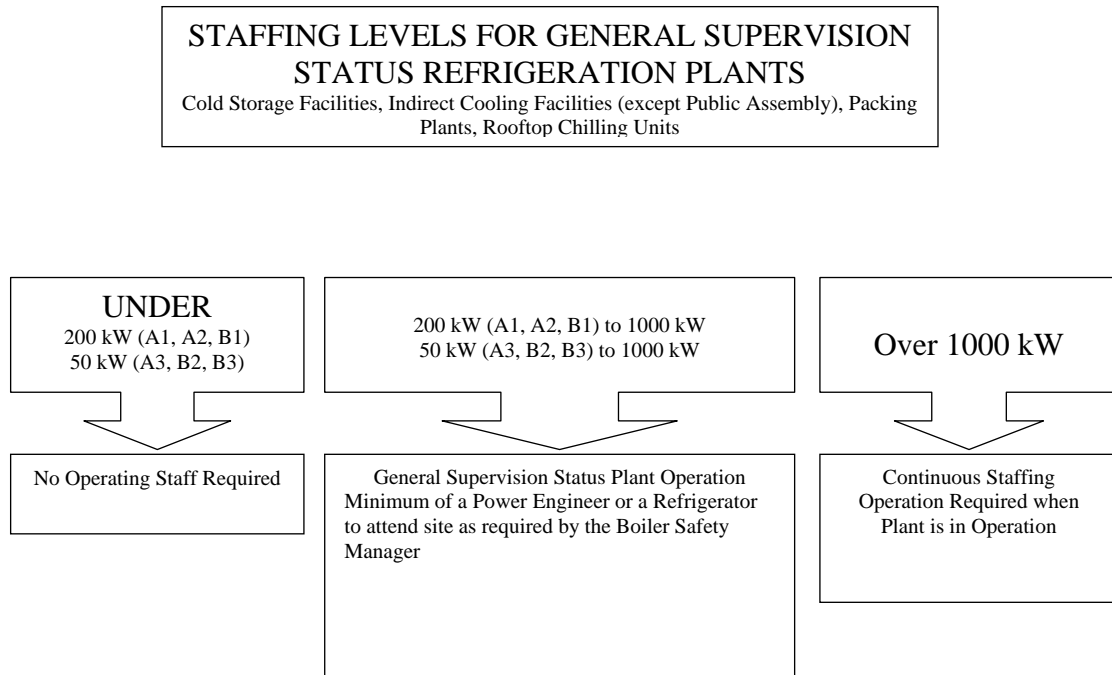


Figure 2



**NOTE 2:**

1. Refrigeration Plants applying for reduced staff levels must be audited by the BC Safety Authority and registered for either a General Supervision Status Plant operation, or a Risk Assessed Plant Status Operation.
2. Plants must maintain the same conditions as demonstrated in the audit in order to maintain their plant registration status.
3. Any changes to plant capacity, operating hours, certified personnel, plant production and other variables must be reported to the BC Safety Authority.
4. When changes do occur, a new audit may be conducted in order to recertify the plant registration.
5. All plants will be audited on a periodic frequency to be established by the Boiler Safety Manager.
6. Plants operating under the Risk Assessed Plant Operation, or General Supervision Status, will be required to have additional monitoring equipment and safety protection devices such as refrigeration leak sensors, room temperature and pressure sensors, and other safety devices as may be required by the Boiler Safety Officer to achieve the equivalent level of safety.

## ***Plant Audit Guideline***

### **Purpose:**

The purpose of this guideline is to provide minimum requirements for Special Plant Registration. The plant may require additional requirements based on the location, age of the plant, employees experience and technology. This is for guidance only and should not be taken as a guarantee for the successful audit.

### **1. Installation**

- Plant meets the applicable code requirements for installation
- All required safety devices are installed, working and tested

### **2. Training Program**

- Written training program
- Training provided on periodic basis and recorded
- Provisions for occupational health and safety requirements as per WorkSafeBC regulations

### **3. Remote monitoring**

- Acceptable arrangements for remote monitoring when plant is not supervised by Power Engineer or Refrigeration Operator

### **4. Traceability**

- All units, safety devices, valves and piping systems are marked with a unique identification which is traceable to the plant drawing operation and layout drawings

### **5. Maintenance Program**

- Written maintenance/inspection program as per manufacturer's recommendation and those of National Board Inspection Code and other related codes/standards adopted under Power Engineers, Boiler, Pressure Vessel and Refrigeration Safety Regulations
- Maintenance contract (if applicable)
- Maintenance activities are identified and deliverable
- Licensed contractor to provide services whenever outsourcing maintenance work

### **6. Emergency preparedness**

- Emergency rescue plan
  - Emergency evacuation procedure
  - Periodic review and drill program
  - Emergency shutdown procedure
  - Emergency contacts
  - Emergency response times must be acceptable
- Response time for emergencies to attend the site when plant is not supervised

## **7. Documentation**

- Copy of latest applicable codes
- Copy of the BC Safety Act and regulations
- Management of plant related reports, log book, contract, services and archiving
- Original certificate of qualification for operator(s) are posted

## **APPENDIX**

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### ***References***

1. D-B6 041206 1 Registration Requirements for Risk Assessed and General Supervision Status Plants Directive.
2. Safety Standards Act - Section 30
3. Power Engineers, Boiler, Pressure Vessel and Refrigeration Safety Regulation - Sections 54, 55(1)(d), 56(1)(e)
4. Directive: Registration and permit requirements for Boilers in Heating Plant

## DEFINITIONS

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**"boiler"** means a vessel, in which by the application of heat,

- a.) gas, steam or vapour is capable of being generated and pressurized, or
- b.) a liquid is capable of being pressurized or heated

and includes fittings and boiler external piping associated with the vessel;

**"high pressure steam plant"** means an assembly of one or more boilers and includes ancillary equipment, the pressure piping system and a pressure plant, in which steam or vapour is generated at a pressure greater than 103 kPa;

**"power plant"** means a high pressure steam plant or a high pressure thermal fluid plant or a high temperature high pressure fluid plant;

**"low pressure steam plant"** means an assembly of one or more boilers and includes ancillary equipment, the pressure piping system and a pressure plant, in which steam or vapour is generated at a pressure not exceeding 103 kPa;

**"steam heating plant"** means a heating plant that generates steam or vapour;

**"heating plant"** means

- a.) an assembly of one or more boilers in which steam or other vapour may be generated at a pressure not exceeding 103 kPa, or
- b.) means an assembly of one or more boilers, other than a low-temperature, low-pressure boilers, in which water or an aqueous solution may be heated to a pressure not exceeding 1 100 kPa or a temperature not exceeding 121°C;

**(Directive .....)**

**"fluid heating plant"** means a heating plant that heats fluid without vapourizing the fluid;

**"low pressure thermal fluid plant"** means an assembly of one or more thermal fluid boilers that do not contain an expansible fluid and are protected with temperature control and safety devices that will not permit the boilers to continue to operate should the temperature rise to or above the vapour point of the contained thermal fluid at atmospheric pressure;

**"low temperature low pressure fluid plant"** means an assembly of one or more boilers, including ancillary equipment, that contain liquid and operate at a working pressure of 206 kPa or less and a temperature of 100°C or less;

**"unfired plant"** means a plant where heat from gas, steam or vapour or other heating medium is supplied to heat exchangers or used directly for the purpose of heating a facility or a process without combustion of a solid, liquid or gaseous fuel taking place on the premises;

**"refrigeration plant"** means an assembly of refrigeration equipment and includes a pressure plant connected to it;

## Revision History

Revision	Revision Date	Revision history	Revised by
00	2004/12/10	New release	Alina Urloiu
01	2005/05/09	Revised the section on “Low Water Cut-off Control” to align with Section 55 (1) (c) (i) of the PEBPVR Safety Regulation	Alina Urloiu
02	2006/03/03	Revised language usage and grammatical inconsistencies	Stephanie Salido
03	2012/02/06	Revised to reflect changes in the regulations and further requirement under this program	Shabbir Ahmed

## Approval

This document has been approved for adequacy by:

Ed Hurd

March 12, 2012

*Safety Manager, Boilers and Pressure Vessels*