NRC·CNRC Administrative Services and Property Management

SPECIFICATIONS

SOLICITATION #: 15-22191

BUILDING: M-6
1200 Montreal Road Campus
Ottawa, Ontario

PROJECT: M-6 Boilers #1 & #3 Upgrade

PROJECT #: M6-5042

Date: March 2015

National Research Council Canada | Conseil national de recherches Canada

Canada

SPECIFICATION

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NRC·CNRC

From **Discovery** to **Innovation...**

Directions to the Ottawa Research Facilities — Montreal Road

1200 Montréal Road
Ottawa, Ontario, Canada K1A 0R6

Tel: 613-993-9101

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By Road, from the OTTAWA International Airport

1. From the airport take the AIRPORT PARKWAY to RIVERSIDE DR EAST
2. Follow RIVERSIDE DR EAST to HIGHWAY 417 EAST
3. Take HIGHWAY 417 EAST, past the ST-LAURENT BLVD exit, where HIGHWAY 417 splits, continue LEFT on HIGHWAY 174 (ROCKLAND)
4. Exit HIGHWAY 174 on BLAIR RD NORTH
5. Proceed on BLAIR RD NORTH, cross OGILVIE RD, and continue on to the traffic lights at the intersection of BLAIR and MONTREAL RD
6. Turn left onto MONTREAL RD and take the first immediate right onto the ramp leading down to the traffic circle. Stop at Building M-1 on the north side of the traffic circle. Ask the commissionaires in M-1 for directions to the NRC building, institute or staff member you seek.

By Road, from MONTRÉAL

1. Take MÉTROPOLITAIN 40 WEST and follow signs for OTTAWA and HIGHWAY 417 WEST
2. Follow 417 WEST to reach OTTAWA
3. Exit at HIGHWAY 174 EAST (ROCKLAND) when entering OTTAWA
4. Follow 174 EAST and exit at BLAIR RD NORTH (first exit after entering 174 EAST)
5. Follow BLAIR RD NORTH, cross OGILVIE RD, and continue on to the traffic lights at the intersection of BLAIR and MONTREAL RD
6. Turn left onto MONTREAL RD and take the first immediate right onto the ramp leading down to the traffic circle. Stop at Building M-1 on the north side of the traffic circle. Ask the commissionaires in M-1 for directions to the NRC building, institute or staff member you seek.


1 Sussex Facilities
2 Montreal Road Facilities
3 Uplands Facilities
4 NRC-CSTT
N
GATINEAU
OTTAWA
QUÉBEC
ONTARIO
Outaouais
Aylmer
Taché
Rockcliffe
Montréal
Vanier
Aviation
Blair
Sussex
Wellington
Bank
Bronson
Island Park
Ottawa River
Carling
Fisher
Prince of Wales
Walkley
Heron
Hawthorne
Hunt Club
Baseline
Riverside
Conroy
Airport
Uplands
Lester
Davidson
Albion
Hunt Club (W)
Merivale
Woodroffe
Greenbank
Fallowfield
Leitrim
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417
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73
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416
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NRC Institute
Trans Canada HWY
Major HWY
Secondary HWY
Airport
Train Station
Ferry
Bus Station
Metro


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Leggett
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Montréal
17B
Montréal
Mackenzie
Macallum
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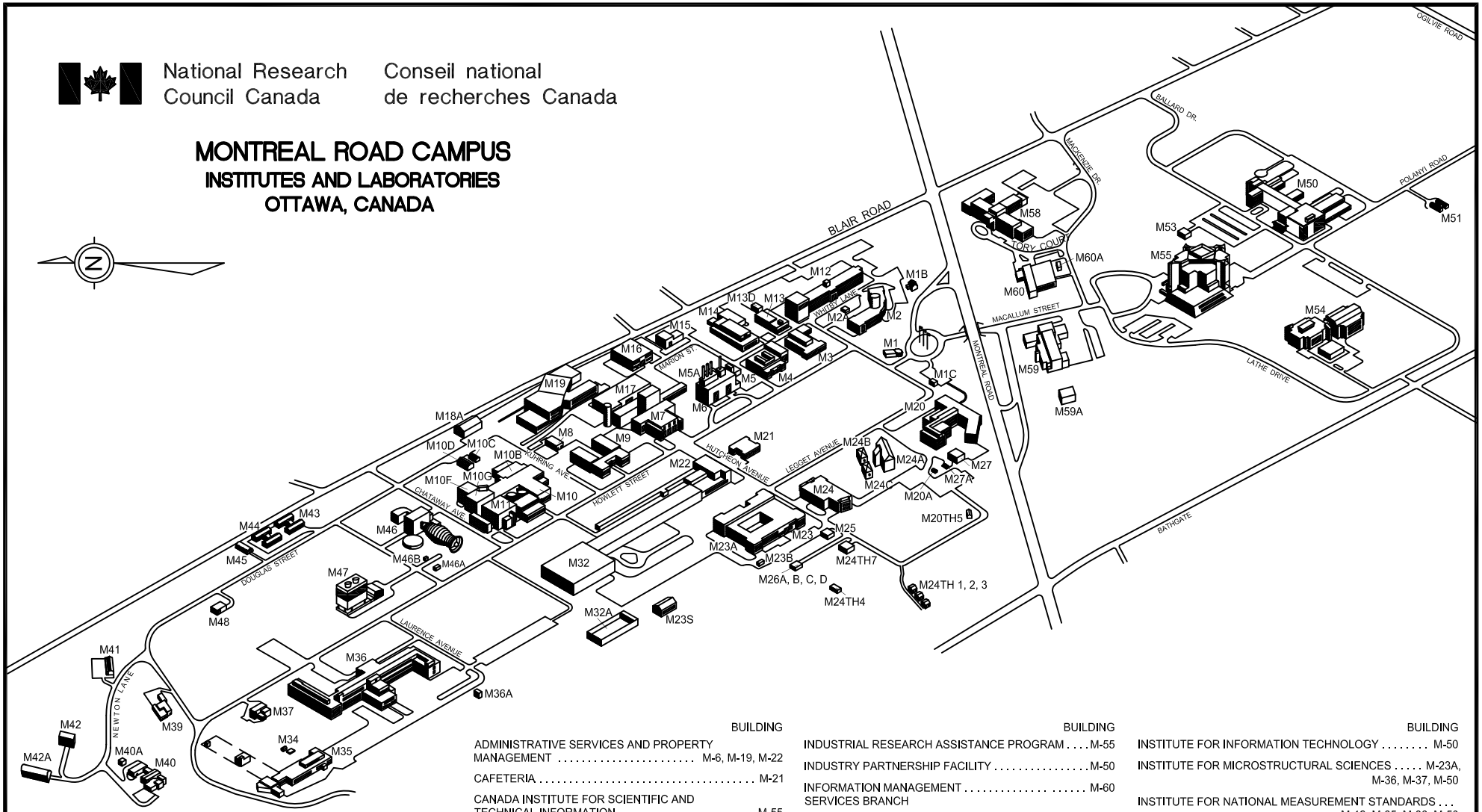
NRC Institute
Major HWY
Airport
Ferry
Metro
Trans Canada HWY
Secondary HWY
Train Station
Bus Station

National Research Council Canada | Conseil national de recherches Canada

MONTREAL ROAD CAMPUS
INSTITUTES AND LABORATORIES
OTTAWA, CANADA



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Updated: July 2008

National Research Council Canada	Conseil national de recherches Canada
Administrative Services & Property management Branch (ASPM)	Direction des services administratif et gestion de l'immobilier (SAGI)

Construction Tender Form

Project Identification **M-6 Boilers #1 & #3 Upgrade**

Tender No.: **15-22191**

1.2 **Business Name and Address of Tenderer**

Name_____

Address_____

_____

Contact Person(Print Name)_____

Telephone (_____) _____ **Fax**: (_____) _____

1.3 Offer

I/We the Tenderer, hereby offer to Her Majesty the Queen in Right of Canada (hereinafter referred to as "Her Majesty") represented by the National Research Council Canada to perform and complete the work for the above named project in accordance with the Plans and Specifications and other Tender Documents, at the place and in the manner set out therein for the Total Tender Amount (to be expressed in numbers only) of**: $_____. _____ in lawful money of Canada (excluding GST/HST)**

The above amount is inclusive of all applicable (*) Federal, Provincial and Municipal taxes except that in the event of a change in any tax imposed under the Excise Act, the Excise Tax Act, the Old Age Security Act, the Customs Act, the Customs Tariff or any provincial sales tax legislation imposing a retail sales tax on the purchase of tangible personal property incorporated into Real Property, that occurs

.1 after the date this tender was mailed or delivered, or
.2 if this tender is revised, after the date of the last revision

the amount of this offer shall be decreased or decreased in the manner provided for in GC22 of the General Conditions of the Contract Documents.

1.3.1 Offer (continued)

(*) For the purpose of this tender, the Goods and Services Tax (GST) is not to be considered as an applicable tax.

In the province of Quebec, the Quebec Sales Tax is not to be included in the tender amount because the Federal Government is exempt from this tax. Tenderers shall make arrangements directly with the provincial Revenue Department to recover any tax they may pay on good and servives acquired in the performance of this contract. However, tenderers should include in their tender amount Quebec Sales Tax for which an Input Tax Refund is not available.

1.4 Acceptance and Entry into Contract

I/We undertake, within fourteen (14) days of notification of acceptance of my/our offer, to sign a contract for the performance of the work provided I/we are notified, by the Department, of the acceptance of my/our offer within 30 days of the tender closing date.

1.5 Construction Time

I/We Agree to complete the work within the time stipulated in the specification from the date of notification of acceptance of my/our offer.

1.6 Bid Security

I/We herewith enclose tender security in accordance with Article 5 of the General Instruction to Tenderers.

I/We understand that if a security deposit is furnished as tender security and if I/we refuse to enter into a contract when called upon to do so, my/our security deposit shall be forfeited but the Minister may, if it is in the public interest, waive the right of Her Majesty to forfeit the security deposit.

I/We understand that if the security furnished is not in the approved from as described in Article 5 of the General Instructions to Tenderers, my/our tender is subject to disqualification.

1.7 Contract Security

Within fourteen (14) days after receipt of written notification of the acceptance of my/our offer, I/we will furnish contract security in accordance with the Contract Conditions "F" of the Contract Documents.

I/We understand that the contract security referred to herein, if provided in the form of a bill of exchange, will be deposited into the Consolidated Revenue Fund of Canada.

1.8 Appendices

This Tender Form includes Appendix No. _____N/A_____.

1.9 Addenda

The Total Tender Amount provides for the Work described in the following Addenda:

NUMBER	DATE	NUMBER	DATE

(Tenderers shall enter numbers and dates of addenda)

1.10 Execution of Tender

The Tenderer shall refer to Article 2 of the General Instructions to Tenderers.

SIGNED, ATTESTED TO AND DELIVERED on the _____day of _____on behalf of

_____

(Type or print the business name of the Tenderer)

AUTHORIZED SIGNATORY (IES)

_____

(Signature of Signatory)

_____

(Print name & Title of Signatory)

_____

(Signature of Signatory)

_____

(Print name & Title of Signatory)

SEAL

BUY AND SELL NOTICE

M-6 Boilers #1 & #3 Upgrade

The National Research Council Canada, 1200 Montreal Road Campus, Ottawa, ON has a requirement for a project that includes:

The general scope of work for this project involves the TSSA field approval of Boiler#1 and Boiler #3, which involves but is not limited to all required mechanical, electrical and controls work associated with the following: replacement of main shut-off valves, modifications and rework of the existing fuel trains and/or vent piping, demolition and re-work to the existing controls, installation of a VFD for Boiler#1 and all associated instrumentation and controls modifications.

1. GENERAL

Questions regarding any aspect of the project are to be addressed to and answered only by the Departmental Representative (or his designate) or the Contracting Authority.

Any information received other than from the Departmental Representative (or his designate) or the Contracting Authority will be disregarded when awarding the contract and during construction.

Firms intending to submit tenders on this project should obtain tender documents through the Buyandsell.gc.ca TMA services provider. Addenda, when issued, will be available from the Buyandsell.gc.ca TMA service provider. Firms that elect to base their bids on tender documents obtained from other sources do so at their own risk and will be solely responsible to inform the tender calling authority of their intention to bid. Tender packages are not available for distribution on the actual day of tender closing.

2. MANDATORY SITE VISIT

It is mandatory that the bidder attends one of the site visits at the designated date and time. At least one representative from proponents that intend to bid must attend.

The site visits will be held on March 16th and March 17th 2016 at **9:00** . Meet Marco Pozzebon at Building M-6, Main Entrance, 1200 Montreal Road, Ottawa, ON. Bidders who, for any reason, cannot attend at the specified date and time will not be given an alternative appointment to view the site and their tenders, therefore, will be considered as non-responsive. **NO EXCEPTIONS WILL BE MADE.**

As proof of attendance, at the site visit, the Contracting Authority will have an Attendance Form which MUST be signed by the bidder's representative. It is the responsibility of all bidders to ensure they have signed the Mandatory Site Visit Attendance form prior to leaving the site. Proposals submitted by bidders who have not attended the site visit or failed to sign the Attendance Form will be deemed non-responsive.

3. CLOSING DATE

Closing date is April 4th , 2016 at 14:00.

4. TENDER RESULTS

Following the Tender closing, the tender results will be sent by facsimile to all Contractors who submitted a tender

5. SECURITY REQUIREMENT FOR CANADIAN CONTRACTORS

5.1 MANDATORY SECURITY REQUIREMENT:

This procurement contains a mandatory security requirement as follows:

1 The Contractor must, at all times during the performance of the Contract, hold a valid Designated Organization Screening (DOS), issued by the Canadian Industrial Security Director (CISD), Public Works Government Services Canada.

2 The Contractor personnel requiring access to sensitive work site(s) must EACH hold a valid RELIABILITY STATUS, granted or approved by CISD/PWGSC.

3 The Contractor must comply with the provisions of the:

a. Security Requirements Checklist attached at Appendix "D"

b. Industrial Security Manual (Latest Edition) available at: http://ssi-iss.tpsgc-pwgsc.gc.ca/ssi-iss-services/eso-oss-eng.html

5.2 VERIFICATION OF SECURITY CLEARANCE AT BID CLOSING

1 The Bidder must hold a valid Designated Organization Screening (DOS) issued by the Canadian Industrial Security Directorate (CISD), Public Works and Government Services Canada (PWGSC), TO BE INCLUDED WITH THEIR TENDER OR PROVIDED WITHIN 48 HOURS FROM THE DATE AND TIME OF TENDER CLOSING. Verifications will be made through CISD to confirm the security clearance status of the Bidder. Failure to comply with this requirement will render the bid non-compliant and no further consideration will be given to the bid.

2 Within 72 hours of tender closing, the General Contractor must name all of his sub-contractors, each of whom must hold a valid RELIABILITY STATUS, granted or approved by CISD/PWGSC, or any other Federal Department or Agency along with the names and birthdates or security clearance certificate numbers of all personnel who will be assigned to the project.

3 It is to be noted that any subcontractor required to perform any part of the work during the performance of the subsequent contract must also adhere to the mandatory security requirement of the contract. As well, no personnel without the required level of security will be allowed on site. It will be the responsibility of the successful bidder to ensure that the security requirement is met throughout the performance of the contract. The Crown will not be held liable or accountable for any delays or additional costs associated with the contractor's non-compliance to the mandatory security requirement. Failure to comply with the mandatory security requirement will be grounds for being declared in default of contract.

4 For any enquiries concerning the project security requirement during the bidding period, the Bidder/Tenderer must contact the Security Officer @ 613-993-8956.

6.0 WSIB (WORKPLACE SAFETY AND INSURANCE BOARD)

1 All Bidders must provide a valid WSIB certificate with their Tender or prior to contract award.

7.0 OFFICE OF THE PROCUREMENT OMBUDSMAN

1 Dispute Resolution Services
The parties understand that the Procurement Ombudsman appointed pursuant to Subsection 22.1(1) of the *Department of Public Works and Government Services Act* will, on request or consent of the parties to participate in an alternative dispute resolution process to resolve any dispute between the parties respecting the interpretation or application of a term and condition of this contract and their consent to bear the cost of such process, provide to the parties a proposal for an alternative dispute resolution process to resolve their dispute. The Office of the Procurement Ombudsman may be contacted by telephone at 1-866-734-5169 or by e-mail at boa.opo@boa-opo.gc.ca.

2 Contract Administration
The parties understand that the Procurement Ombudsman appointed pursuant to Subsection 22.1(1) of the *Department of Public Works and Government Services Act* will review a complaint filed by [*the supplier or the contractor or the name of the entity awarded this contract*] respecting administration of this contract if the requirements of Subsection 22.2(1) of the *Department of Public Works and Government Services Act* and Sections 15 and 16 of the *Procurement Ombudsman Regulations* have been met, and the interpretation and application of the terms and conditions and the scope of the work of this contract are not in dispute. The Office of the Procurement Ombudsman may be contacted by telephone at 1-866-734-5169 or by e-mail at boa.opo@boa-opo.gc.ca.

3 The Office of the Procurement Ombudsman (OPO) was established by the Government of Canada to provide an independent avenue for suppliers to raise complaints regarding the award of contracts under $25,000 for goods and under $100,000 for services. You have the option of raising issues or concerns regarding the solicitation, or the award resulting from it, with the OPO by contacting them by telephone at 1-866-734-5169 or by e-mail at boa.opo@boa-opo.gc.ca. You can also obtain more information on the OPO services available to you at their website at www.opo-boa.gc.ca.

The Departmental Representative or his designate for this project is: **Marco Pozzebon**
Telephone: **613 998-7849**

Contracting Authority for this project is: **Marc Bédard marc.bedard@nrc-cnrc.gc.ca**
Telephone**: 613 993-2274**

INSTRUCTIONS TO BIDDERS

Article 1 – Receipt of Tender

1a) Tenders must be received not later than the specified tender closing time. Tenders received after this time are invalid and shall not be considered, regardless of any reason for their late arrival.

1b) A letter of printed telecommunication from a bidder quoting a price shall not be considered as a valid tender unless a formal tender has been received on the prescribed Tender Form.

1c) Bidders may amend their tenders by letter or printed telecommunication provided that such amendments are received not later than the specified tender closing time.

1d) Any amendments to the tender which are transmitted by telefax must be signed and must clearly identify the tenderer.

All such amendments are to be addressed to:
National Research Council of Canada
Marc Bedard, Senior Contracting Officer
Building M-22
Montreal Road, Ottawa, Ontario
K1A 0R6

Fax: (613) 991-3297

Article 2 – Tender Form & Qualifications

1) All tenders must be submitted on the Construction Tender Form and the tender must be signed in compliance with the following requirements:

a) Limited Company: The full names of the Company and the name(s) and status of the authorized signing officer(s) must be printed in the space provided for that purpose. The signature(s) of the authorized officer(s) and the corporate seal must be affixed.

b) Partnership: The firm name and the name(s) of the person(s) signing must be printed in the space provided. One or more of the partners must sign in the presence of a witness who must also sign. An adhesive coloured seal must be affixed beside each signature.

c) Sole Proprietorship : The business name and the name of the sole proprietor must be printed in the space provided. The sole proprietor must sign in the presence of a witness who must also sign. An adhesive coloured seal must be affixed beside each signature.

2) Any alterations in the printed part of the Construction Tender Form or failure to provide the information requested therein, may render the tender invalid.

3) All space in the Construction Tender Form must be completed and any handwritten or typewritten corrections to the parts so completed must be initialed immediately to the side of the corrections by the person or persons executing the tender on behalf of the the tenderer.

4) Tenders must be based on the plans, specifications and tender documents provided.

Article 3 - Contract

1) The Contractor will be required to sign a contract similar to the Standard Contract Form for Fixed Price Construction Contracts, a blank specimen of which is enclosed in the package for reference purposes.

Article 4 – Tender Destination

1a) Tenders are to be submitted in sealed envelopes to:
National Research Council Canada
Administrative Services and Property Management Branch
1200 Montreal Road
Building M-22
Ottawa, ON
K1A 0R6

Endorsed "Tender for (insert title of work as it appears in the drawings and specifications)" and must bear the name and address of the tenderer.

1b) Unless otherwise specified, the only documents required to be submitted with the tender are the Tender form and the Bid Security.

Article 5 - Security

1a) Bid Security is required and must be submitted in one of the following forms:

i) a certified cheque payable to the Receiver General for Canada and drawn on a member of the Canadian Payments Association or a local cooperative credit society that is a member of a central cooperative credit society having membership in the Canadian Payments Association; **OR**

ii) bonds of the Government of Canada, or bonds unconditionally guaranteed as to principal and interest by the Government of Canada; **OR**

iii) a bid bond.

1b) Regardless of the Bid Security submitted, it should never be more than $250,000 maximum, calculated at 10% of the first $250,000 of the tendered price, plus 5% of any amount in excess of $250,000.

2a) Bid Security shall accompany each tender or, if forwarded separately from the tender, shall be provided not later than the specified tender closing time. Bid Security must be in the ORIGINAL form. Fax or photocopies and NOT acceptable. FAILURE TO PROVIDE THE REQUIRED BID SECURITY SHALL INVALIDATE THE TENDER.

2b) If the tender is not accepted, the Bid Security submitted pursuant to Article 8 shall be returned to the tenderer.

3a) The successful tenderer is required to provide security within 14 days of receiving notice of tender acceptance. The tenderer must furnish EITHER:

i) a Security Deposit as described in 1(b) above together with a Labour and Material Payment Bond in the amount of at least 50% of the amout payable under the contract, OR

ii) a Performance Bond and a Labour and Material Payment Bond – each in the amount of 50% of the amount payable under the contract.

3b) Should it not be possible to obtain a Labour Material Payment Bond as required under 3(a) above, on making application thereof to at least two acceptable Bonding Companies, an additional Security Deposit of a straight 10% of the amount payable under the contract must be furnished.

3c) Where a tender has been accompanied by a Security Deposit, as described in 1(b) above, the amount of the Security Deposit required under 3(a) above may be reduced by the amount of the Security Deposit which accompanied the tender.

3d) Bonds must be in an approved form and from the companies whose

bonds are acceptable to the Government of Canada. Samples of the approved form of Bid Bond, Performance Bond and Labour and Material Payment Bond and a list of acceptable Bonding Companies may be obtained from the Contracting Officer, National Research Council, Building M-22, Montreal Road, Ottawa, Ontario, K1A 0R6.

Article 6 – Interest On Security Deposits

1) Tenderers are notified that they must make their own arrangements with their bankers as to the interest, if any, on the amount of the certified cheque accompanying their tender. The Council will not pay interest on said cheque pending the awarding of the contract nor be responsible for the payments of interest under any arrangement made by the tenderers.

Article 7 – Sales Tax

1) The amount of the tender shall include all taxes as levied under the Excise Act, the Excise Tax Act, the Old Age Security Act, the Customs Act or the Customs Tariff, in force or applicable at the time.

2) In Quebec, the Provincial Sales Tax should not be included in the Tender Price as the Federal Government is exempt. Tenderers should contact the Provincial Revenue Minister to recover all taxes paid for goods and services rendered under this contract.

Tenderers must include in their Tender Price the amount of Provincial Sales Tax for which the exemption does not apply.

Article 8 – Examination of Site

1) All parties tendering shall examine the sites of the proposed work before sending in their tender and make themselves thoroughly acquainted with the same and obtain for themselves any and all information that may be necessary for the proper carrying out of the Contract. No after claim will be allowed or entertained for any work or material that may be requisite and necessary for the proper execution and completion of this Contract with the exception of that provided for under GC 35 in the General Conditions of the General Specification.

Article 9 – Discrepancies, Omissions, Etc.

1a) Bidders finding discrepancies in, or omissions from, drawings, specifications or other documents, or having any doubt as to the meaning or intent of any part thereof, should at once notify the Engineer who will send written instructions or explanation to all bidders.

1b) Neither the Engineer nor the Council will be responsible for oral instructions.

1c) Addenda or corrections issued during the time of the bidding shall be covered in the proposal. However, the contract supersedes all communications, negotiations and agreements, either written or oral, relating to the work and made prior to the date of the contract.

Article 10 – No additional Payments for Increased Costs

1) The only other adjustments in the contract price allowed are those specified in the General Conditions of the General Specification. The contract price will not be amended for change in freight rates, exchange rates, wage rates or cost of materials, plant or services.

Article 11 – Awards

1a) The Council reserves the power and right to reject tenders received from parties who cannot show a reasonable acquaintance with and preparation for the proper performance of the class of work herein specified and shown on plans. Evidence of such competence must be furnished by the tenderers if required to do so.

1b) A tenderer may be required to furnish to the Contracting Office, National Research Council of Canada, Building M-22, 1200 Montreal Road, Ottawa, Ontario, K1A 0R6, Canada, unsigned copies of the insurance requirements as covered by the Insurance Conditions of the General Specification.

1c) The Council does not bind itself to accept the lowest or any tender.

Article 12 – Harmonized Sales Tax

1) The Harmonized Sales Tax (HST) which in now in effect shall be considered an applicable tax for the purpose of this tender. However, the bidder shall NOT include any amount in the bid price for said HST. The successful contractor will indicate on each application for payment as a separate amount the appropriate HST the Owner is legally obliged to pay. This amount will be paid to the Contractor in addition to the amount certified for payment under the Contract in addition to the amount certified for payment under the Contract and will therefore not affect the Contract Price. The Contractor agrees to remit any HST collected or due to Revenue Canada.

Non-resident contractors

RST guide 804
Published August 2006
ISBN: 1-4249-2007-8 (Print), **1-4249-2009-4 (PDF), 1-4249-2008-6 (HTML)**

Publication Archived

Notice to the reader: For Retail Sales Tax (RST) – On July 1, 2010 the 13 per cent Harmonized Sales Tax (HST) took effect in Ontario replacing the existing provincial Retail Sales Tax (RST) and combining it with the federal Goods and Services Tax (GST). As a result, RST provisions described on this page and in other publications ended on June 30, 2010.

Effective July 1, 2010 this publication was archived for RST purposes **only**. Use caution when you refer to it, since it reflects the law in force for RST at the time it was released and may no longer apply.

- The information in this Guide explains the Retail Sales Tax (RST) responsibilities of a non-resident contractor who is awarded a construction contract to perform work in Ontario and their Ontario customers. Please note that this Guide replaces the previous version dated March 2001.

Non-Resident Contractor Defined

A non-resident contractor is a contractor located outside Ontario who has been awarded a construction contract to perform work in Ontario, and who has not maintained a permanent place of business in Ontario continuously for twelve months immediately prior to signing the contract, or which is not a company incorporated under the laws of Ontario. A construction contract is a contract for the erection, remodelling or repair of a building or other structure on land.
A contractor is a person who is in the business of constructing, altering, repairing or improving real property and includes, but is not limited to,

1. a general contractor and subcontractor,
2. a carpenter, bricklayer, stonemason, electrician, plasterer, plumber, painter, decorator, paver, and bridge builder,
3. a sheet metal, tile and terrazzo, heating, air conditioning, insulation, ventilating, papering, road, roofing and cement contractor, who installs or incorporates items into real property. (See RST Guide 206 - Real Property and Fixtures).

Registration and Guarantee Deposit

Non-resident contractors who are awarded a construction contract in Ontario are required to register with the Ministry of Finance (ministry), Centralized Programs Unit and post a guarantee equal to 4 per cent of the total of each Ontario contract. The guarantee can be paid in cash, by certified cheque (payable to the Minister of Finance), letter of credit or by a guarantee bond.

To register with the ministry and to obtain further information on posting a guarantee, contractors should contact the ministry's Centralized Programs Unit, 33 King Street West, PO Box 623, Oshawa, Ontario, L1H 8H7, toll-free 1 866 ONT-TAXS (1 866 668-8297) or fax to 905 435-3617.

Non-resident contractors who sell taxable goods on a supply only basis to Ontario customers, or provide taxable services in Ontario, may obtain a regular Vendor Permit to collect and remit RST on their sales. Non-resident contractors who have been issued a regular Vendor Permit must still register separately with the ministry and post a guarantee if they are awarded a construction contract in Ontario.

Letter of Compliance

After receiving the guarantee, the ministry mails out two copies of a "letter of compliance" to the contractor certifying the Retail Sales Tax (RST) requirements have been met. Contractors must give a copy of the letter to their customers.

If a copy of the compliance letter is not provided, the customer must withhold 4 per cent of all amounts payable to the non resident contractor and pay the withheld amounts to the Minister of Finance (minister). Details relating to the contract should be sent along with the payments to the Centralized Programs Unit. Customers may give the minister a guarantee bond equal to 4 per cent of the total contract price instead of making the 4 per cent payments.

Note: Customers who do not follow these requirements may be held liable for 4 per cent of all amounts payable to the non resident contractor or any other amount that the Ministry deems to be the RST payable resulting from the performance of the contract.

Calculation of RST

Fair Value

RST is payable on the "fair value" of materials, purchased or brought into Ontario, to be used for work performed in Ontario. "Fair value" includes:

- the purchase price in Canadian funds;
- all charges by the supplier for handling and delivery, and
- any federal customs duties and excise taxes paid (but not the federal Goods and Services Tax (GST)).

Contractors are also required to pay RST to Ontario suppliers on the purchase, rental or lease of taxable services, materials, machinery, or equipment.

Machinery and Equipment - Leased

If machinery or equipment is leased from a supplier outside Ontario and brought into the province, RST is payable on the lease payments for the period the machinery or equipment is in Ontario.

Machinery and Equipment - Owned by Contractor

If machinery or equipment is owned by the contractor, RST may be calculated in one of the following ways:

a. If a contractor brings machinery and equipment into Ontario for less than 12 months' use, RST is to be calculated using the following formula:

   1/36 × net book value at date of import × number of months in Ontario × tax rate

   For the purpose of this formula, RST is payable for each month or part of a month that the goods are in Ontario. A month is considered 31 consecutive days and a part month is considered more than 12 days. The RST payable is based on the number of days the machinery and equipment are located in Ontario and not the number of days the items are actually used.

Example: Equipment is brought into Ontario on March 28 and taken out on May 8. The items were in the province for 41 days. RST is payable on the first 31 days' temporary stay in Ontario vs. use of the equipment. Since the remainder (10 days) is not considered part of a month, no RST is payable on this portion.

b. If, at the time the goods are brought into Ontario, it is expected that the machinery or equipment will be in Ontario for more than twelve months, contractors must pay Retail Sales Tax (RST) on the following basis:

   net book value at date of import × tax rate

   If, at the time of import, the length of time is not known, vendors may use the formula under (a). If they later find it necessary to keep the machinery and equipment in Ontario for more than 12 months, the RST paid under (a) may be deducted from the RST payable under (b).

Using formula (a) or (b) above, contractors will calculate and remit the RST payable on the return that is filed when the contract is finished.

(See Completion of Contract section)

Manufacturing for Own Use

Contractors may need to manufacture items, such as doors and windows, for their construction contracts. Manufacturing is work done in a factory away from a construction site, or in a mobile unit or workshop that is on or near the construction site. Manufacturing occurs when raw materials are changed into manufactured goods for use in real property contracts.

Contractors are considered to be manufacturing contractors if they produce goods:
1. for their own use in real property contracts, and
2. the manufactured cost of the goods is more than $50,000 a year.

(See RST Guide 401 - Manufacturing Contractors)

Contracts with the Federal Government

Where a non-resident contractor enters into a construction contract with the federal government, for the construction of a building and/or the installation of equipment, the nature of the equipment will determine whether the contract should be let on a tax-included or tax excluded basis.

Contracts for the construction of a building and the installation of equipment that directly services that building (i.e., elevators, escalators, light fixtures, central heating and air conditioning, etc.) should be tendered on a tax -included basis. Contractors are the consumers of the materials used in fulfilling these contracts and must pay or account for RST on the materials used to complete the contracts. There is NO exemption just because the contract is with the federal government.

Contracts for the installation of equipment that becomes a fixture and does not directly service a building (i.e., material handling equipment, production machinery, communication equipment, training equipment) may be tendered on a tax-excluded basis. Contractors engaged in contracts of this nature are permitted to make tax exempt purchases of such equipment by issuing a valid Purchase Exemption Certificate (PEC) to their supplier. Only non-resident contractors who have registered with the ministry and posted a guarantee may issue a PEC.

Exemptions

Contractors may supply and install equipment or materials for certain customers that may be entitled to an exemption from RST (e.g., manufacturers, Indian band councils, farmers and diplomatic organizations). The equipment or materials, when installed, becomes real property if it is permanently attached to land, or a fixture if it is permanently attached to a building or real property structure. Since

contractors are liable for RST, they should contact the ministry to find out if the customer qualifies for exemption before tendering the contract on a tax-excluded basis.

Status Indians, Indian Bands and Band Councils

Non-resident contractors may purchase building materials exempt from Retail Sales Tax (RST) for certain buildings and structures situated on reserves. The cost of such projects must be paid by the band council, and the buildings must provide a community service for the reserve. Contracts for the construction of an exempt community building project should be made on an RST-excluded basis. Non-resident contractors may purchase the materials exempt from RST by providing suppliers with a valid Purchase Exemption Certificate (PEC). As noted previously, only non-resident contractors who have registered with the ministry and posted a guarantee may issue a PEC. (See RST Guide 204 - Purchase Exemption Certificates).

Non-resident contractors must pay RST on items purchased for incorporation into a building or structure built for individual status Indians on a reserve. (See RST Guide 808 - Status Indians, Indian Bands and Band Councils).

Completion of Contract

When a contract is completed, non-resident contractors who were required to post a guarantee must complete a Non-Resident Contractor Retail Sales Tax Return [PDF - 92 KB] that is provided by the ministry.

If a contractor's guarantee was given in cash or by certified cheque, the amount of the deposit can be deducted from the RST liability owed by the contractor. If the liability is greater than the deposit, the amount remaining must be paid by the contractor. If the deposit is more than the liability, the contractor will receive a refund.

If a guarantee bond was posted instead of cash, the bond will be discharged once the RST liability is paid in full.

All returns are subject to audit.

Legislative References

- Retail Sales Tax Act, Subsections 19(2) and 39(3)(4) and (5)
- Regulation 1012 under the Act, Subsections 15.3(1)(2)(5)(6) and (7)
- Regulation 1013 under the Act, Sections 1 and 3

For More Information

The information contained in this publication is only a guideline. For more information, please contact the Ontario Ministry of Finance at 1 866 ONT-TAXS (1 866 668-8297) or visit our website at ontario.ca/finance.

Acceptable Bonding Companies

Published September 2010

The following is a list of insurance companies whose bonds may be accepted as security by the government.

1. Canadian Companies

- ACE INA Insurance
- Allstate Insurance Company of Canada
- Ascentus Insurance Ltd. (Surety only)
- Aviva Insurance Company of Canada
- AXA Insurance (Canada)
- AXA Pacific Insurance Company
- Canadian Northern Shield Insurance Company
- Certas Direct Insurance Company (Surety only)
- Chartis Insurance Company of Canada (formerly AIG Commercial Insurance Company of Canada)
- Chubb Insurance Company of Canada
- Commonwealth Insurance Company
- Co-operators General Insurance Company
- CUMIS General Insurance Company
- The Dominion of Canada General Insurance Company
- Echelon General Insurance Company (Surety only)
- Economical Mutual Insurance Company
- Elite Insurance Company
- Everest Insurance Company of Canada
- Federated Insurance Company of Canada
- Federation Insurance Company of Canada
- Gore Mutual Insurance Company
- Grain Insurance and Guarantee Company
- The Guarantee Company of North America
- Industrial Alliance Pacific General Insurance Corporation
- Intact Insurance Company
- Jevco Insurance Company (Surety only)
- Lombard General Insurance Company of Canada
- Lombard Insurance Company
- Markel Insurance Company of Canada
- The Missisquoi Insurance Company
- The Nordic Insurance Company of Canada
- The North Waterloo Farmers Mutual Insurance Company (Fidelity only)
- Novex Insurance Company (Fidelity only)
- The Personal Insurance Company
- Pilot Insurance Company
- Quebec Assurance Company
- Royal & Sun Alliance Insurance Company of Canada
- Saskatchewan Mutual Insurance Company
- Scottish & York Insurance Co. Limited
- The Sovereign General Insurance Company
- TD General Insurance Company
- Temple Insurance Company
- Traders General Insurance Company

- Travelers Guarantee Company of Canada
- Trisura Guarantee Insurance Company
- The Wawanesa Mutual Insurance Company
- Waterloo Insurance Company
- Western Assurance Company
- Western Surety Company

2. Provincial Companies

Surety bonds issued by the following companies may be accepted provided that the contract of suretyship was executed in a province in which the company is licensed to do business as indicated in brackets.

- AXA Boreal Insurance Company (P.E.I., N.B., Que., Ont., Man., B.C.)
- AXA Boreal Insurance Company (P.E.I., N.B., Que., Ont., Man., B.C.)
- ALPHA, Compagnie d'Assurances Inc. (Que.)
- Canada West Insurance Company (Ont., Man., Sask, Alta., B.C., N.W.T.) (Surety only)
- The Canadian Union Assurance Company (Que.)
- La Capitale General Insurance Inc. (Nfld. & Lab., N.S., P.E.I., Que.(Surety only), Man., Sask., Alta., B.C., Nun., N.W.T., Yuk.)
- Coachman Insurance Company (Ont.)
- Continental Casualty Company (Nfld. & Lab., N.S., P.E.I., N.B., Que., Ont., Man., Sask., Alta., B.C., Nun., N.W.T., Yuk.)
- GCAN Insurance Company (Nfld. & Lab., N.S., P.E.I., N.B., Que., Ont., Man., Sask., Alta., B.C., Nun., N.W.T., Yuk.)
- The Insurance Company of Prince Edward Island (N.S., P.E.I., N.B.)
- Kingsway General Insurance Company (N.S., N.B., Que., Ont., Man., Sask., Alta., and B.C.)
- Liberty Mutual Insurance Company (Nfld. & Lab., N.S., P.E.I., N.B., Que., Ont., Man., Sask., Alta., B.C., Nun., N.W.T., Yuk.)
- Manitoba Public Insurance Corporation (Man.)
- Norgroupe Assurance Générales Inc.
- Orleans General Insurance Company (N.B., Que., Ont.)
- Saskatchewan Government Insurance Office (Sask.)
- SGI CANADA Insurance Services Ltd. (Ont., Man., Sask., Alta.)
- L'Unique General Insurance Inc. (Nfld. & Lab., N.S., P.E.I., N.B., Que.(Surety only), Ont.(Surety only), Man., Sask., Alta., B.C.(Surety only), Nun., N.W.T., Yuk.)

3. Foreign Companies

- Aspen Insurance UK Limited
- Compagnie Française d'Assurance pour le Commerce Extérieur (Fidelity only)
- Eagle Star Insurance Company Limited
- Ecclesiastical Insurance Office Public Limited Company (Fidelity only)
- Lloyd's Underwriters
- Mitsui Sumitomo Insurance Company, Limited
- NIPPONKOA Insurance Company, Limited
- Sompo Japan Insurance Inc.
- Tokio Marine & Nichido Fire Insurance Co., Ltd.
- XL Insurance Company Limited (Surety only)
- Zurich Insurance Company Ltd

Standard Construction Contract – Articles of Agreement
(23/01/2002)

A1 Contract Documents

A2 Date of Completion of Work and Description of Work

A3 Contract Amount

A4 Contractor’s Address

A5 Unit Price Table

Articles of Agreement

These Articles of Agreement made in duplicate this day of .

Between

Her Majesty the Queen, in right of Canada (referred to in the contract documents as " Her Majesty") represented by the National Research Council Canada (referred to in the contract documents as the "Council")

and

(referred to in the contract documents as the "Contractor")

Witness that in consideration for the mutual promises and obligations contained in the contract, Her Majesty and the Contractor covenant and agree as follows:

A1 Contract Documents

(23/01/2002)

1.1 Subject to A1.4 and A1.5, the documents forming the contract between Her Majesty and the Contractor, referred to herein as the contract documents, are

1.1.1 these Articles of Agreement,

1.1.2 the document attached hereto, marked "A" and entitled "Plans and Specifications", referred to herein as the Plans and Specifications,

1.1.3 the document attached hereto, marked "B" and entitled "Terms of Payment", referred to herein as the Terms of Payment,

1.1.4 the document attached hereto, marked "C" and entitled "General Conditions", referred to herein as the General Conditions,

1.1.5 the document attached hereto, marked "D" and entitled "Labour Conditions", referred to herein as the Labour Conditions,

1.1.6 the document attached hereto, marked "E" and entitled "Insurance Conditions", referred to herein as the Insurance Conditions,

1.1.7 the document attached hereto, marked "F" and entitled "Contract Security Conditions", referred to herein as the Contract Security Conditions, and

1.1.8 any amendment or variation of the contract documents that is made in accordance with the General Conditions.

1.1.9 the document entitled Fair Wage Schedules for Federal Construction Contracts referred to herein as Fair Wage Schedules

1.1.10

The Council hereby designates of of the Government of Canada as the Engineer for the purposes of the contract, and for all purposes of or incidental to the contract, the Engineer's address shall be deemed to be:

1.2 **In the contract**

1.3.1 " Fixed Price Arrangement" means that part of the contract that prescribes a lump sum as payment for performance of the work to which it relates; and

1.3.2 " Unit Price Arrangement" means that part of the contract that prescribes the product of a price multiplied by a number of units of measurement of a class as payment for performance of the work to which it relates.

1.3 Any of the provisions of the contract that are expressly stipulated to be applicable only to a Unit Price Arrangement are not applicable to any part of the work to which a Fixed Price Arrangement is applicable.

1.4 Any of the provisions of the contract that are expressly stipulated to be applicable only to a Fixed Price Arrangement are not applicable to any part of the work to which a Unit Price Arrangement is applicable.

A2 Date of Completion of Work and Description of Work

(23/01/2002)

2.1 The contractor shall, between the date of these Articles of Agreement and the **,** , in the careful and workmanlike manner, diligently perform and complete the following work:

which work is more particularly described in the Plans and Specifications.

A3 Contract Amount

(23/01/2002)

3.1 Subject to any increase, decrease, deduction, reduction or set-off that may be made under the Contract, Her Majesty shall pay the Contractor at the times and in the manner that is set out or referred to in the Terms of Payment

3.1.1 the sum of (GST/HST extra), in consideration for the performance of the work or the part thereof that is subject to Fixed Price Arrangement, and

3.1.2 a sum that is equal to the aggregate of the products of the number of units of Measurement of each class of labour, plant and material that is set out in a Final Certificate of Measurement referred to in GC44.8 multiplied in each case by the appropriate unit price that is set out in the Unit Price Table in consideration for the performance of the work or the part thereof that is subject to a Unit Price Arrangement.

3.2 For the information and guidance of the Contractor and the persons administering the contract on behalf of Her Majesty, but not so as to constitute a warranty , representation or undertaking of any nature by either party, it is estimated that the total amount payable by Her Majesty to the Contractor for the part of the work to which a Unit Price Arrangement is applicable will be approximately $N/A

3.3 A3.1.1 is applicable only to a Fixed Price Arrangement.

3.4 A3.1.2 and A3.2 applicable only to a Unit Price Arrangement.

A4 Contractor's Address

(23/01/2002)

4.1 For all purposes of or incidental to the contract, the Contractor's address shall be deemed to be:

A5 Unit Price Table

(23/01/2002)

5.1 Her Majesty and the Contractor agree that the following table is the Unit Price Table for the purposes of the contract.

Column 1 Item	**Column 2** Class of Labour Plant Or Material	**Column 3** Unit of Measurement	**Column 4** Estimated Total Quantity	**Column 5** Price per Unit	**Column 6** Estimated Total Price
		N/A			

5.2 The Unit Price Table that is set out in A5.1 designates the part of the work to which a Unit Price Arrangement is applicable.

5.3 The part of the work that is not designated in the Unit Price Table referred to in A5.2 is the part of the work to which a Fixed Price Arrangement is applicable.

Articles of Agreement

Signed on behalf of Her Majesty by

_____

as Senior Contracting Officer

and_____

as_____

of the **National Research Council Canada**

on the_____

day of _____

Signed, sealed and delivered by

_____

as_____and
Position

by_____

as_____
Position

Seal

of

on the_____

day of_____

END OF SECTION 00 00 10

1. SCOPE OF WORK

.1 Work under this contract covers the TSSA Field Approval for Boiler 1 and Boiler 3 at the Council's Building M-06 of the National Research Council. Refer to specification section 01 11 00 – Summary of Work for detailed project scope of work.

The general contractor shall hire R&R Automation for any and all required electrical and controls work on this project. Contact information:

Kevin Nauss
rrautomation@rogers.com
telephone: (613) 692-6058
cell: (613) 558-9484

2. DRAWINGS

.1 The following drawings illustrate the work and form part of the contract documents:

5042-M01	Boiler 1 Natural Gas Train Schematic
5042-M02	Boiler 1 Oil Train Schematic
5042-M03	Boiler 3 Natural Gas Train Schematic
5042-M04	Boiler 3 Oil Train Schematic
5042-M07A	M06 Ground Floor Layout Locations
5042-M08	Areas of Work – Pictorial Views
5042-M09	Areas of Work – Pictorial Views
5042-E01	Boiler 1 BMS Wiring Diagram Fireye Connection
5042-E02	Boiler 1 BMS Wiring Diagram Annunciator Connection
5042-E03	Boiler 1 BMS Wiring Diagram Limits
5042-E04	Boiler 3 BMS Wiring Diagram Fireye Connection
5042-E05	Boiler 3 BMS Wiring Diagram Annunciator Connection
5042-E06	Boiler 3 BMS Wiring Diagram Limits
5042-E10	Boiler BMS : Ventilation Interlock Diagram

Appendix A - Device List

Appendix B – TSSA Registration Documents

3. COMPLETION

.1 Complete all work within the dates as stated in the specification section 01 11 00 – Summary of Work following receipt of notification of acceptance of tender.

4. GENERAL

.1 The word "provide" in this Specification means to supply and install.

.2 Provide items mentioned in either the drawings or the specification.

5. SPECIFIED ACCEPTABLE & ALTERNATIVE EQUIPMENT & MATERIALS

.1 Materials and equipment scheduled and/or specified on the drawings or in the specifications have been selected to establish a performance and quality standard. In most cases, acceptable manufacturers are stated for any material or equipment specified by manufacturer's name and model number. Contractors may base their tender price on materials and equipment supplied by any of the manufacturers' names as acceptable for the particular material or equipment.

.2 In addition to the manufacturers specified or named as acceptable, you may propose alternative manufacturers of materials or equipment to the Departmental Representative for acceptance. For a product to be considered as an alternative product substitute, make a written application to the Departmental Representative during the tender period, not later than ten (10) working days before tender closing.

.3 Certify in writing that the alternative meets all requirements of the specified material or equipment. In addition, it shall be understood that all costs required by or as a result of acceptance or proposed alternatives, will be borne by the contractor.

.4 Approval of alternatives will be signified by issue of an Addendum to the Tender Documents.

.5 Any alternative manufacturers or materials submitted which are incomplete and cannot be evaluated, or are later than ten (10) working days before tender closing date or after the tender period, will not be considered.

6. MINIMUM STANDARDS

.1 Conform to or exceed minimum acceptable standards of the various applicable federal, provincial and municipal codes such as The National Building Code, The National Fire Code, Canadian Plumbing Code, Canadian Electrical Code, Canadian Code for Construction Safety and the Provincial Construction Safety Act.

.2 Work to conform to referenced standards and codes as reaffirmed or revised to date of specification.

7. WORKPLACE HAZARDOUS MATERIAL INFORMATION SYSTEM (WHMIS)

.1 The general contractor shall comply with Federal and Provincial legislation regarding the WHMIS. The contractor's responsibilities include, but are not limited to the following:

.1 To ensure that any controlled product brought on site by the contractor or sub-contractor is labeled;

.2 To make available to the workers and the Departmental Representative, Material Safety Data Sheets (MSDS) for these controlled products;

.3 To train own workers about WHMIS, and about the controlled products that they use on site;

.4 To inform other contractors, sub-contractors, the Departmental Representative, authorized visitors and outside inspection agency personnel about the presence and use of such products on the site.

.5 The site foreman or superintendent must be able to demonstrate, to the satisfaction of the Departmental Representative, that he/she has had WHMIS training and is knowledgeable in its requirements. The Departmental Representative can require replacement of this person if this condition or implementation of WHMIS is not satisfactory.

8. REQUIREMENTS OF BILL 208, SECTION 18(a)

Under the requirements of Bill 208 of the Ontario Ministry of Labour Occupational Health & Safety Act, the following designated substances may be encountered while performing the work described in these contract documents:

.1 Acrylonitrile, Isocyanates, Arsenic, Lead, Asbestos, Mercury, Benzene, Silica, Coke Oven Emissions, Vinyl Chloride, and Ethylene Oxide

.1 It is the responsibility of the general contractor to ensure that each prospective subcontractor for this project has received a copy of the above list.

.2 In addition to the above designated substances, the following may also be present: None anticipated.

.3 The general contractor is advised to take the following precautions when dealing with the above substances: N/A.

9. COST BREAKDOWN

.1 Submit, for approval by the Departmental Representative, a cost breakdown of tender 72 hours after the contract is awarded.

.2 Use the approved cost breakdown as the basis for submitting all claims.

.3 Request Departmental Representative's verbal approval to amount of claim prior to preparing and submitting the claim in its final form.

10. SUB-TRADES

.1 Submit no later than 72 hours after tender closing, a complete list of sub trades for the Departmental Representative's review.

11. PERSONNEL SECURITY AND IDENTIFICATION

.1 All persons employed by the contractor, or by any subcontractor and present on the site must be security cleared in accordance with the requirements of the Section entitled Special Instructions to Tenderers.

.2 All such persons must wear and keep visible identification badges as issued by the Security Office of NRC.

12. WORKING HOURS AND SECURITY

.1 Normal working hours on the NRC property are from 8:00 a.m. until 4:30 p.m., Monday to Friday inclusive, except statutory holidays.

.2 At all other times, special written passes are required for access to the building site.

.3 Before scheduling any work outside normal working hours, obtain permission from the Departmental Representative to perform the specific tasks.

.4 An escort may be required whenever working outside normal hours. Contractor to bear the associated costs.

13. SCHEDULE

.1 The contractor shall prepare a detailed schedule, fixing the date for commencement and completion of the various parts of the work and update the said schedule. Such schedule shall be made available to the Departmental Representative not later than two weeks after the award of the contract and prior to commencement of any work on site.

.2 Notify Departmental Representative in writing of any changes in the schedule.

.3 Three (3) days before the scheduled completion date, arrange to do an interim inspection with the Departmental Representative.

14. PROJECT MEETINGS

.1 Hold regular project meetings at times and locations approved by the Departmental Representative.

.2 Notify all parties concerned of meetings to ensure proper coordination of work.

.3 Departmental Representative will set times for project meetings and assume responsibility for recording and distributing minutes.

15. SHOP DRAWINGS

.1 Submit to Departmental Representative for review, shop drawings, product data and samples specified within two (2) week(s) after contract award.

.2 Submit to Departmental Representative for review a complete list of all shop drawings, product data and samples specified and written confirmation of corresponding delivery dates within one (1) week after shop drawings, product data and samples approval date. This list shall be updated on a one (1) week basis and any changes to the list shall be immediately notified in writing to the Departmental Representative.

.3 Review shop drawings, data sheets and samples prior to submission.

.4 Submit electronic copy of all shop drawings and product data and samples for review, unless otherwise specified.

.5 Review of shop drawings and product data by the Departmental Representative does not relieve the contractor of the responsibility for errors and omissions and for the conformity with contract documents.

16. SAMPLES AND MOCK-UPS

.1 Submit samples in sizes and quantities as specified.

.2 Where colour, pattern or texture is criterion, submit full range of samples.

.3 Construct field samples and mock-ups at locations acceptable to Departmental Representative.

.4 Reviewed samples or mock-ups will become standards of workmanship and material against which installed work will be checked on the project.

17. MATERIALS AND WORKMANSHIP

.1 Install only new materials on this project unless specifically noted otherwise.

.2 Only first class workmanship will be accepted, not only with regard to safety, efficiency, durability, but also with regard to neatness of detail and performance.

18. WORK & MATERIALS SUPPLIED BY OWNER

.1 Work and materials not included in this contract are described on drawings and in this specification.

.2 Deliver to a storage place, as directed by the Departmental Representative, all materials returned to the Owner.

.3 Unless otherwise specified, accept owner-supplied materials at their storage location and provide all transportation as required.

.4 General Contractor's duties:

.1 Unload at site.
.2 Promptly inspect products and report damaged or defective items.
.3 Give written notification to the Departmental Representative for items accepted in good order.
.4 Handle at site, including uncrating and storage.
.5 Repair or replace items damaged on site.
.6 Install, connect finished products as specified.

19. SITE ACCESS

.1 Make prior arrangements with the Departmental Representative before starting work or moving materials and equipment on site.

.2 Obtain approval of Departmental Representative for regular means of access during the construction period.

.3 Obtain approval of Departmental Representative before temporarily suspending operations on site; before returning to the site and before leaving the site at the end of the job.

.4 Provide and maintain access to site.

.5 Build and maintain temporary roads and provide snow removal during period of work.

.6 Make good any damage and clean up dirt, debris, etc., resulting from contractor's use of existing roads.

20. USE OF SITE

.1 Restrict operations on the site to the areas approved by the Departmental Representative

.2 Locate all temporary structures, equipment, storage, etc., to the designated areas.

.3 Restrict parking to the designated areas.

21. ACCEPTANCE OF SITE

.1 Inspect the site before commencing work, review any unexpected conditions with the Departmental Representative.

.2 Commencement of work will imply acceptance of existing conditions.

22. SITE OFFICE & TELEPHONE

.1 Contractor to erect a temporary site office at his own expense.

.2 Install and maintain a telephone, if necessary.

.3 Use of NRC phones is not permitted unless in the case of an emergency.

23. SANITARY FACILITIES

.1 Obtain permission from the Departmental Representative to use the existing washroom facilities in the building.

24. TEMPORARY SERVICES

.1 A source of temporary power will be made available in the area. Bear all costs to make connections to the power source and perform distribution on site.

.2 Provide all load centres, breakers, conduit, wiring, disconnects, extension cords, transformers, as required from the source of power.

.3 Power is to be used only for power tools, lighting, controls, motors, and not for space heating.

.4 A source of temporary water will be made available if required.

.5 Bear all costs associated with distributing the water to the required locations.

.6 Comply with NRC requirements when connecting to existing systems in accordance with the articles entitled "Co-operation" and "Service Interruptions" of this section.

25. DOCUMENTS REQUIRED AT WORK SITE

.1 The contractor shall keep on the site, one (1) up-to-date copy of all contract documents, including specifications, drawings, addenda, shop drawings, change notices, schedule and any reports or bulletins pertaining to the work, in good order, available to the Departmental Representative and to his / her representatives at all times.

.2 At least one (1) copy of specifications and drawings shall be marked by the contractor to show all work "As Built" and shall be provided to the Departmental Representative with the Application for Payment and for the Final Certificate of Completion.

26. CO-OPERATION

.1 Co-operate with NRC staff in order to keep disruption of normal research work to an absolute minimum.

.2 Work out in advance, a schedule for all work which might disrupt normal work in the building.

.3 Have schedule approved by the Departmental Representative.

.4 Notify the Departmental Representative in writing, 72 hours prior to any intended interruption of facilities, areas, corridors, mechanical or electrical services and obtain requisite permission.

27. PROTECTION AND WARNING NOTICES

.1 Provide all materials required to protect existing equipment.

.2 Erect dust barriers to prevent dust and debris from spreading through the building.

.3 Place dust protection in the form of cover sheets over equipment and furniture and tape these sheets to floors, to ensure no dust infiltration.

.4 Repair or replace any and all damage to Owner's property caused during construction, at no cost to the Owner and to the satisfaction of the Departmental Representative.

.5 Protect the buildings, roads, lawns, services, etc. from damage which might occur as a result of this work.

.6 Plan and co-ordinate the work to protect the buildings from the leakage of water, dust, etc.

.7 Ensure that all doors, windows, etc., that could allow transfer of dust, noise, fumes, etc., to other areas of the building are kept closed.

.8 Be responsible for security of all areas affected by the work under the Contract until acceptance by NRC. Take all necessary precautions to prevent entry to the work area by unauthorized persons and guard against theft, fire and damage by any cause. Secure working area at the end of each day’s work and be responsible for same.

.9 Provide and maintain adequate safety barricades around the work sites to protect NRC personnel and the public from injury during the construction.

.10 Post warnings, in all instances where possible injury could occur such as Work Overhead, Hard Hat Areas, etc. or as required by the Departmental Representative.

.11 Provide temporary protective enclosures over building entrances and exits to protect pedestrians. All enclosures to be structurally sound against weather and falling debris.

28. BILINGUALISM

.1 Ensure that all signs, notices, etc. are posted in both official languages.

.2 Ensure that all identification of services called for by under this contract are bilingual.

29. LAYOUT OF WORK

.1 Location of equipment, fixtures, outlets and openings indicated on drawings or specified are to be considered as approximate.

.2 Locate equipment, fixtures and distribution systems to provide minimum interference and maximum usable space and in accordance with the manufacturer's recommendations for safety, access and maintenance.

.3 Employ competent person to lay out work in accordance with the contract documents.

30. DISCREPANCIES & INTERFERENCES

.1 Prior to the start of the work, examine drawings and specifications. Report at once to the Departmental Representative, any defects, discrepancies, omissions or interferences affecting the work.

.2 Contractor to immediately inform the Departmental Representative in writing, of any discrepancies between the plans and the physical conditions so the Departmental Representative may promptly verify same.

.3 Any work done after such a discovery, until authorized, is at the contractor's risk.

.4 Where minor interferences as determined by the Departmental Representative are encountered on the job and they have not been pointed out on the original tender or on the plans and specifications, provide offsets, bends or reroute the services to suit job conditions at no extra cost.

.5 Arrange all work so as not to interfere in any way with other work being carried out.

31. MANUFACTURER'S INSTRUCTIONS

.1 Unless otherwise specified, comply with manufacturer's latest printed instructions for materials and installation methods.

.2 Notify the Departmental Representative in writing of any conflict between these specifications and manufacturer's instruction. Departmental Representative will designate which document is to be followed.

32. TEMPORARY HEATING AND VENTILATING

.1 Bear the costs of temporary heat and ventilation during construction including costs of installation, fuel, operation, maintenance, and removal of equipment.

.2 Use of direct-fired heaters discharging waste products into the work areas will not be permitted unless prior approval is given by the Departmental Representative.

.3 Furnish and install temporary heat and ventilation in enclosed areas as required to:

.1 Facilitate progress of work.

.2 Protect work and products against dampness and cold.

.3 Reduce moisture condensation on surfaces to an acceptable level.

.4 Provide ambient temperature and humidity levels for storage, installation and curing of materials.

.5 Provide adequate ventilation to meet health regulations for a safe working environment.

.4 Maintain minimum temperature of 10 ^{o}C (50 ^{o}F) or higher where specified as soon as finishing work is commenced and maintain until acceptance by the Departmental Representative. Maintain ambient temperature and humidity levels as required for comfort of NRC personnel.

.5 Prevent hazardous or unhealthy accumulations of dust, fumes, mists, vapours or gases in areas occupied during construction including also, storage areas and sanitary facilities.

.1 Dispose of exhaust materials in a manner that will not result in a harmful or unhealthy exposure to persons.

.6 Maintain strict supervision of operation of temporary heating and ventilating equipment.

.1 Enforce conformance with applicable codes and standards.

.2 Comply with instructions of the Departmental Representative including provision of full-time watchman services when directed.

.3 Enforce safe practices.

.4 Vent direct-fired combustion units to outside.

.7 Submit tenders assuming existing or new equipment and systems will not be used for temporary heating and ventilating.

.8 After award of contract, Departmental Representative may permit use of the permanent system providing agreement can be reached on:

.1 Conditions of use, special equipment, protection, maintenance, and replacement of filters.

.2 Methods of ensuring that heating medium will not be wasted and in the case of steam, agreement on what is to be done with the condensate.

.3 Saving on contract price.

.4 Provisions relating to guarantees on equipment.

33. CONNECTIONS TO AND INTERRUPTIONS TO EXISTING SERVICES

.1 Where work involves breaking into or connecting to existing services, carry out work at times and in the manner agreed to by the Departmental Representative and by authorities having jurisdiction, with minimum disruption to NRC Personnel and vehicular traffic and minimum service interruption. Do not operate any NRC equipment or plant.

.2 Before commencing work, establish location and extent of service lines in area of work and notify Departmental Representative of findings.

.3 Submit a schedule to and obtain approval from the Departmental Representative for any shut-down or closure of active service or facility; allow minimum 72 hours notice. Adhere to approved schedule and provide notice to the Departmental Representative.

.4 Where unknown services are encountered, immediately advise Departmental Representative and confirm findings in writing.

.5 Provide detours, bridges, alternate feeds, etc., as required to minimize disruptions.

.6 Protect existing services as required and immediately make repairs if damage occurs.

.7 Remove any abandoned service lines as indicated on the contract documents and as approved by the Departmental Representative; cap or otherwise seal lines at cut-off points. Record and provide a copy to the Departmental Representative of locations of maintained, re-routed and abandoned service lines.

34. CUTTING AND PATCHING

.1 Cut existing surfaces as required to accommodate new work.

.2 Remove all items as shown or specified.

.3 Patch and make good with identical materials, the surfaces that have been disturbed, cut or damaged, to the satisfaction of the Departmental Representative.

.4 Where new pipes pass through existing construction, core drill an opening. Size openings to leave 12mm (1/2") clearance around the pipes or pipe insulation. Do not drill or cut any surface without the approval of the Departmental Representative.

.5 Obtain written approval of the Departmental Representative before cutting openings through existing or new structural members.

.6 Seal all openings where cables, conduits or pipes pass through walls with an acoustic sealant conforming to CAN/CGSB-19.21-M87.

.7 Where cables, conduits and pipes pass through fire rated walls and floors, pack space between with compressed glass fibres and seal with fire stop caulking in accordance with CAN/CGSB-19.13-M87 AND NBC 3.1.7.

35. FASTENING DEVICES

.1 Do not use explosive actuated tools, without first obtaining permission from the Departmental Representative.

.2 Comply with the requirements of CSA A-166 (Safety Code for Explosive Actuated Tools).

.3 Do not use any kind of impact or percussion tool without first obtaining permission from the Departmental Representative.

36. OVERLOADING

.1 Ensure that no part of the building or work is subjected to a load which will endanger safety or cause permanent deformation or structural damage.

37. DRAINAGE

.1 Provide temporary drainage and pumping as required to keep excavations and site free of water.

38. ENCLOSURE OF STRUCTURES

.1 Construct and maintain all temporary enclosures as required to protect foundations, sub-soil, concrete, masonry, etc., from frost penetration or damage.

.2 Maintain in place until all chances of damage are over and proper curing has taken place.

.3 Provide temporary weather tight enclosures for exterior openings until permanent sash and glazing and exterior doors are installed.

.4 Provide lockable enclosures as required to maintain the security of NRC facilities and be responsible for the same.

.5 Provide keys to NRC security personnel when required.

.6 Lay out the work carefully and accurately and verify all dimensions and be responsible for them. Locate and preserve general reference points.

.7 Throughout the course of construction, keep continuously acquainted with field conditions, and the work being developed by all trades involved in the project. Maintain an awareness of responsibility to avoid space conflict with other trades.

.8 Conceal all services, piping, wiring, ductwork, etc., in floors, walls or ceilings except where indicated otherwise.

39. STORAGE

.1 Provide storage as required to protect all tools, materials, etc., from damage or theft and be responsible for the same.

.2 Do not store flammable or explosive materials on site without the authorization of the Departmental Representative.

40. GENERAL REVIEW

.1 Periodic review of the contractor's work by the Departmental Representative does not relieve the contractor of the responsibility of making the work in accordance with contract documents. Contractor shall carry out his own quality control to ensure that the construction work is in accordance with contract documents.

.2 Inform the Departmental Representative of any impediments to the installation and obtain his / her approval for actual location.

41. INSPECTION OF BURIED OR CONCEALED SERVICES

.1 Prior to concealing any services that are installed, ensure that all inspection bodies concerned, including NRC, have inspected the work and have witnessed all tests. Failure to do so may result in exposing the services again at the contractor's expense.

42. TESTING

.1 On completion, or as required by local authority inspectors and/or Departmental Representative during progress of work and before any services are covered up and flushing is complete, test all installations in the presence of the Departmental Representative.

.2 Obtain and hand to the Departmental Representative all acceptance certificates or test reports from authority having jurisdiction. The project will be considered incomplete without the same.

43. PARTIAL OCCUPANCY

.1 NRC may request partial occupancy of the facility if the contract extends beyond the expected completion date.

.2 Do not restrict access to the building, routes, and services.

.3 Do not encumber the site with materials or equipment.

44. DISPOSAL OF WASTES

.1 Dispose of waste materials including volatiles, safely off NRC property. Refer to the section entitled "General and Fire Safety Requirements" included as part of this specification.

45. CLEAN-UP DURING CONSTRUCTION

.1 On a daily basis, maintain project site and adjacent area of campus including roofs, free from debris and waste materials.

.2 Provide on-site dump containers for collection of waste materials and rubbish.

46. FINAL CLEAN-UP

.1 Upon completion do a final clean-up to the satisfaction of the Departmental Representative.

.2 Clean all new surfaces, lights, existing surfaces affected by this work, replace filters, etc.

.3 Clean all resilient flooring and prepare to receive protective finish. Protective finish applied by NRC.

47. WARRANTY AND RECTIFICATION OF DEFECTS IN WORK

.1 Refer to General Conditions "C", section GC32.

.2 Ensure that all manufacturers' guarantees and warranties are issued in the name of the General Contractor and the National Research Council.

48. MAINTENANCE MANUALS

.1 Provide three (3) bilingual copies of maintenance manuals or two English and two French maintenance manuals immediately upon completion of the work and prior to release of holdbacks.

.2 Manuals to be neatly bound in hard cover loose leaf binders.

.3 Manuals to include operating and maintenance instructions, all guarantees and warranties, shop drawings, technical data, etc., for the material and apparatus supplied under this contract.

END OF SECTION 00 10 00

1. GENERAL CONSTRUCTION SAFETY REQUIREMENTS

.1 The Contractor shall take all necessary steps to protect personnel (workers, visitors, general public, etc.) and property from any harm during the course of the contract.

.2 The Contractor shall be solely responsible for the construction safety of both its employees and those of its sub-contractors at the work site, and for initiating, maintaining and supervising safety precautions, programs and procedures in connection with the performance of the work.

.3 The Contractor shall comply with all Federal, Provincial and Municipal safety codes and regulations and the Occupational Health and Safety Act and the Workplace Safety and Insurance Board. In the event of any conflict between any provisions in legislation or codes, the most stringent provisions shall apply.

.4 Periodic review of the contractor's work by the Departmental Representative, using the criteria of the contract documents, does not relieve the contractor of his safety responsibilities in carrying out the work in accordance with the contract documents. The contractor shall consult with the Departmental Representative to ensure that this responsibility is carried out.

.5 The Contractor shall ensure that only competent personnel are permitted to work on site. Throughout the term of the contract, any person will be removed from the site who is not observing or complying with the safety requirements.

.6 All equipment shall be in safe operating condition and appropriate to the task.

.7 Following a project and site hazard assessment, the Contractor shall develop a Site Specific Safety Plan based on the following minimum requirements:

- .1 Provide a safety board mounted in a visible location on the project site, with the following information included thereon:
  - .1 Notice of Project
  - .2 Site specific Safety Policy
  - .3 Copy of Ontario Health and Safety Act
  - .4 Building Schematic showing emergency exits
  - .5 Building emergency procedures
  - .6 Contact list for NRC, Contractor and all involved sub-contractors
  - .7 Any related MSDS sheets
  - .8 NRC Emergency phone number

.8 The Contractor shall provide competent personnel to implement its safety program and those of any Health and Safety Act legislation applicable at this project location, and to ensure they are being complied with.

.9 The Contractor shall provide safety orientation to all its employees as well as those of any subcontractors under its jurisdiction.

.10 The Departmental Representative will monitor to ensure that safety requirements are met and that safety records are properly kept and maintained. Continued disregard for safety standards can cause the contract to be cancelled and the Contractor or sub-contractors removed from the site.

.11 The Contractor will report to the Departmental Representative and jurisdictional authorities, any accident or incident involving Contractor or NRC personnel or the public and/or property arising from the Contractor's execution of the work.

.12 If entry to a laboratory is required as part of the work of the Contractor, a safety orientation shall be provided to all his employees as well as those of any subcontractors regarding lab safety requirements and procedures, as provided by the Researcher or the Departmental Representative.

2. FIRE SAFETY REQUIREMENTS

.1 Authorities

1. The Fire Commissioner of Canada (FC) is the authority for fire safety at NRC.
2. For the purpose of this document, "Departmental Representative" will be deemed as the NRC person in charge of the project and who will enforce these Fire Safety Requirements.
3. Comply with the following standards as published by the Office of the Fire Commissioner of Canada:
    a. Standard No. 301 - June 1982 "Standard for Construction Operations";
    b. Standard No. 302 - June 1982 "Standard for Welding and Cutting".

.2 Smoking

.1 Smoking is prohibited inside all NRC buildings, as well as roof areas.

.2 Obey all "NO SMOKING" signs on NRC premises.

.3 Hot Work

.1 Prior to commencement of any "Hot Work" involving welding, soldering, burning, heating, use of torches or salamanders or any open flame, obtain a Hot Work Permit from the Departmental Representative.

.2 Prior to commencement of "Hot Work", review the area of hot work with the Departmental Representative to determine the level of fire safety precautions to be taken.

.4 Reporting Fires

.1 Know the exact location of the nearest Fire Alarm Pull Station and telephone, including the emergency phone number.

.2 REPORT immediately, all fire incidents as follows:

.1 Activate nearest fire alarm pull station and;

.2 Telephone the following emergency phone number as appropriate:

FROM AN NRC PHONE	**333**
FROM ANY OTHER PHONE	**(613) 993-2411**

4. When reporting a fire by phone, give the location of fire, building number and be prepared to verify location.
5. The person activating fire alarm pull station must remain at a safe distance from the scene of the fire but readily available to provide information and direction to the Fire Department personnel.

.5 Interior and Exterior Fire protection & Alarm Systems

.1 DO NOT OBSTRUCT OR SHUT OFF FIRE PROTECTION EQUIPMENT OR SYSTEMS, INCLUDING BUT NOT LIMITED TO FIRE ALARM SYSTEMS, SMOKE/HEAT DETECTORS, SPRINKLER SYSTEM, PULL STATIONS, EMERGENCY CALL BUTTONS AND PA SYSTEMS, WITHOUT AUTHORIZATION FROM THE DEPARTMENTAL REPRESENTATIVE.

.2 WHEN ANY FIRE PROTECTION EQUIPMENT IS TEMPORARILY SHUT DOWN, ALTERNATIVE MEASURES AS PRESCRIBED BY THE DEPARTMENTAL REPRESENTATIVE SHALL BE TAKEN TO ENSURE THAT FIRE PROTECTION IS MAINTAINED.

.3 DO NOT LEAVE FIRE PROTECTION OR ALARM SYSTEMS INACTIVE AT THE END OF A WORKING DAY WITHOUT NOTIFICATION AND AUTHORISATION FROM THE DEPARTMENTAL REPRESENTATIVE. THE DEPARTMENTAL REPRESENTATIVE WILL ADVISE THE (FPO) OF THE DETAILS OF ANY SUCH EVENT.

.4 DO NOT USE FIRE HYDRANTS, STANDPIPES AND HOSE SYSTEMS FOR OTHER THAN FIRE FIGHTING PURPOSES UNLESS AUTHORISED BY DEPARTMENTAL REPRESENTATIVE.

.6 Fire Extinguishers

.1 Provide a minimum of 1-20 lb. ABC Dry Chemical Fire Extinguisher at each hot work or open flame location.

.2 Provide fire extinguishers for hot asphalt and roofing operations as follows:

a. Kettle area - 1-20 lb. ABC Dry Chemical;

b. Roof - 1-20 lb. ABC Dry Chemical at each open flame location.

.3 Provide fire extinguishers equipped as below:

c. Pinned and sealed;

d. With a pressure gauge;

e. With an extinguisher tag signed by a fire extinguisher servicing company.

.4 Carbon Dioxide (C02) extinguishers will not be considered as substitutes for the above.

.7 Roofing Operations

.1 Kettles:

.1 Arrange for the location of asphalt kettles and material storage with the Departmental Representative before moving on site. Do not locate kettles on any roof or structure and keep them at least 10m (30 feet) away from a building.

.2 Equip kettles with 2 thermometers or gauges in good working order; a hand held and a kettle-mounted model.

.3 Do not operate kettles at temperatures in excess of 232°C (450 °F).

.4 Maintain continuous supervision while kettles are in operation and provide metal covers for the kettles to smother any flames in case of fire. Provide fire extinguishers as required in article 2.6.

.5 Demonstrate container capacities to Departmental Representative prior to start of work.

.6 Store materials a minimum of 6m (20 feet) from the kettle.

.2 Mops:

.1 Use only glass fibre roofing mops.

.2 Remove used mops from the roof site at the end of each working day.

.3 Torch Applied Systems:

.1 DO NOT USE TORCHES NEXT TO WALLS.

.2 DO NOT TORCH MEMBRANES TO EXPOSED WOOD OR CAVITY

.3 Provide a Fire Watch as required by article 2.9 of this section.

.4 Store all combustible roofing materials at least 3m (10 feet) away from any structure.

.5 Keep compressed gas cylinders a minimum of 6m (20 feet) away from the kettle, protected from mechanical damage and secured in an upright position.

.8 Welding / Grinding Operations

.1 Contractor to provide fire blankets, portable fume extraction devices, screens or similar equipment to prevent exposure to welding flash, or sparks from grinding.

.9 **Fire Watch**

.1 Provide a fire watch for a minimum of one hour after the termination of any hot work operation.

.2 For temporary heating, refer to General Instructions Section 00 010 00.

.3 Equip fire watch personnel with fire extinguishers as required by article 2.6.

.10 Obstruction of access/egress routes-roadways, halls, doors, or elevators

.1 Advise the Departmental Representative in advance of any work that would impede the response of Fire Department personnel and their apparatus. This includes violation of minimum overhead clearance, erection of barricades and the digging of trenches.

.2 Building exit routes must not be obstructed in any way without special permission from the Departmental Representative, who will ensure that adequate alternative routes are maintained.

.3 The Departmental Representative will advise the FPO of any obstruction that may warrant advanced planning and communication to ensure the safety of building occupants and the effectiveness of the Fire Department.

.11 Rubbish and Waste Materials

.1 Keep rubbish and waste materials to a minimum and a minimum distance of 6m (20 feet) from any kettle or torches.

.2 Do not burn rubbish on site.

.3 Rubbish Containers

.1 Consult with the Departmental Representative to determine an acceptable safe location for any containers and the arrangement of chutes etc. prior to bringing the containers on site.

.2 Do not overfill the containers and keep area around the perimeter free and clear of any debris.

.4 Storage

.1 Exercise extreme care when storing combustible waste materials in work areas. Ensure maximum possible cleanliness, ventilation and that all safety standards are adhered to when storing any combustible materials.

.2 Deposit greasy or oily rags or materials subject to spontaneous combustion in CSA or ULC approved receptacles and remove at the end of the work day or shift, or as directed.

.12 Flammable Liquids

.1 The handling, storage and use of flammable liquids is governed by the current National Fire Code of Canada.

.2 Flammable Liquids such as gasoline, kerosene and naphtha may be kept for ready use in quantities not exceeding 45 litres (10 imp gal), provided they are stored in approved safety cans bearing the ULC seal of approval and kept away from buildings, stockpiled combustible materials etc. Storage of quantities of flammable liquids exceeding 45 litres (10 imp gal) for work purposes, require the permission of the Departmental Representative.

.3 Flammable liquids are not to be left on any roof areas after normal working hours.

.4 Transfer of flammable liquids is prohibited within buildings.

.5 Do not transfer flammable liquids in the vicinity of open flames or any type of heat producing device.

.6 Do not use flammable liquids having a flash point below 38 ^{o}C (100 ^{o}F) such as naphtha or gasoline as solvents or cleaning agents.

.7 Store flammable waste liquids for disposal in approved container located in a safe, ventilated area. Waste flammable liquids are to be removed from the site on a regular basis.

.8 Where flammable liquids, such as lacquers or urethane are used, ensure proper ventilation and eliminate all sources of ignition. Inform the Departmental Representative prior to, and at the cessation of such work.

3. Questions and/or clarifications

.1 Direct any questions or clarification on Fire or General Safety, in addition to the above requirements, to the Departmental Representative.

END OF SECTION 00 15 45

1. PROJECT DESCRIPTION

1.1. The National Research Council Canada (the "Owner") is upgrading the fuel handling equipment, combustion safety and combustion control systems on the three larger boilers in their Steam Plant located at Building M-06, 1200 Montreal Rd, Ottawa.

1.2. The scope of this specification covers the design, fabrication, installation, testing and commissioning, and TSSA Field Approval for Boilers 1 and Boiler 3.

1.3. The project schedule shall begin after project award. General order of construction shall be as follows:
1.3.1. Replacement of main isolation valves.
1.3.2. Modifications to Boiler 1.
1.3.3. Modifications to Boiler 3.

1.4. Boiler 1 shall be commissioned with combustion tests competed, TSSA Field Approval granted and be completely ready for operation no later than 15 July 2016.

1.5. Boilers 3 shall be commissioned with combustion tests complete, TSSA Field Approval granted and be completely ready for operation no later than 02 Sep 2016.

2. SCOPE OF WORK

2.1. The Contractor shall carry the services of R&R Automation, the "Controls Contractor", for the instrumentation components, VFD and related installation and all electrical work, as well as the work on the combustion safety system and the fuel air ratio control (section 23 09 00). Commissioning and testing of the complete system (section 23 08 00) and TSSA field approval inspection shall also be the responsibility of R&R Automation. During this period of commissioning and testing, the Contractor shall supply assistance as required and repair or replace components as needed. Please allow for the following:

- Boiler 1 – 2 days.
- Boiler 3 – 2 days.

2.2. The intent is to provide the Owner complete systems and, while no attempt has been made to detail or list each individual part required, include all parts and furnish all labour reasonably implied by these documents in order to deliver to the Owner the complete systems ready for operation.

2.3. Plans and specifications augment each other, and any item reasonably implied in one but omitted in the other shall be interpreted as sufficiently covered, and must be provided.

2.4. If the Contractor or R&R Automation finds inconsistencies, or aspects that should be added or deleted from the project scope, then these should be brought to the attention of NRC as soon as possible for their consideration and review.

2.5. The project schedule must be adhered to. The Contractor shall allow for overtime as required in order to meet the milestone dates.

2.6. The Contractor shall supply all required labour, equipment, scaffolding and tools for the complete implementation of this contract. The work shall be carried on in a proper, safe, workmanlike manner to completion, in all respects to the satisfaction of the Owner.

2.7. The Contractor is fully responsible for all administration, supervision, expediting, and coordinating delivery to suit the installation schedules. The Contractor is also fully responsible for the installation, commissioning and testing, start-up and TSSA field approval.

2.8. For components including valves and regulators, the Contractor shall include for all necessary check-out, supervisory or specialist services from equipment suppliers for installation, testing and start-up and training of all equipment.

2.9. R&R Automation shall provide the instrumentation, VFD and changes to the controls systems (section 23 09 00). The Contractor shall provide all the remaining components listed in section 23 00 00.

2.10. The Contractor shall be familiar with the extent of demolition on the removal of instruments, devices, piping and equipment. Before each aspect of demolition, ensure that NRC has submitted their instructions as to any equipment or materials that shall be kept. Control room cabinets, and any equipment such as valves and electronic transmitters that will be not be kept shall be removed and disposed of. Associated field wiring to these devices will also be replaced, wiring will not be re-used.

2.11. The existing Fuel Trains shall be modified or replaced according to the schematics provided by the Consultant (refer to section 23 00 00).

2.12. Ensure that any insulation that may be damaged during any work on the steam piping is repaired.

2.13. The Contractor shall provide an appliance rating plate for each boiler as per TSSA-FA-2012 clause 2.1.26

2.14. Instrumentation, controls equipment and drives shall be installed by R&R Automation as per section 23 09 00 – Instrumentation, Controls and VFD. Electrical Loop drawings for the PLC connections shall be provided by R&R Automation. An electrical schematic for the new combustion safety control system (BMS) is provided by the Consultant.

2.15. The testing, commissioning, start-up and TSSA field inspection will be done by R&R Automation. Assistance by the Contractor may be required during these activities and the Contractor shall allow for such as specified in section 2.1.

2.16. The consultant will provide schematic drawings as included in this specification. Detailed drawings are the responsibility of the Contractor.

2.17. During construction, contamination which was not identified in previous site investigations may become evident. If unexpected contaminated materials (including asbestos) are encountered, the Contractor shall immediately inform NRC and request direction on how to proceed.

2.18. The contractor shall allow for authorized jurisdictional inspections required by authorities and include any fees, obtaining of permits and issuance of notices which shall be arranged and paid for by the Contractor. The exception being that the costs of TSSA for the engineering review and inspection will be paid by NRC.

2.19. In order to comply with all regulations, carry out all changes and alterations required by the jurisdictional inspector without delay to the progress of the work and without any cost to the Owner.

3. DOCUMENTATION

3.1 The Contract shall submit drawings in ample time to allow proper review without delaying progress of scheduled construction.

3.2 Drawings shall be produced in AutoCad (version 2010 or later), sheet size as required.

3.3 Submit two (2) prints and one electronic copy of all required shop drawings to NRC. One (1) reviewed print will be returned to the Contractor.

3.4 Shop drawings and product data shall show, all dimensions, mounting bases and supports, and certification of code compliance.

3.5 Drawing review by NRC or its Consultant is for the sole purpose of ascertaining conformance with the general design concept. The Contractor is responsible for dimensions to be confirmed and correlated at the job site.

3.6 The contractor shall proceed with work dependent on drawing information until final reviewed drawings have been returned by NRC.

3.7 The Contractor shall keep drawings up to date in regard to changes in actual installation from the drawings and specifications and submit final record drawings (i.e. as-builts) to NRC. Refer to section 00 10 00 – General Instructions.

4. COMPLETION

4.1. The work shall not be considered complete until all systems and component parts have been tested and approved and found to be in satisfactory operating condition by the local authority having jurisdiction (TSSA).

4.2. NRC shall be notified in writing to arrange for a final inspection and testing of all systems and TSSA field inspection. Ensure that all deficiencies have been completed and the systems have been tested and approved for operation.

END OF SECTION 01 11 00

Part 1 General

1.1 REFERENCES

.1 American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE)

.1 ASHRAE Standard 90.1-[01], Energy Standard for Buildings Except Low-Rise Residential Buildings (IESNA co-sponsored; ANSI approved; Continuous Maintenance Standard).

.2 American Society for Testing and Materials International (ASTM)

.1 ASTM B209M-[04], Standard Specification for Aluminum and Aluminum Alloy Sheet and Plate [Metric].

.2 ASTM C335-[04], Standard Test Method for Steady State Heat Transfer Properties of Horizontal Pipe Insulation.

.3 ASTM C411-[04], Standard Test Method for Hot-Surface Performance of High-Temperature Thermal Insulation.

.4 ASTM C449/C449M-[00], Standard Specification for Mineral Fiber-Hydraulic-Setting Thermal Insulating and Finishing Cement.

.5 ASTM C533-[2004], Calcium Silicate Block and Pipe Thermal Insulation.

.6 ASTM C547-[2003], Mineral Fiber Pipe Insulation.

.7 ASTM C795-[03], Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel.

.8 ASTM C921-[03a], Standard Practice for Determining the Properties of Jacketing Materials for Thermal Insulation.

.3 Canadian General Standards Board (CGSB)

.1 CGSB 51-GP-52Ma-[89], Vapour Barrier, Jacket and Facing Material for Pipe, Duct and Equipment Thermal Insulation.

.2 CAN/CGSB-51.53-[95], Poly (Vinyl Chloride) Jacketting Sheet, for Insulated Pipes, Vessels and Round Ducts.

.4 Department of Justice Canada (Jus)

.1 Canadian Environmental Assessment Act (CEAA), 1995, c. 37.

.2 Canadian Environmental Protection Act (CEPA), 1999, c. 33.

.3 Transportation of Dangerous Goods Act (TDGA), 1992, c. 34.

.5 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.6 Manufacturer's Trade Associations

.1 Thermal Insulation Association of Canada (TIAC): National Insulation Standards (Revised 2004).

.7 Underwriters' Laboratories of Canada (ULC)

.1 CAN/ULC-S102-[03], Surface Burning Characteristics of Building Materials and Assemblies.

.2 CAN/ULC-S701-[01], Thermal Insulation, Polystyrene, Boards and Pipe Covering.

.3 CAN/ULC-S702-[1997], Thermal Insulation, Mineral Fibre, for Buildings

.4 CAN/ULC-S702.2-[03], Thermal Insulation, Mineral Fibre, for Buildings, Part 2: Application Guidelines.

1.2 DEFINITIONS

.1 For purposes of this section:

.1 "CONCEALED" - insulated mechanical services in suspended ceilings and non-accessible chases and furred-in spaces.

.2 "EXPOSED" - will mean "not concealed" as specified.

.2 TIAC ss:

.1 CRF: Code Rectangular Finish.

.2 CPF: Code Piping Finish.

1.3 SUBMITTALS

.1 Submittals: in accordance with Section 00 10 00 – General Instructions.

.2 Product Data/Shop Drawings:

.1 Submit manufacturer's printed product literature, specifications shop drawings and datasheet in accordance with Section 00 10 00 - General Instructions.

1.4 QUALITY ASSURANCE

.1 Qualifications: installer shall be specialist in performing work of this Section, and have at least three (3) years successful experience in this size and type of project, qualified to standards of TIAC.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Packing, shipping, handling and unloading:

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.2 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.

.2 Storage and Protection:

.1 Protect from weather, construction traffic.

.2 Protect against damage.

.3 Store at temperatures and conditions required by manufacturer.

1.6 WASTE MANAGEMENT AND DISPOSAL

.1 Construction/Demolition Waste Management and Disposal: separate waste materials for reuse and recycling in accordance with Section 00 10 00 – General Instructions.

.2 Place excess or unused insulation and insulation accessory materials in designated containers.

.3 Divert unused metal materials from landfill to metal recycling facility.

.4 Dispose of unused adhesive material at official hazardous material collections site.

Part 2 Products

2.1 FIRE AND SMOKE RATING

.1 In accordance with CAN/ULC-S102.

.1 Maximum flame spread rating: 25.

.2 Maximum smoke developed rating: 50.

2.2 INSULATION

.1 TIAC Code A-1: rigid moulded mineral fibre without factory applied vapour retarder jacket.

.1 Mineral fibre: to CAN/ULC-S702, ASTM C547.

.2 Maximum "k" factor: to CAN/ULC-S702.

2.3 INSULATION SECUREMENT

.1 Tape: self-adhesive, aluminum, plain, 50mm wide minimum.

.2 Contact adhesive: quick setting.

.3 Canvas adhesive: washable.

.4 Tie wire: 1.5mm diameter stainless steel.

.5 Bands: stainless steel, 19mm wide, 0.5mm thick.

.6 Wire mesh: 25mm hexagonal type 304 stainless steel wire, tightly laced together at horizontal and circumferential joints.

2.4 VAPOUR RETARDER LAP ADHESIVE

.1 Water based, fire retardant type, compatible with insulation.

2.5 JACKETS

.1 Canvas:

.1 220 gm/m² cotton, plain weave, treated with dilute fire retardant lagging adhesive to ASTM C921.

.2 Lagging adhesive: compatible with insulation.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

3.2 PRE-INSTALLATION REQUIREMENT

.1 Pressure testing of piping systems and adjacent equipment to be complete, witnessed and certified.

.2 Piping to be inspected and approved by Departmental Representative

.3 Surfaces clean, dry, free from foreign material.

3.3 INSTALLATION

.1 Install in accordance with TIAC National Standards.

.2 Apply materials in accordance with manufacturer’s instructions and this specification.

.3 Use two layers with staggered joints when required nominal wall thickness exceeds 50mm.

.4 Maintain uninterrupted continuity and integrity of vapour retarder jacket and finishes.

.1 Install hangers, supports outside vapour retarder jacket.

.5 Supports, Hangers:

.1 Apply high compressive strength insulation, suitable for service, at oversized saddles and shoes where insulation saddles have not been provided.

3.4 PIPING INSULATION SCHEDULES

.1 Includes valves, valve bonnets, strainers, flanges and fittings unless otherwise specified.

.2 TIAC Code: A-1.

.1 Securements: stainless steel wire at 300mm on centre.

.2 Seals: VR lap seal adhesive, VR lagging adhesive.

.3 Installation: TIAC Code: 1501-H.

.3 Thickness of insulation as listed in following table.

.1 Run-outs to individual units and equipment not exceeding 4000mm long.

.2 Do not insulate exposed runouts to plumbing fixtures, chrome plated piping, valves, fittings.

Application	Temperature (degrees C)	TIAC Code	Pipe sizes (NPS) and Insulation Thickness (mm)					
			Run out	to 1	1 1/4 to 2	2 1/2 to 4	5 to 6	8 & over
STEAM	up to 180	A-1	38	50	75	75	75	75

.4 Finishes:

.1 Exposed indoors: canvas.

.2 Exposed in mechanical rooms: canvas.

.3 Concealed, indoors: canvas on valves, fittings. canvas.

.4 Use vapour retarder jacket on TIAC code A-3 insulation compatible with insulation.

.5 Installation: to appropriate TIAC code CRF/1 through CPF/5.

.5 Repair all damaged insulation on existing modified piping.

3.5 CLEANING

.1 Proceed in accordance with Section 00 10 00 – General Instructions.

.2 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION 21 07 19

1. GENERAL INSTRUCTION

1.1. Refer to Section 00 10 00 - General Instructions. Also refer to the following sections:
Section 21 07 19 - Thermal Insulation for Piping.
Section 23 05 05 - Installation of Pipework.
Section 23 05 17 - Pipe Welding.
Section 23 22 13 - Piping and Valves.

1.2. The Contractor shall be aware that any work required to be performed is to be carefully and closely coordinated with the existing occupants. The areas to be affected by the new piping and demolition work shall be identified prior to commencing construction and as soon as possible after award of Contract.

1.3. The drawings from the Consultant show fuel train piping in a schematic form arrangement. The actual pipe layout is to be determined prior to fabrication and only after close examination of the existing obstructions such as structural beams, light fixtures, piping, and ductwork. Allow for additional offsets and changes to piping and routing in the tender price.

1.4. If the Contractor finds inconsistencies, or aspects that should be added or deleted from the project scope, then these should be brought to the attention of NRC as soon as possible for their consideration and review.

1.5. All of the materials required for the performance of the work shall be new and the best of their respective kind.

1.6. The approximate locations of work are shown on drawing 5042-M07A M06 Ground Floor Layout Locations.

1.7. Major components required are listed in the Device List.

1.8. The scope of work is described in the following sections:

Replacement of Main Shutoff Valves
Changes to Existing Fuel Trains and Vent Piping
Demolition Work including Control Room Backup Controller Cabinets
VFD for Boiler 1 (section 23 09 00 and 26 29 23)
Instrumentation and Control (described in section 23 09 00)

2. CODES AND STANDARDS

2.1. Comply with all codes and standards as listed in the general requirements including:

a) Ontario Regulation 212/01 Gaseous Fuels.

b) TSSA Field Approval Code, TSSA FA-2012.

c) CSA B149.3-10 Code for the Field Approval of Fuel Related Components on Appliances and Equipment.

d) CSA B149.1-10 Natural Gas and Propane Installation Code.

e) CSA B139.1-09 Installation code for oil-burning equipment.

2.2. All natural gas components shall be visibly marked as CSA or CGA approved.

2.3. The contractor shall be registered with TSSA and have an up to date welding procedure.

2.4. The piping installation, repair and testing shall be done by a licensed Gas technician 1 (G1) or a licensed gas piping fitter (GP).

3. SCOPE OF WORK : Replacement of Main Shutoff Valves

3.1. For this section also refer to drawings 5042-M08 Areas of Work – Pictorial Views and the Device List.

3.2. The following valves shall be replaced:

a) 8″ main shutoff valve located at the level of the main floor along the back wall between Boilers 3 and 4 (Item 1 Device list, Detail 1on drawing 5042-M08).

b) 6″ shutoff valve for Boiler 4 that is elevated at the rear of Boiler 4 (Item 2 Device List, Detail 2 on drawing 5042-M08).

c) 6″ shutoff valve for Boiler 2 that is located in front of Boiler 2 (Item 3 Device List, Detail 3 on drawing 5042-M08).

d) 6″ shutoff valve for Boiler 3 that is located near the front of Boiler 3 (Item 1 on drawing 5042-M03, Detail 4 on drawing 5042-M08).

3.3. These valves shall be purchased and available for installation during the first available NRC scheduled weekend steam shutdown proposed for late May. Finalized date for scheduled shutdown to be coordinated with NRC.

3.4. Replacement of these valves shall be completed prior to commencement of any other work detailed under this project.

4. SCOPE OF WORK : Changes to Boiler 1 Fuel Trains and Vent Piping

4.1. For this section also refer to drawings 5042-M01 Boiler 1 Gas Train, 5042-M02 Boiler 1 Oil Train, 5042-M08 Areas of Work – Pictorial Views and the Device List.

4.2. Boiler 1 Fuel Trains : Gas

a) Add a Strainer for the natural gas inlet (Item 2 on drawing 5042-M01, Detail 5 on drawing 5042-M08). The suggested location is to replace the overhead spool piece located downstream of the appliance main shutoff with a strainer and a shorter spool piece.
b) Replace the existing downstream manual reset type Maxon SSOV with a Maxon automatic reset type (Item 15 on drawing 5042-M01, Detail 6 on drawing 5042-M08).
c) Both flexible hoses must be replaced (Items 14 & 28 on drawing 5042-M01, Detail 6 on drawing 5042-M08); the existing hoses do not have indication of CRN number and CSA certification for natural gas.

4.3. Boiler 1 Fuel Trains : Venting

a) Safety vent valve on the pilot line is no longer required. Disconnect and remove valve and associated vent piping and plug. This involves the removal of about 10 feet of piping (Item 20 on drawing 5042-M01, Detail 7 on drawing 5042-M08).

4.4. Boiler 1 Fuel Trains : Oil

a) The flexible hose must be replaced, the existing hose does not show rating of 1000F (Item 12 on drawing 5042-M02, Detail 8 on drawing 5042-M08).
b) A means to handle a pressure surge between the two SSOVs must be added. To achieve this, install a vertical 4" nipple (Item 25 on drawing 5042-M02, Detail 8 on drawing 5042-M08).

4.5. Boiler 1 Fuel Trains : Steam

a) Flexible hose must be replaced, the existing hose does not show rating of 1000F (Item 21 on drawing 5042-M02, Detail 8 on drawing 5042-M08).
b) Safety Shut-Off valve missing and must be added as per NFPA 85 (Item 20 on drawing 5042-M02, Detail 8 on drawing 5042-M08).
c) Low Atomizing Steam Pressure switch missing and must be added (Item 17 on drawing 5042-M02, Detail 8 on drawing 5042-M08).

5. SCOPE OF WORK : Changes to Boiler 3 Fuel Trains and Vent Piping

5.1. For this section also refer to drawing 5042-M03 Boiler 3 Gas Train, 5042-M04 Boiler 3 Oil Train, 5042-M09 Areas of Work – Pictorial Views and the Device List.

5.2. Boiler 3 Fuel Trains : Gas

a) Add a Strainer downstream of the appliance shut-off valve and upstream of the regulator (Item 5 on drawing 5042-M03, Detail 1 on drawing 5042-M09).
b) The butterfly valve shall be replaced with a valve that is designed for use with natural gas (Item 8 on drawing 5042-M03, Detail 2 on drawing 5042-M09).
c) Replace the pilot train from take-off from main train to the final burner connection, no pilot safety vent valve required (refer to Items 20, 21, 22, 24, 25 & 26 on drawing 5042-M03, Detail 3 on drawing 5042-M09). Include a new CSA approved flexible hose (Item 27 on drawing 5042-M03, Detail 4 on drawing 5042-M09).
d) Replace existing downstream manual reset type Maxon SSOV with Maxon automatic reset type (Item 11 on drawing 5042-M03).

5.3. Boiler 3 Fuel Trains : Venting

a) Disconnect vent line from pilot safety vent valve and plug. Remove vent piping back to main Boiler 2 vent. (Item 20 on drawing 5042-M03, Details 6, 7 & 8 on drawing 5042-M09).
b) Disconnect main regulator sensing line bleed valve and plug. Remove vent piping back to main Boiler 2 vent. (Details 5, 6, 7 & 8 on drawing 5042-M09).
c) Disconnect the vent combination where Boiler 2 main natural gas vent connects with Boiler 3 main natural gas vent. Cap Boiler 2 interconnection at Boiler 3 main natural gas vent. This combination is located at the front right of the boiler near the top of the boiler. Rework new main and pilot regulator vent piping and connect to existing interconnection point on Boiler 2 main natural gas vent where existing pilot safety vent (5.3.a) and main regulator sensing bleed line (5.3.b) combined vent are to be removed (Details 6, 7 & 8 on drawing 5042-M09).

5.4. Boiler 3 Fuel Trains : Oil

a) Remove the changeover gun port and weld a cover. Remove the associated valves and lines for the changeover burner for both steam and oil back to relevant “Tee” in line. Remove the associated switches and wiring (Detail 4 on drawing 5042-M09).
b) The flexible hose must be replaced, the existing hose does not show rating of 1000F (Item 15 on drawing 5042-M04, Detail 4 on drawing 5042-M09).
c) A means to handle a pressure surge between the two SSOVs must be added. To achieve this, install a vertical 4" nipple (Item 23 on drawing 5042-M04, Detail 4 on drawing 5042-M09).
d) Replace oil flow transmitter with PD type similar to or identical to that used on Boiler 1 (Item 5 on drawing 5042-M04, Detail 4 on drawing 5042-M09).

5.5. Boiler 3 Fuel trains : Steam

a) The flexible hose must be replaced, the existing hose does not show rating of 1000F (Item 25 on drawing 5042-M04, Detail 4 on drawing 5042-M09).
b) Safety Shut-Off valve missing and must be added as per NFPA 85 (Item 19 on drawing 5042-M04, Detail 4 on drawing 5042-M09).

c) Low Atomizing Steam/Oil Differential Pressure switch is missing and must be added (Item 20 on drawing 5042-M04, Detail 4 on drawing 5042-M09).
d) Remove Bypass valves as indicated in drawing (Items 24 on drawing 5042-M04, Detail 4 on drawing 5042-M09).

6. DEMOLITION WORK

6.1. The Contractor shall confirm which items shall be kept before commencing work on each area of demolition.

6.2. Before demolition of Boiler 3 pilot train, coordinate with R&R Automation for the removal of existing instrumentation so that these components can be reused.

6.3. Coordinate with R&R Automation before the Backup controller cabinets that are located in the control room are removed. R&R Automation will relocate the Boiler E-Stops into a new cabinet and will remove the associated wiring from the control room cabinets to the controls cabinets located near the boiler.

7. INSTALLATION

7.1. In addition to the articles below, follow Sections 23 05 05 - Installation of Pipework and 23 05 17- Pipe Welding.

7.2. Provide sufficient supports and hangers for pipe services per code.

7.3. Onsite welding shall follow standard industrial safe practices. Use safety watch, shielding screen, use separate grounds etc. Follow NRC procedures for hot work permit process.

7.4. Slope piping down in direction of flow to low points.

7.5. Install drip pockets at all low points in piping system.

7.6. Ream pipes and clean inside and out.

7.7. Paint all new natural gas piping. Clean and prepare piping, prime and paint yellow, a minimum of two coats. Standard of Acceptance: Benjamin Moore TP-2224.

8. PIPING : PRESSURE TESTING AND PURGING

8.1. Pressure test natural gas piping following guidelines of CSA B149.1-10 Clause 6.22.

8.2. Purge natural gas piping following guidelines of CSA B149.1-10 Clause 6.23.

8.3. Pressure test fuel oil systems following NFPA 85 guidelines.

9. WORKMANSHIP

9.1. Only first class workmanship will be accepted, not only as regards to safety, efficiency, durability, etc., but also as regards to the neatness of detail. All piping and ductwork must be lined up paralleling or at right angles to the building or appliance walls, except where indicated otherwise on the design schematics.

9.2. Equipment must be accurately set, plumbed and levelled, and hanger rods must be similarly in true vertical alignment. In general, the entire work throughout shall be first class and workmanlike and present a neat and clean appearance on completion.

9.3. Follow manufacturer's instructions for fabrication, application and installation.

9.4. Maintain uninterrupted all services which are necessary for the effective functioning of the existing building program and operations.

9.5. Execute all work as quietly as possible in and around existing building. Noisy operations shall be scheduled with the Owner.

10. TESTING AND COMMISSIONING

10.1. Also refer to section 23 08 00 for testing and commissioning.

10.2. Ensure that all equipment and systems are operable and safe for normal operation. All testing, adjusting and record keeping shall be performed prior to commissioning.

10.3. Use qualified personnel to test and commission mechanical equipment and systems.

10.4. Tests which fail to verify acceptable performance of equipment and systems shall be repeated after corrective measures are carried out, and this process shall continue until acceptable performance is achieved.

10.5. Functional performance tests shall be witnessed by the Owner. Submit test report which shall include space for remarks and Owner's acceptance signature.

END OF SECTION 23 00 00

Part 1 General

1.1 REFERENCES

.1 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-1.181-[99], Ready-Mixed Organic Zinc-Rich Coating.

.2 American Society for Testing and Materials International (ASTM)

.1 ASTM A53/A53M-[04], Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.

.2 ASTM A181/A181M-[01], Standard Specification for Carbon Steel Forgings for General Purpose Fitting.

1.2 SUBMITTALS

.1 Provide submittals in accordance with Section 00 10 00 – General Instructions.

1.3 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle in accordance with manufacturer's recommendations.

.2 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.

.3 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, paddling and packaging materials in accordance with Section 00 10 00 – General Instructions.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 APPLICATION

.1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 CONNECTIONS TO EQUIPMENT

.1 In accordance with manufacturer's instructions unless otherwise indicated.

.2 Use valves and either unions or flanges for isolation and ease of maintenance and assembly.

.3 Use double swing joints when equipment mounted on vibration isolation and when piping subject to movement.

.4 Provide flexible connectors complete with all accessories for air handling units, heat exchangers, pumps, chillers, cooling towers, etc.

3.3 CLEARANCES

.1 Provide clearance around systems, equipment and components for observation of operation, inspection, servicing, maintenance and as recommended by manufacturer.

.2 Provide space for disassembly, removal of equipment and components as recommended by manufacturer or as indicated (whichever is greater) without interrupting operation of other system, equipment, and components.

3.4 DRAINS

.1 Install piping with grade in direction of flow except as indicated.

.2 Install drain valve at low points in piping systems, at equipment and at section isolating valves.

.3 Pipe each drain valve discharge separately to above floor drain. Discharge to be visible.

.4 Drain valves: NPS ½ or ¾ gate or globe valves unless indicated otherwise, with hose end male thread, cap and chain.

.5 Drawings do not show all valves. Contractor shall be responsible to provide all drain valves required.

3.5 DIELECTRIC COUPLINGS, UNIONS & FLANGE KITS

.1 General: compatible with system, to suit pressure rating of system.

.2 Locations: where dissimilar metals are joined.

.3 NPS 2 and under: isolating unions or bronze valves.

.4 NPS 2 & Over: isolating flange kits to suit temperature, pressure and working fluid.

3.6 PIPEWORK INSTALLATION

.1 Screwed fittings jointed with Teflon tape.

.2 Protect openings against entry of foreign material.

.3 Install to isolate equipment and allow removal without interrupting operation of other equipment or systems.

.4 Pipe routing on drawings is only indicative and does not show all valves, fittings supports and accessories. Contractor shall verify site conditions prior to commencement of work, and allow for all required piping accessories and supports.

.5 Assemble piping using fittings manufactured to ANSI standards.

.6 Saddle type branch fittings may be used on mains if branch line is no larger than half size of main.

.1 Hole saw (or drill) and ream main to maintain full inside diameter of branch line prior to welding saddle.

.7 Install exposed piping, equipment, rectangular cleanouts and similar items parallel or perpendicular to building lines.

.8 Install concealed pipework to minimize furring space, maximize headroom, conserve space.

.9 Slope piping, except where indicated, in direction of flow for positive drainage and venting.

.10 Install, except where indicated, to permit separate thermal insulation of each pipe.

.11 Group piping wherever possible.

.12 Ream pipes, remove scale and other foreign material before assembly.

.13 Use eccentric reducers at pipe size changes to ensure positive drainage and venting.

.14 Provide for thermal expansion as indicated.

.15 Valves:

.1 Install in accessible locations.

.2 Remove interior parts before soldering.

.3 Install with stems above horizontal position unless otherwise indicated.

.4 Valves accessible for maintenance without removing adjacent piping.

.5 Install globe valves in bypass around control valves.

.6 Use ball valves at branch take-offs for isolating purposes except where otherwise specified.

.7 Use chain operators on valves NPS 2-1/2 and larger where installed more than 2400mm (95 inches) above floor in Mechanical Rooms.

.16 Check Valves:

.1 Install silent check valves on discharge of pumps and in vertical pipes with downward flow and elsewhere as indicated.

.2 Install swing check valves in horizontal lines on discharge of pumps and elsewhere as indicated.

.17 Provide flexible connectors complete with accessories on all equipment.

3.7 SLEEVES

.1 General: install where pipes pass through masonry, concrete structures, fire rated assemblies, and elsewhere as indicated.

.2 Material: schedule 40 black steel pipe.

.3 Construction: foundation walls and where sleeves extend above finished floors to have annular fins continuously welded on at mid-point.

.4 Sizes: 6mm (1/4 inch) minimum clearance between sleeve and uninsulated pipe or between sleeve and insulation.

.5 Installation:

.1 Concrete, masonry walls, concrete floors on grade: terminate flush with finished surface.

.2 Other floors: terminate 25mm (1 inch) above finished floor.

.3 Before installation, paint exposed exterior surfaces with heavy application of zinc-rich paint to CAN/CGSB-1.181.

.6 Sealing:

.1 Foundation walls and below grade floors: fire retardant, waterproof non-hardening mastic.

.2 Elsewhere: Provide space for firestopping. Maintain fire rating integrity.

.3 Sleeves installed for future use: fill with lime plaster or other easily removable filler.

.4 Ensure no contact between copper pipe or tube and sleeve.

3.8 ESCUTCHEONS

.1 Install on pipes passing through walls, partitions, floors, and ceilings in finished areas.

.2 Construction: one piece type with set screws. Chrome or nickel plated brass or type 302 stainless steel.

.3 Sizes: outside diameter to cover opening or sleeve. Inside diameter to fit around pipe or outside of insulation if so provided.

3.9 PREPARATION FOR FIRESTOPPING

.1 Material and installation within annular space between pipes, ducts, insulation and adjacent fire separation to be fire stopped.

.2 Uninsulated unheated pipes not subject to movement: No special preparation.

.3 Uninsulated heated pipes subject to movement: wrap with non-combustible smooth material to permit pipe movement without damaging fires topping material or installation.

.4 Insulated pipes and ducts: ensure integrity of insulation and vapour barriers.

3.10 FLUSHING OUT OF PIPING SYSTEMS

.1 Flush system in accordance with Section 23 08 02 - Cleaning and Start-up of Mechanical Piping Systems.

.2 Before start-up, clean interior of piping systems in accordance with requirements of Section 00 10 00 – General Instructions supplemented as specified in relevant mechanical sections.

.3 Preparatory to acceptance, clean and refurbish equipment and leave in operating condition, including replacement of filters in piping systems.

3.11 PRESSURE TESTING OF EQUIPMENT AND PIPEWORK

.1 Advise Departmental Representative 48h minimum prior to performance of pressure tests.

.2 Pipework: test as specified in relevant sections of mechanical specification.

.3 Maintain specified test pressure without loss for 4h unless specified for longer period of time in relevant mechanical sections.

.4 Prior to tests, isolate equipment and other parts which are not designed to withstand test pressure or media.

.5 Conduct tests in presence of Departmental Representative.

.6 Pay costs for repairs or replacement, retesting, and making good. Departmental Representative to determine whether repair or replacement is appropriate.

.7 Insulate or conceal work only after approval and certification of tests by Departmental Representative.

3.12 EXISTING SYSTEMS

.1 Connect into existing piping systems at times approved by Departmental Representative.

.2 Request written approval 10 days minimum, prior to commencement of work.

.3 Be responsible for damage to existing plant by this work.

.4 Ensure daily clean-up of existing areas.

3.13 CLEANING

.1 Clean in accordance with Section 00 10 00 – General Instructions. Remove surplus materials, excess materials, rubbish, tools and equipment.

.2 Waste Management: separate waste materials for reuse and recycling in accordance with Section 00 10 00 – General Instructions.

END OF SECTION 23 05 05

Part 1 General

1.1 REFERENCES

.1 American National Standards Institute/American Society of Mechanical Engineers (ANSI/ASME)

.1 ANSI/ASME B31.1-[07], Power Piping.

.2 ANSI/ASME B31.3-[08], Process Piping.

.3 ANSI/ASME Boiler and Pressure Vessel Code-[07]:

.1 BPVC 2007 Section I: Power Boilers.

.2 BPVC 2007 Section V: Nondestructive Examination.

.3 BPVC 2007 Section IX: Welding and Brazing Qualifications.

.2 American National Standards Institute/American Water Works Association (ANSI/AWWA)

.1 ANSI/AWWA C206-[03], Field Welding of Steel Water Pipe.

.3 American Welding Society (AWS)

.1 AWS C1.1M/C1.1-[2000(R2006)], Recommended Practices for Resistance Welding.

.2 AWS Z49.1-[05], Safety in Welding, Cutting and Allied Process.

.3 AWS W1-[00], Welding Inspection Handbook.

.4 Canadian Standards Association (CSA International)

.1 CSA W47.2-[M1987(R2008)], Certification of Companies for Fusion Welding of Aluminum.

.2 CSA W48-[06], Filler Metals and Allied Materials for Metal Arc Welding.

.3 CSA B51-[03(R2007)], Boiler, Pressure Vessel and Pressure Piping Code.

.4 CSA-W117.2-[06], Safety in Welding, Cutting and Allied Processes.

.5 CSA W178.1-[08], Certification of Welding Inspection Organizations.

.6 CSA W178.2-[08], Certification of Welding Inspectors.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 00 10 00 – General Instructions

1.3 QUALITY ASSURANCE

.1 Qualifications:

.1 Contractor:

.1 Contractor shall have a Certificate of Authorization for the following Quality Assurance Systems:

.2 The construction of piping systems in accordance with CSA B149.1-[10] and ANSI/ASME B31.1 and the requirements of CSA B51 latest edition and CSA 285.0-[95], Class 6 latest edition with field construction and assembly.

.2 Welders:

.1 Welding qualifications in accordance with CSA B51.

.2 Use qualified and licensed welders possessing certificate for each procedure performed from authority having jurisdiction.

.3 Submit welder's qualifications to Departmental Representative.

.4 Each welder to possess identification symbol issued by authority having jurisdiction.

.5 Certification of companies for fusion welding of aluminum in accordance with CSA W47.2.

.3 Inspectors:

.1 Inspectors qualified to CSA W178.2.

.4 Certifications:

.1 Registration of welding procedures in accordance with CSA B51.

.2 Copy of welding procedures available for inspection.

.3 Safety in welding, cutting and allied processes in accordance with CSA-W117.2.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle in accordance with Section 00 10 00 – General Instructions.

.2 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.

.3 Packaging Waste Management: remove for reuse and or recycling of pallets, crates, paddling and packaging materials in accordance with Section 00 10 00 – General Instructions.

Part 2 Products

2.1 ELECTRODES

.1 Electrodes: in accordance with CSA W48 Series.

Part 3 Execution

3.1 WORKMANSHIP

.1 Welding to be in accordance with ANSI/ASME B31.1 Power Piping Code, ANSI/ASME Boiler and Pressure Vessel Code, Sections I and IX and ANSI/AWWA C206 using procedures conforming to AWS C1.1, and special provides where specified elsewhere.

.2 Contractor shall provide smoke eater of adequate capacity for all indoor welding.

3.2 APPLICATION

.1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.3 QUALITY OF WORK

.1 Welding: in accordance with ANSI/ASME B31.1, ANSI/ASME Boiler and Pressure Vessel Code, Sections I and IX and ANSI/AWWA C206, using procedures conforming to AWS B3.0, AWS C1.1, and special procedures specified as applicable requirements of provincial authority having jurisdiction.

3.4 INSTALLATION REQUIREMENTS

.1 Identify each weld with welder's identification symbol.

.2 Backing rings:

.1 Where used, fit to minimize gaps between ring and pipe bore.

.2 Do not install at orifice flanges.

.3 Fittings:

.1 NPS 2 and smaller: install welding type sockets.

.2 Branch connections: install welding tees or forged branch outlet fittings.

3.5 INSPECTION AND TESTS - GENERAL REQUIREMENTS

.1 Review weld quality requirements and defect limits of applicable codes and standards with Departmental Representative.

.2 Formulate "Inspection and Test Plan" in co-operation with Departmental Representative.

.3 Do not conceal welds until they have been inspected, tested and approved by inspector.

.4 Provide for inspector to visually inspect welds during early stages of welding procedures in accordance with Welding Inspection Handbook. Repair or replace defects as required by codes and as specified.

.5 Contractor shall be responsible for TSSA Fuels Safety Program Piping System Installation and Test Data Report implementation and documentation to be submitted to NRC Departmental Representative upon completion. The NRC has previously registered the natural gas piping. Refer to appendices for registration number.

3.6 SPECIALIST EXAMINATIONS AND TESTS

.1 General:

.1 Perform examinations and tests by specialist qualified to CSA W178.1 and CSA W178.2 and approved by Departmental Representative.

.2 To ANSI/ASME Boiler and Pressure Vessels Code, Section V, CSA B51 and requirements of authority having jurisdiction.

.3 Inspect and test 20% of welds in accordance with "Inspection and Test Plan" by non-destructive visual examination and full gamma ray radiographic (hereinafter referred to as "radiography") tests.

.2 Hydrostatically test welds to ANSI/ASME B31.1.

.3 Visual examinations: include entire circumference of weld externally and wherever possible internally.

.4 Failure of visual examinations:

.1 Upon failure of welds by visual examination, perform additional testing as directed by Departmental Representative of total of up to 10% of welds, selected at random by Departmental Representative by radiography.

.5 Radiographic tests of piping systems.

.1 Radiographic film:

.1 Identify each radiographic film with date, location, name of welder, and submit to Departmental Representative. Replace film if rejected because of poor quality.

.2 Interpretation of radiographic films:

.1 By qualified radiographer.

.3 Failure of radiographic tests:

.1 Extend tests to welds by welder responsible when those welds fails tests.

3.7 DEFECTS CAUSING REJECTION

.1 As described in ANSI/ASME B31.1 and ANSI/ASME Boiler and Pressure Vessels Code.

3.8 REPAIR OF WELDS WHICH FAILED TESTS

.1 Re-inspect and re-test repaired or re-worked welds at Contractor's expense.

3.9 CLEANING

.1 Clean in accordance with Section 00 10 00 – General Instructions.

.2 Waste Management: separate waste materials for reuse and recycling in accordance with Section 00 10 00 – General Instructions.

END OF SECTION 23 05 17

1. DEFINITION

1.1. Commissioning is the process of assuring that all systems and components of a building or industrial plant are designed, installed, tested, operated, and maintained according to the operational requirements of the owner or final client.

2. SCOPE OF WORK

2.1. The Project requires the testing, commissioning, start-up, TSSA Field Approval and Owner approval. The responsibility for this lies with the Contractor either directly or indirectly via the Controls Contractor (R&R Automation).

2.2. All of the following tasks shall be completed for both natural gas firing and oil firing.

2.3. Testing the installed components and systems both electrically and mechanically to the extent possible and practical shall occur before the commissioning phase.

2.4. Field instruments shall be calibrated before commissioning. Calibration sheets shall be completed.

2.5. The Controls Contractor shall conduct point to point and instrument loop checks (for each field device wired to the control system) and initial equipment operation (from the control system). This shall be done before the commissioning exercise.

2.6. The Controls Contractor will lead the commissioning activities. Any modifications or corrections required for the field devices or equipment may require support from the Contractor. The Contractor shall include time for that support.

2.7. The Controls Contractor shall develop the commissioning schedule for each boiler. The schedule shall identify when the installation Contractor shall be onsite for support or on standby.

2.8. The Controls Contractor shall create a safety interlock checklist showing switch set-points where applicable. This shall be completed and signed off during commissioning, prior to the TSSA Field Inspection Visit.

2.9. The Fuel Air Ratio Control shall be commissioned for the full operating range of the boiler for both fuels. A performance test at various operating points shall be conducted. Measurements shall be recorded of all flows, temperatures and pressures as well as the flue gas oxygen and carbon monoxide content. Carbon monoxide levels shall be below 400 ppm as specified in TSSA FA-2012. The recorded test results shall be submitted to NRC and available to TSSA during the field inspection

2.10. For each Boiler there will be a TSSA Field Inspection. During the field inspection the installation and components will be reviewed for code compliance. The Combustion Safety

System will be checked. The Controls Contractor should be prepared to demonstrate any of the safe actions that they have designed in the FARC system. For example:

- Simulate failure of Air flow transmitter (disconnect transmitter); Did boiler operate safely?
- Simulate failure of Fuel flow transmitter (disconnect transmitter); Did boiler operate safely?
- Check Cross limited control: increase boiler master output while preventing air flow damper from opening; Did gas valve open?
- Check Cross limited control: decrease boiler master output while preventing gas flow control valve from closing; Did air damper close?
- O2 trim : i) put O2 signal high then observe effect ; ii) put O2 signal low then observe effect; expect to see less than 10% effect on combustion controls.
- Demonstrate shutdown caused by Failure of watch dog timer on FARC system.

3. RESPONSIBILITIES

3.1. The Contractor shall coordinate work and manpower requirements for all sub-trades as required ensuring that all of the systems and components are tested and the commissioning work can be done without interruption.

3.2. Where any component or system that requires testing, the Contractor shall arrange for trades participation for that test in advance of the commissioning period.

3.3. Should the start-up, commissioning or testing phase identify any deficient work or equipment, then the Contractor shall expedite the remediation of such.

3.4. The Controls Contractor shall advise NRC when the commissioning will be completed and that the TSSA Field Inspection can be arranged. Unless delegated, NRC will arrange the TSSA Field Inspection.

3.5. Costs from TSSA for the TSSA Field Approval will be covered by NRC.

END OF SECTION 23 08 00

1. GENERAL INSTRUCTIONS

1.1. Refer to section 26 05 00 - Common Work Results - Electrical.

1.2. All work in this section shall be done by the Controls Contractor.

2. CODES AND REGULATIONS

2.1. All instruments shall be CSA approved and visibly marked as such.

2.2. Electrical Panels shall be CSA approved.

2.3. Obtain approval from the local jurisdiction that the equipment and complete system meets their requirements. Ensure that ESA "S-label" stickers are obtained for each Boiler prior to the TSSA Field Approval Inspection.

3. SCOPE OF WORK

3.1. The Controls Contractor shall include for all necessary check-out, supervisory or specialist services from equipment suppliers for installation, testing and start-up of all equipment.

3.2. The Controls Contractor shall update all wire tags and field tags for all instrumentation both new, re-used and existing.

3.3. The Controls Contractor shall provide updated wiring drawings for all PLC Layouts, Front and Interior Panel Layout and field terminations. The drawings shall be in AutoCad format.

3.4. The detailed scope of work is described in the following sections and applies to all boilers, except for the VFD which applies to Boiler 1 only.

Modifications to Existing Fuel Air Ratio Control and Combustion Safety Control
Boiler 1 VFD
Demolition of Backup Controller Cabinets
Instrumentation (new and re-used)

4. MODIFICATIONS TO EXISTING CONTROL SYSTEMS

4.1. Modifications to existing Fuel/Air Ratio Controls

4.1.1. The Fuel Air Ratio Control for each boiler is done with an ABB PLC. The existing equipment is suitable for this task. The software application logic must be modified to meet the requirements of Annex D of CSA B149.3-10.

4.1.2. Within two (2) weeks of project award the Controls Contractor shall prepare a response to Annex D of CSA B149.3-10 and submit this to NRC. NRC will approve the safe operating philosophy. If there are any changes desired, they shall be incorporated into a revised response by the Controls Contractor. NRC will then send this document as part of the Field Approval submission to TSSA.

4.1.3. The Controls Contractor shall be prepared and allow time for compliance tests of this control logic by a TSSA inspector during the field approval inspection visit.

4.2. Modifications to Combustion Safety Control

4.2.1. The Combustion Safety Control for each boiler is done with an ABB PLC. The existing equipment is <u>not approved</u> for this task. A Fireye Burner Logix YB110DC with YP102 programmer module and Fireye YZ300 interlock annunciator shall be purchased and installed. The existing ABB flame scanners shall be re-used.

4.2.2. The electrical drawings for the Fireye System are provided in this specification for review. The Controls Contractor shall review this drawing for accuracy and completeness before proceeding with the work. Comments if required shall be submitted to NRC before work is started. Drawings 5042-E01 to 5042-E06 & 5042-E10 are included in this specification.

4.2.3. The existing PLC will be retained and re-configured in order to collect status information from the field contacts either directly or via Modbus from the Fireye YZ300 Annunciator. A communications module shall be added to the ABB PLC for the Modbus communication.

4.2.4. The Operator HMI Displays will continue to receive tag information from the existing PLCs.

4.2.5. Add a Furnace pressure switch to Boiler 3 and wire to the Combustion Safety System. Set the pressure trip setting according to the boiler manufacturer's information.

4.2.6. Add a differential pressure switch across the Boiler 1 economizer and wire to the Combustion Safety System. Set the pressure trip setting according to the economizer manufacturer's information.

4.2.7. Boiler 1 VFD running and fault status shall be connected to the Combustion Safety Control as indicated on the drawing 5042-E03.

4.2.8. A ventilation system interlock must be added to each Boiler's Combustion Control System. The building pressurization status is monitored through a series of four (4) differential pressure transmitters (one at each building exposure). An outside air pressure pickup port shall be installed on the outside of the building and connected to a Pressure Switch which will then be wired into the control system. The wiring drawing 5042-E10 is included in this specification. The instruments, pickup port, safety relay and related installation and wiring shall be provided. The safety relay shall be located in the new E-Stop cabinet (refer to item 6.4).

5. BOILER 1 VFD

5.1. A new 50 HP VFD will be added on Boiler 1 for the FD fan control, refer to specification section 26 29 23 – Variable Frequency Drive. The Controls Contractor will supply, install and commission the VFD.

5.2. The VFD will be adequately environmentally protected for the proposed installation location, taking into account the dust, water and heat such that the local environment will not cause or contribute to a VFD failure or alarm.

5.3. The drive will be located on the control room floor within 50 feet from the fan motor. Refer to the location shown on drawing 5042-M07A.

5.4. The MCC for Boiler 1 VFD is located in room 207 which is above room 111. Refer to the location shown on drawing 5042-M07A.

5.5. Included in the supply of the VFD will be a Bypass System such that the fan may be operated with or without the VFD in operation, and will even allow the VFD to be removed without losing fan control.

5.6. A Profibus connection shall be installed between the VFD and the DCS. Signals to indicate either operating mode (Normal or Bypass) as well as firing rate control signals and feedback shall be communicated with the DCS.

5.7. Signals indicating VFD fault and other Appliance status necessary for safe Burner operation as required by code and this specification will be hardwired directly to the new Burner Management System (BMS).

5.8. The VFD and fan will operate from the DCS based control system to control air flow. The existing Variable Inlet Vanes (air damper system) will NOT be removed as they will be used at low boiler firing rates.

5.9. The boiler will be tuned such that the boiler may operate using VFD control augmented by damper operation, and may also operate solely on the existing Variable Inlet Vanes as before.

5.10. The Fuel/Air Ratio shall be commissioned for both cases above, for Natural Gas firing and for back-up #2 Oil firing with the VFD in operation and in bypass mode.

6. DECOMMISSION OF BACKUP CONTROLLERS

6.1. There are three (3) cabinets in the control room that house ABB Protronic controllers that have acted as backup controls. These cabinets shall be removed along with the related wiring including back to the relays in the associated PLC cabinets.

6.2. The PLC software configuration logic shall be modified as required to remove the facility for the backup control.

6.3. A new desktop will be supplied by NRC to cover the table top in the control room.

6.4. The three (3) E-Stops in the above cabinets shall be moved to a new separate small cabinet to be located in the control room. All wiring for this shall be retained and re-used where possible without using junction boxes.

7. INSTRUMENTATION

7.1. All instruments to be purchased and installed are identified on the Device List (Appendix A).

7.2. The locations of instruments related to the fuel train are shown on the fuel train schematic drawings.

7.3. Install valves with stems upright or horizontal, unless otherwise approved.

7.4. Instruments shall be located to minimize the possibility of damage from high temperature, vibration or humidity and shall not interfere with maintenance of other equipment. Where practical, instruments shall be located and installed with regard to operations viewing and ease of maintenance, including inspection, cleaning, repair, and calibration. Involve NRC Departmental Representative as required.

7.5. Process impulse lines tubing from a process connection to an instrument shall be 1/4", 316SSL seamless and annealed (ASTM A269). All instrument air tubing lines from the instrument manifolds to the valves/dampers shall be 3/8" x 0.035". 316 SSL seamless and annealed 316SS twin-ferrule design tube fittings shall be used; use Swagelok or approved equivalent.

7.6. All instruments shall be complete with a securely fastened tag indicating instrument tag number, model, serial number, calibrated range, etc.

7.7. All instruments shall be calibrated by the Controls Contractor. Calibration sheets shall be completed.

7.8. All differential pressure transmitters shall be provided with and tubed to 3-valve manifolds. Manifolds shall be of 316SS construction, with hard seat type, seals, packing materials, etc., selected to meet the specified process conditions for each application. Manifolds shall have at least a five-year warranty on stem seal leakage with no maintenance requirements. Process connections on manifolds shall be 1/2" NPT.

8. TESTING AND COMMISSIONING

8.1. The Controls Contractor shall conduct point to point and instrument loop checks (for each field device wired to the control system) and initial equipment operation (from the control system).

8.2. The testing and commissioning process is described in specification section 23 08 00 – Testing and Commissioning.

9. COMPLETION

9.1. The work of this Section shall not be considered complete until all systems and component parts have been tested and approved and found to be in satisfactory operating condition by local authority having jurisdiction (TSSA).

END OF SECTION 23 09 00

Part 1 General

1.1 REFERENCES

.1 American National Standards Institute (ANSI) / American Society of Mechanical Engineers (ASME)

.1 ANSI/ASME B31.1-[07], Power Piping.

.2 ANSI/ASME 16.5-[09], Pipe Flanges and Flanged Fittings.

.3 ANSI/ASME B16.25-[07], Buttwelding Ends.

.4 ANSI/ASME B16.3-[06], Malleable Iron Threaded Fittings: Classes 150 and 300.

.5 ANSI/ASME B16.5-[03], Pipe Flanges and Flanged Fittings: NPS 1/2 through 24.

.6 ANSI/ASME B16.9-[07], Factory-Made Wrought Steel Buttwelding Fittings.

.7 ANSI/ASME B18.2.1-[96(R2005)], Square and Hex Bolts and Screws (Inch Series).

.8 ANSI/ASME B18.2.2-[87(R2005)], Square and Hex Nuts (Inch Series).

.9 ANSI/ASME B16.11, Forged Fittings, Socket-Welded and Threaded.

.10 ANSI/ASME B1.20.1, NPT Threads.

.11 ASME Section IX, Welding and Brazing Qualifications.

.2 ASTM International Inc.

.1 ASTM A106-[95], Standard Specification for Seamless Steel Pipe for High Temperature Service.

.2 ASTM A234-[07], Standard Specification for Wrought Carbon and Low Allow Steel Piping Fittings.

.3 ASTM 105/105N, Specification for Carbon Steel Forgings for Piping Applications.

.4 ASTM A53/A53M-[07], Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc Coated, Welded and Seamless.

.5 ASTM A126-[04], Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings.

.3 Canadian Standards Association (CSA International)

.1 CSA W48-[06], Filler Metals and Allied Materials for Metal Arc Welding.

.4 Manufacturers Standardization Society of the Valve and Fittings Industry, Inc.

.1 MSS-SP-70-[06], Cast Iron Gate Valves, Flanged and Threaded Ends.

.2 MSS-SP-71-[05], Gray Iron Swing Check Valves, Flanged and Threaded Ends.

.3 MSS-SP-80-[03], Bronze Gate, Globe, Angle and Check Valves.

.4 MSS-SP-85-[02], Cast Iron Globe and Angle Valves, Flanged and Threaded Ends.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 00 10 00 – General Instructions.

.2 Product Data:

.1 Provide manufacturer's printed product literature and datasheets for valves and pipes and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Shop Drawings:

.1 Provide drawings in accordance with requirements outlined in Section 00 10 00 – General Instructions and Section 23 00 00 – Detailed Scope of Work.

.4 Closeout Submittals

.1 Provide operation and maintenance data for incorporation into manuals as specified in Section 00 10 00 – General Instructions and Section 23 00 00 - Detailed Scope of Work.

1.3 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle in accordance with Section 00 10 00 – General Instructions.

.2 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.

.3 Remove for reuse or return to manufacturer of pallets, crates, padding and packaging materials in accordance with Section 00 10 00 – General Instructions.

1.4 MAINTENANCE MATERIALS SUBMITTALS

.1 Extra Stock Materials:

.1 Provide spare parts as follows:

.1 Valve seats: one for every ten valves, each size. Minimum one.

.2 Discs: one for every ten valves, each size. Minimum one.

.3 Stem packing: one for every ten valves, each size. Minimum one.

.4 Valve handles: two of each size.

.5 Gaskets for flanges: one for every ten flanges.

Part 2 Products

2.1 GENERAL

.1 All products to have CRN registration numbers.

2.2 PIPE & FITTINGS

.1 Generally piping shall be designed in conformance with ANSI/ASME B31.1: Code for Pressure Piping, except for more stringent requirements as outlined herein.

.2 Pipe:

.1 Condensate:

.1 2 NPS & under: carbon steel, schedule 80 to ASTM A106, Grade B.

.2 2.5 NPS & over: carbon steel, schedule 80 to ASTM A53 ERW, Grade B

.2 Steam:

.1 2 NPS & under: carbon steel, schedule 80 to ASTM A106, Grade B.

.2 2.5 NPS & over: carbon steel, schedule 80 to ASTM A53 ERW, Grade B

.3 Natural Gas

.1 Comply with CSA B149.1-10 section 6.

.2 Piping shall comply with ASTM A53/A53M or ASTM A106 and shall be at least schedule 40.

.3 Fittings:

.1 Condensate:

.1 2 NPS & under: socket weld or screwed with PTFE tape to ASME 16.3, forged steel. All reducing fittings to be flat on bottom.

.2 2.5 NPS & over: flanged and welded, ASTM A234, Grade WPB, ANSI 16.9 & 16.25. All reducing fittings to be flat on bottom.

.2 Steam:

.1 2 NPS & under: screwed fittings with PTFE tape to ASME 16.3, forged steel. All reducing fittings to be flat on bottom.

.2 2.5 NPS & over: flanged and welded, ASTM A234, Grade WPB, ANSI 16.9 & 16.25. All reducing fittings to be flat on bottom.

.4 Flanges: to ASTM A105, ASME B16.5, RFWN.

.1 Pressure less than and equal to 15 psig (103 kPa): to match mating flange but minimum Class 125.

.2 Pressure above 15 psig (1030 kPa): Class 300.

.5 Bolting:

.1 Bolts: to ASTM A193 Gr B7.

.2 Nuts: to ASTM A194 Gr 2H.

.6 Gaskets:

.1 Flexitallic non-asbestos. CG style or heavy duty non-asbestos compressed sheet.

.2 Minimum thickness: 1.6mm (1/16").

.3 Standard of Acceptance: Sepco Style 6234 or approved equivalent.

2.3 SPECIALITIES

.1 General:

.1 All valves shall be slow close / open.

.2 Connections:

.1 NPS 2 and smaller: flanged or screwed ends as indicated on contract documents.

.2 NPS 2 1/2 and larger:

.1 Equipment: Flanged ends.

.2 Elsewhere: Flanged or welded ends.

.3 Valves Steam & Condensate Pressure ≤ 15 psig (103 kPa):

.1 Isolation Gate Valves:

.1 2 NPS & under:

.1 Flanged ends or screwed ends as indicated, Class 125 Cast Iron, Outside Screw & Yoke, Bolted Bonnet, Solid Wedge Dist (SWD), Rising Stem, 125 psig (86034 kPa) saturated steam, MSS SP-70 Type 1.

.2 Standard of Acceptance: Velan or approved equivalent.

.2 2-1/2 to 12 NPS:

.1 Flanged ends, Class 125 Cast Iron, Outside Screw & Yoke, Bolted Bonnet, Solid Wedge Disc (SWD), Rising Stem, 125 psig (860 kPa) saturated steam, MSS SP-70 Type 1.

.2 Standard of Acceptance: Velan or approved equivalent.

.2 Check Valves:

.1 2 NPS & under:

.1 Screwed ends, Class 150 Bronze, Y-Pattern Swing, Integral Seat, 150 psig (1,034 kPa) saturated steam, MSS SP-80 Type 3.

.2 Standard of Acceptance: Velan or approved equivalent.

.2 2-1/2 to 10 NPS:

.1 Fanged ends, Class 125 Cast Iron, Swing Check, MSS SP-71.

.2 Standard of Acceptance: Velan or approved equivalent.

.4 Valves Steam & Condensate Pressure > 15 psig (103 kPa):

.1 Isolation Gate Valves:

.1 2 NPS & under:

.1 Screwed end, Class 800, Forged Steel, Bolted Bonnet, Outside Screw & Yoke, Rising Stem.

.2 Standard of Acceptance: Velan or approved equivalent.

.2 2-1/2 to 12 NPS:

.1 Flanged ends, Class 300 Cast Carbon Steel, Bolted Bonnet, Outside Screw & Yoke, and Rising Stem.

.2 Standard of Acceptance: Velan or approved equivalent.

.2 Check Valves:

.1 2 NPS & under:

.1 Screwed ends, Class 800 Forged Carbon Steel, Swing Check, Bolted Cover to API 602.

.2 Standard of Acceptance: Velan or approved equivalent.

.2 2 1/2 to 24 NPS:

.1 Flanged ends, Class 300, Cast Carbon Steel Swing Check, Bolted Cover.

.2 Standard of acceptance: Velan or approved equivalent.

.5 Pressure Gauges:

.1 As specified in accordance with section 23 00 00 – Detailed Scope of Work.

Part 3 Execution

3.1 APPLICATION

.1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 PIPING & FITTINGS

.1 Install pipework in accordance with Section 23 05 05 – Installation of Pipework, supplemented as specified below.

.2 Connect branch lines into top of mains, either vertically or at a 45 degree angle, as space permits.

.3 Connect all equipment in accordance with manufacturer's instructions unless otherwise indicated.

.4 Install piping in direction of flow with slopes as follows, unless indicated:

.1 Steam:

.1 All steam piping: 1:240.

.2 Condensate Return:

.1 Condensate return piping: 1:70.

.2 Slope steam supply and condensate return branch connections to and from equipment at minimum: 25mm in 1.8m (1" in 6').

.5 Provide clearance of installation of insulation and access for maintenance of equipment, valves and fittings.

.6 Ream inside of pipes. Clean scale and dirt from both inside and outside of pipes before assembly. Clean piping after assembly.

.7 Assemble piping using fittings manufactured to ANSI standards.

.8 Connect low pressure condensate drip piping from steam drip trap assemblies into condensate return piping unless otherwise shown on the drawings or specified herein.

.9 Make all changes in the pipe size in horizontal steam and condensate piping with eccentric reducing fittings. Install eccentric reducing fittings in steam piping with the flat on the bottom and in condensate piping with the flat on the top. Do not use bushings in any piping.

.10 Provide minimum 200mm (8″) long, minimum 25mm (1″) diameter valve (gate hose end drain valve) and capped dirt pocket at bottom of all steam and condensate risers.

.11 Provide globe type shut-off valve and vacuum breaker in the steam piping connection to each piece of equipment.

.12 Provide shut-off valve in the condensate return piping from each piece of equipment.

.13 Provide a steam drip trap assembly in the condensate return piping from each piece of equipment, at the base of each riser, and wherever it is necessary to raise the piping to avoid a reduction in ceiling height or minimum headroom allowances. Equip each drip trap with shut-off valve(s), a strainer and a dirt pocket.

.14 Drip traps in condensate piping at a pressure less than 103.5 kPa (15 psi), except as noted below, shall be float and thermostatic type size in accordance with requirements bypass valve to correspond to condensate return piping sizes.

.15 Drip traps in condensate piping at pressure less than 103.5 kPa (15 psi) at radiation units and motorized heaters shall be balanced pressure thermostatic type to suit requirements.

.16 Drip traps in condensate piping at pressure greater than 103.5 kPa (15 psi) shall be inverted bucket type of the proper size.

.17 Provide all required steam vent piping. Confirm exact location of the roof penetration prior to roughing-in. Coordinate all new required roof penetrations with Departmental Representative.

.18 Check and test the operation of all steam relief valves and adjust as required.

.19 Install automated control valves, piping wells and similar piping mounted control components as required to accommodate operation and control of the piping system.

.20 Provide all required steam and condensate piping and accessories for connections to the equipment as shown and/or scheduled as part of this contract.

.21 Make provision for thermal expansion as necessary. Provide expansion joints and compensators, flexible connections, pipe loops and offsets required for expansion and contraction of piping systems.

.22 Support piping to prevent stress and strain on equipment connections.

.23 Drip pocket: line size.

3.3 VALVES

.1 Install valves with stems upright or angled 45 degrees above horizontal unless approved otherwise by Departmental Representative.

3.4 TESTING

.1 Test system in accordance with Section 23 08 00 – Commissioning and Testing.

.2 Steam and Condensate Test pressure: 1-1/2 times maximum system operating pressure.

.3 Pressure test natural gas piping following guidelines of CSA B149.1-10 Clause 6.22.

.4 Purge natural gas piping following guidelines of CSA B149.1-10 Clause 6.23.

.5 Pressure test fuel oil systems following NFPA 85 guidelines.

3.5 SYSTEM START-UP

.1 In accordance with Section 23 08 00 – Commissioning and Testing.

3.6 PERFORMANCE VERIFICATION (PV)

.1 General:

.1 Verify performance in accordance with Section 23 08 00 – Commissioning and Testing.

.2 Timing, only after:

.1 Pressure tests successfully completed.

.2 Flushing as specified has been completed.

.3 Water treatment system has been commissioned.

.3 PV Procedures:

.1 Verify complete drainage of condensate from steam coils.

.2 Verify proper operation of system components, including, but not limited to:

.1 Steam traps - verify no blow-by.

.2 Flash tanks.

.3 Thermostatic vents.

.3 Monitor operation of provisions for controlled pipe movement including expansion joints, loops, guides, anchors.

.1 If expansion joints flex incorrectly, shut down system, re-align, repeat start-up procedures.

3.7 CLEANING

.1 Clean in accordance with Section 00 10 00 – General Instructions. Remove surplus materials, excess materials, rubbish, tools and equipment.

.2 Waste Management: separate waste materials for reuse and recycling in accordance with Section 00 10 00 – General Instructions.

END OF SECTION 23 22 13

1 REFERENCES

.1 Perform all work to meet or exceed the requirements of the Canadian Electrical Code, CSA Standard C22.1 - (latest edition).

.2 Consider CSA Electrical Bulletins in force at time of tender submission, while not identified and specified by number in this Division, to be forming part of related CSA Part II standard.

.3 Do overhead and underground systems in accordance with CSA C22.3 except where specified otherwise.

.4 Where requirements of this specification exceed those of above mentioned standards, this specification shall govern.

.5 Notify the NRC Departmental Representative as soon as possible when requested to connect equipment supplied by NRC which is not CSA approved.

.6 Refer to Sections 00 10 00 & 0015 45.

2 PERMITS AND FEES

.1 Submit to Electrical Inspection Department and Supply Authority necessary number of drawings and specifications for examination and approval prior to commencement of work.

.2 Pay all fees required for the performance of the work.

3 START-UP

.1 Instruct the NRC Departmental Representative and operating personnel in the operation, care and maintenance of equipment supplied under this contract.

4 INSPECTION AND FEES

.1 Furnish a Certificate of Acceptance from the Authorized Electrical Inspection Department on completion of work.

.2 Request and obtain Special Inspection approval from the Authorized Electrical Inspection Department for any non-CSA approved control panels or other equipment fabricated by the contractor as part of this contract.

.3 Pay all fees required for inspections.

5 FINISHES

.1 Shop finish metal enclosure surfaces by removal of rust and scale, cleaning, application of rust resistant primer inside and outside, and at least two coats of finish enamel.

.1 Outdoor electrical equipment "equipment green" finish to EEMAC Y1-1-1955.

.2 Indoor switchgear and distribution enclosures light grey to EEMAC 2Y-1-1958.

.2 Clean and touch up surfaces of shop-painted equipment scratched or marred during shipment or installation, to match original paint.

6 ACOUSTICAL PERFORMANCE

.1 In general provide equipment producing minimal sound levels in accordance with the best and latest practices established by the electrical industry.

.2 Do not install any device or equipment containing a magnetic flux path metallic core, such as gas discharge lamp ballasts, dimmers, solenoids, etc., which are found to produce a noise level exceeding that of comparable available equipment.

7 EQUIPMENT IDENTIFICATION

.1 Identify with 3mm (1/8") Brother, P-Touch non-smearing tape, or an alternate approved by the NRC Departmental Representative, all electrical outlets shown on drawings and/or mentioned in the specifications. These are the lighting switches, recessed and surface mounted receptacles such as those in offices and service rooms and used to plug in office equipment, telecommunication equipment or small portable tools. Indicate only the source of power (Ex. for a receptacle fed from panel L32 circuit #1: "L32-1").

.2 Light fixtures are the only exceptions for electrical equipment identification (except as noted in 7.13 below). They are not to be identified.

.3 Identify with lamicoid nameplates all electrical equipment shown on the drawings and/or mentioned in the specification such as motor control centers, switchgear, splitters, fused switches, isolation switches, motor starting switches, starters, panelboards, transformers, high voltage cables, industrial type receptacles, junction boxes, control panels, etc., regardless of whether or not the electrical equipment was furnished under this section of the specification.

.4 Coordinate names of equipment and systems with other Divisions to ensure that names and numbers match.

.5 Wording on lamicoid nameplates to be approved by the NRC Departmental Representative prior to fabrication.

.6 Provide two sets of lamicoid nameplates for each piece of equipment; one in English and one in French.

.7 Lamicoid nameplates shall identify the equipment, the voltage characteristics and the power source for the equipment. Example: A new 120/240 volt single phase circuit breaker panelboard, L16, is fed from panelboard LD1 circuit 10.

"PANEL L16
120/240 V
FED FROM LD1-10"

PANNEAU L16
120/240 V
ALIMENTE PAR LD1-
10

.8 Provide warning labels for equipment fed from two or more sources - "DANGER MULTIPLE POWER FEED" black letters on a yellow background. These labels are available from NRC's Facilities Maintenance group in building M-19.

.9 Lamicoid nameplates shall be rigid lamicoid, minimum 1.5 mm (1/16") thick with:

.1 Black letters engraved on a white background for normal power circuits.

.2 Black letters engraved on a yellow background for emergency power circuits.

.3 White letters engraved on a red background for fire alarm equipment.

.10 For all interior lamicoid nameplates, mount nameplates using two-sided tape.

.11 For all exterior lamicoid nameplates, mount nameplates using self-tapping 2.3 mm (3/32") dia. slot head screws - two per nameplate for nameplates under 75 mm (3") in height and a minimum of 4 for larger nameplates. Holes in lamicoid nameplates to be 3.7 mm (3/16") diameter to allow for expansion of lamicoid due to exterior conditions.

.1 No drilling is to be done on live equipment.

.2 Metal filings from drilling are to be vacuumed from the enclosure interiors.

.12 All lamicoid nameplates shall have a minimum border of 3 mm (1/8"). Characters shall be 9 mm (3/8") in size unless otherwise specified.

.13 Identify lighting fixtures which are connected to emergency power with a label "EMERGENCY LIGHTING/ÉCLAIRAGE D'URGENCE", black letters on a yellow background. These labels are available from NRC's Facilities Maintenance group in building M-19.

.14 Provide neatly typed updated circuit directories in a plastic holder on the inside door of new panelboards.

.15 Carefully update panelboard circuit directories whenever adding, deleting, or modifying existing circuitry.

8 WIRING IDENTIFICATION

.1 Unless otherwise specified, identify wiring with permanent indelible identifying markings, using either numbered or coloured plastic tapes on both ends of phase conductors of feeders and branch circuit wiring.

.2 Maintain phase sequence and colour coding throughout.

9 CONDUIT AND CABLE IDENTIFICATION

.1 All new conduits to be colour-coded EMT, type as follows:

.1 Fire alarm – red conduit
.2 Emergency power circuits – yellow conduit
.3 Voice/data – blue conduit
.4 Gas detection system – purple conduit
.5 Building Automation system – orange conduit
.6 Security system – green conduit

.2 Apply paint to the covers of junction boxes and condulets of existing conduits as follows:

.1 Fire alarm – red
.2 Emergency power circuits – yellow
.3 Voice/data – blue
.4 Gas detection system – purple
.5 Building Automation system – orange
.6 Security system – green

.3 All other systems need not be coloured.

10 MANUFACTURER'S & APPROVALS LABELS

.1 Ensure that manufacturer's registration plates are properly affixed to all apparatus showing the size, name of equipment, serial number, and all information usually provided, including voltage, cycle, phase and the name and address of the manufacturer.

.2 Do not paint over registration plates or approval labels. Leave openings through insulation for viewing the plates. Contractor's or sub-contractor's nameplate not acceptable.

11 WARNING SIGNS AND PROTECTION

.1 Provide warning signs, as specified or to meet requirements of Authorized Electrical Inspection Department and NRC Departmental Representative.

.2 Accept the responsibility to protect those working on the project from any physical danger due to exposed live equipment such as panel mains, outlet wiring, etc. Shield and mark all live parts with the appropriate voltage. Caution notices shall be worded in both English and French.

12 LOAD BALANCE

.1 Measure phase current to new panelboards with normal loads operating at time of acceptance. Adjust branch circuit connections as required to obtain best balance of current between phases and record changes, and revise panelboard schedules.

.2 Measure phase voltages at loads and adjust transformer taps to within 2% of rated voltage of equipment.

13 MOTOR ROTATION

.1 For new motors, ensure that motor rotation matches the requirements of the driven equipment.

.2 For existing motors, check rotation before making wiring changes in order to ensure correct rotation upon completion of the job.

14 GROUNDING

.1 Thoroughly ground all electrical equipment, cabinets, metal supporting frames, ventilating ducts and other apparatus where grounding is required in accordance with the requirements of the latest edition of the Canadian Electrical Code Part 1, C.S.A. C22.1 and corresponding Provincial and Municipal regulations. Do not depend upon conduits to provide the ground circuits.

.2 Run separate green insulated stranded copper grounding conductors in all electrical conduits including those feeding toggle switches and receptacles.

15 TESTS

.1 Provide any materials, equipment and labour required and make such tests deemed necessary to show proper execution of this work, in the presence of the NRC Departmental Representative.

.2 Correct any defects or deficiencies discovered in the work in an approved manner at no additional expense to the Owner.

.3 Megger all branch circuits and feeders using a 600V tester for 240V circuits and a 1000V tester for 600V circuits. If the resistance to ground is less than permitted by Table 24 of the Code, consider such circuits defective and do not energize.

.4 The final approval of insulation between conductors and ground, and the efficiency of the grounding system is left to the discretion of the local Electrical Inspection Department.

16 COORDINATION OF PROTECTIVE DEVICES

.1 Ensure circuit protective devices such as overcurrent trips, fuses, are installed to values and settings as indicated on the Drawings.

17 WORK ON LIVE EQUIPMENT & PANELS

.1 NRC requires that work be performed on non-energized equipment, installation, conductors and power panels. For purposes of quotation assume that all work is to be done after normal working hours and that equipment, installation, conductors and power panels are to be de-energized when worked upon.

END OF SECTION 26 05 00

Part 1 General

1.1 RELATED WORK SPECIFIED ELSEWHERE

.1 Common Work Results - Electrical Section 26 05 00.

1.2 DESCRIPTION

.1 This specification is to cover a complete Variable Frequency motor Drive (VFD) consisting of a pulse width modulated (PWM) inverter designed for use on a standard NEMA Design B induction motor.

.2 The drive manufacturer shall supply the drive and all necessary controls as herein specified. The manufacturer shall have been engaged in the production of this type of equipment for a minimum of twenty years. All VFDs installed on this project shall be from the same manufacturer.

1.3 QUALITY ASSURANCE

.1 Referenced Standards:

1. Institute of Electrical and Electronic Engineers (IEEE)
   - .1 Standard 519-1992, IEEE Guide for Harmonic Content and Control.

.2 Underwriters laboratories
- .1 UL508C.

.3 National Electrical Manufacturer's Association (NEMA)
- .1 ICS 7.0, AC Adjustable Speed Drives.

.4 IEC 16800 Parts 1 and 2

.5 CSA 22.2

.2 Qualifications:

.1 VFDs and options shall be UL listed and CSA approved as a complete assembly. VFDs that require the customer to supply external fuses for the VFD to be UL listed are not acceptable. VFDs requiring additional branch circuit protection are not acceptable. The base VFD shall be UL listed for 100 KAIC without the need for input fusing.

1.4 SHOP DRAWINGS AND PRODUCT DATA

.1 Submit shop drawings and product data in accordance with Section 00 10 00.

.2 Include schematic, wiring, interconnection diagrams.

.3 Indicate:

.1 Outline dimensions, conduit entry locations and weight.

.2 Customer connection and power wiring diagrams.

.3 Complete technical product description include a complete list of options provided. **Any portions of the specifications not complied with must be**

clearly indicated or the supplier and contractor shall be liable to provide all components required to meet the specification.

.4 Compliance to IEEE 519 – harmonic analysis for particular jobsite including total harmonic voltage distortion and total harmonic current distortion (TDD).

.1 The VFD manufacturer shall provide calculations; specific to the installation, showing total harmonic voltage distortion is less than 5%. Input filters shall be sized and provided as required by the VFD manufacturer to ensure compliance with the IEEE electrical system standard 519. All VFDs shall include a minimum of 5% equivalent impedance reactors, **no exceptions**.

.4 Motors specified and supplied with mechanical equipment. Refer to Division 23.

1.5 OPERATION AND MAINTENANCE DATA

.1 Provide operation and maintenance data for motor starters for incorporation into manual specified in Section 00 10 00.

.2 Include operation and maintenance data for each type and style of starter.

.3 On completion of the installation, the supplier shall provide the following:

.1 Full commissioning report documenting all programmable settings, AC input voltage, DC Bus voltage, current draw at maximum speed, and a description of ambient conditions.

.2 One operator's manual for each VFD installed.

.3 One 8.5" x 11" wiring diagram for each VFD installed.

1.6 GENERAL DESIGN CHARACTERISTICS

.1 The VFD shall be of the Pulse Width Modulated (PWM) type.

.2 The VFD shall be rated for variable torque applications, with an overload rating of 110% for 60 seconds.

.3 All VFD's shall be factory UL/cUL Listed.

.4 All packaged drive systems shall be CSA Listed.

.5 The VFD shall have the capability of operating multiple motors. The minimum VFD continuous current rating shall be the sum of the full load current ratings of the connected motors.

.6 The VFD shall have a minimum displacement power factor of 0.96 or higher at all output frequencies.

.7 The VFD manufacturer shall have a minimum of ten years experience in the Canadian Market.

Part 2 Products

2.1 VARIABLE FREQUENCY DRIVES

.1 The VFD package as specified herein shall be enclosed in a NEMA rated enclosure, completely assembled and tested by the manufacturer in an ISO9001 facility. The VFD tolerated voltage window shall allow the VFD to operate from a line of +30% nominal, and -35% nominal voltage as a minimum.

.1 Environmental operating conditions: 0 – 40^0 C continuous. Altitude 0 to 3300 feet above sea level, up to 95% humidity, non-condensing. All circuit boards shall have conformal coating.

.2 The VFD shall operate within the following rated values.

.1 Output Frequency Range: 0.1 to 400 Hz.

.2 Overload Rating: VT – 110% for 60 seconds

.3 Input Voltage: 3 phase + ground , 600V +10% / -20%

.4 Input Frequency: 48-62 Hz

.3 The VFD shall be designed to include the following protective functions and display for maintainability:

.1 *Instantaneous Over Current Protection*: The VFD output shall be turned off if the operating current exceeds the specified level.

.2 *Motor Overload Protection*: cUL/CSA approved electronic thermal overload protection.

.3 *External Trip Input*: Programmable for either N/O or N/C operation.

.4 *Over Voltage Protection*: The VFD output shall turned off if the DC Bus voltage exceeds the specified level.

.5 *Ground Fault Protection*: The VFD output shall turned off in the event of a ground fault.

.6 *Line or Load Phase Loss Protection*: Programmable for enable – disable.

.7 *Software Lock*: The VFD shall include a software function that prevents changes to the user-defined settings.

.8 *CPU or EEPROM Error*: The VFD output shall turned off in the event of an error in the CPU or EEPROM.

.2 All VFDs shall have the following features:

.1 All VFDs shall have the same customer interface, including digital display, and keypad, regardless of horsepower rating. The keypad shall be removable, capable of remote mounting and allow for uploading and downloading of parameter settings as an aid for start-up of multiple VFDs.

.2 The keypad shall include Hand-Off-Auto selections and manual speed control. There shall be fault reset and "Help" buttons on the keypad. The Help button shall include "on-line" assistance for programming and troubleshooting.

.3 There shall be a built-in time clock in the VFD keypad. The clock shall have a battery back up with 10 years minimum life span. The clock shall be used to date and time stamp faults and record operating parameters at the time of

fault. If the battery fails, the VFD shall automatically revert to hours of operation since initial power up. The clock shall also be programmable to control start/stop functions, constant speeds, PID parameter sets and output relays. The VFD shall have a digital input that allows an override to the time clock (when in the off mode) for a programmable time frame. There shall be four (4) separate, independent timer functions that have both weekday and weekend settings. Capacitor backup is not acceptable.

.4 The VFD shall be capable of starting into a coasting load (forward or reverse) up to full speed and accelerate or decelerate to setpoint without safety tripping or component damage (flying start).

.5 The overload rating of the drive shall be 110% of its normal duty current rating for 1 minute every 10 minutes, 130% overload for 2 seconds. The minimum FLA rating shall meet or exceed the values in the NEC/UL table 430-150 for 4-pole motors.

.6 The VFD shall have 5% equivalent impedance internal reactors to reduce the harmonics to the power line and to add protection from AC line transients. The 5% equivalent impedance may be from dual (positive and negative DC bus) reactors, or 5% AC line reactors. VFDs with only one DC reactor shall add an AC line reactor.

.7 The VFD shall include a coordinated AC transient protection system consisting of 4-120 joule rated MOV's (phase to phase and phase to ground), a capacitor clamp, and 5% equivalent impedance internal reactors.

.8 The VFD shall provide a programmable proof of flow Form-C relay output (broken belt / broken coupling). The drive shall be programmable to signal this condition via a keypad warning, relay output and/or over the serial communications bus. Relay outputs shall include programmable time delays that will allow for drive acceleration from zero speed without signaling a false underload condition.

.3 All VFDs to have the following adjustments:

.1 Three (3) programmable critical frequency lockout ranges to prevent the VFD from operating the load continuously at an unstable speed.

.2 Two (2) PID Setpoint controllers shall be standard in the drive, allowing pressure or flow signals to be connected to the VFD, using the microprocessor in the VFD for the closed loop control. The VFD shall have 250 ma of 24 VDC auxiliary power and be capable of loop powering a transmitter supplied by others. There shall be two parameter sets for the first PID that allow the sets to be switched via a digital input, serial communications or from the keypad for night setback, summer/winter setpoints, etc. There shall be an independent, second PID loop that can utilize the second analog input and modulate one of the analog outputs to maintain setpoint of an independent process (ie. valves, dampers, etc.). All setpoints, process variables, etc. to be accessible from the serial communication network.

.3 Two (2) programmable analog inputs shall accept current or voltage signals.

.4 Two (2) programmable analog outputs (0-20ma or 4-20 ma). The outputs may be programmed to output proportional to Frequency, Motor Speed,

Output Voltage, Output Current, Motor Torque, Motor Power (kW), DC Bus voltage, Active Reference, and other data.

.5 Six (6) programmable digital inputs.

.6 Three (3) programmable digital Form-C relay outputs. The relays shall include programmable on and off delay times and adjustable hysteresis. The relays shall be rated for maximum switching current 8 amps at 24 VDC and 0.4 A at 250 VAC; Maximum voltage 300 VDC and 250 VAC; continuous current rating 2 amps RMS. Outputs shall be true Form-C type contacts; open collector outputs are not acceptable.

.7 Two separate safety interlock inputs shall be provided. When either safety is opened, the motor shall be commanded to coast to stop, and the damper shall be commanded to close.

.8 Two independently adjustable accel and decel ramps with 1 – 1800 seconds adjustable time ramps.

.9 The VFD shall include a motor flux optimization circuit that will automatically reduce applied motor voltage to the motor to optimize energy consumption and audible motor noise.

.10 The VFD shall include a carrier frequency control circuit that reduces the carrier frequency based on actual VFD temperature that allows higher carrier frequency without derating the VFD or operating at high carrier frequency only at low speeds.

.11 The VFD shall include password protection against parameter changes.

.4 The Keypad shall include a backlit LCD display. The display shall be in complete English words for programming and fault diagnostics (LED and alpha-numeric codes are not acceptable). All VFD faults shall be displayed in English words.

.5 All applicable operating values shall be capable of being displayed in engineering (user) units. A minimum of three operating values from the list below shall be capable of being displayed at all times. The display shall be in complete English words (alpha-numeric codes are not acceptable):

.1 Output Frequency
.2 Motor Speed (RPM, %, or Engineering units)
.3 Motor Current
.4 Drive Temperature
.5 DC Bus Voltage
.6 Output Voltage

.6 The VFD shall include a fireman's override input. Upon receipt of a contact closure from the fireman's control station, the VFD shall operate in one of two modes: 1) Operate at a programmed predetermined fixed speed or operate in a specific fireman's override PID algorithm that automatically adjusts motor speed based on override set point and feedback. The mode shall override all other inputs (analog/digital, serial communication, and all keypad commands), except customer defined safety run interlock, and force the motor to run in one of the two modes above. "Override Mode" shall be displayed on the keypad. Upon removal of the override signal, the VFD shall resume normal operation.

.7 Serial Communications

.1 The VFD shall have an RS-485 port as standard. The standard protocols shall be Modbus, BACnet, Johnson Controls N2 bus, and Siemens Building Technologies FLN. Each individual drive shall have the protocol in the base VFD. The use of third party gateways and multiplexers is not acceptable. All protocols shall be "certified" by the governing authority (i.e. BTL Listing for BACnet). Use of non-certified protocols is not allowed.

.2 The BACnet connection shall be an RS485, MS/TP interface operating at 9.6, 19.2, 38.4, or 76.8 Kbps. The connection shall be tested by the BACnet Testing Labs (BTL) and be BTL Listed. The BACnet interface shall conform to the BACnet standard device type of an Applications Specific Controller (B-ASC). The interface shall support all BIBBs defined by the BACnet standard profile for a B-ASC including, but not limited to:

.1 Data Sharing – Read Property – B.

.2 Data Sharing – Write Property – B.

.3 Device Management – Dynamic Device Binding (Who-Is; I-AM).

.4 Device Management – Dynamic Object Binding (Who-Has; I-Have).

.5 Device Management – Communication Control – B.

.3 Serial communication capabilities shall include, but not be limited to; run-stop control, speed set adjustment, proportional/integral/derivative PID control adjustments, current limit, accel/decel time adjustments, and lock and unlock the keypad. The drive shall have the capability of allowing the DDC to monitor feedback such as process variable feedback, output speed / frequency, current (in amps), % torque, power (kW), kilowatt hours (resettable), operating hours (resettable), and drive temperature. The DDC shall also be capable of monitoring the VFD relay output status, digital input status, and all analog input and analog output values. All diagnostic warning and fault information shall be transmitted over the serial communications bus. Remote VFD fault reset shall be possible.

.8 EMI / RFI filters. All VFDs shall include EMI/RFI filters. The VFD shall comply with standard EN 61800-3 for the First Environment, restricted level with up to 100' of motor cables. No Exceptions. Certified test lab test reports shall be provided with the submittals.

.9 All VFDs through 60HP shall be protected from input and output power mis-wiring. The VFD shall sense this condition and display an alarm on the keypad. The VFD shall not be damaged by this condition.

.10 OPTIONAL FEATURES – Optional features to be furnished and mounted by the drive manufacturer. All optional features shall be UL Listed by the drive manufacturer as a complete assembly and carry a UL508 label. The bypass enclosure door and VFD enclosure must be interlocked such that input power is turned off before either enclosure can be opened. The VFD and Bypass as a package shall have a UL listed short circuit rating of 100,000 amps and shall be indicated on the data label.

.1 A complete wired and tested bypass system consisting of an output contactor and bypass contactor, service (isolation) switch and VFD input fuses are required. Bypass designs, which have no VFD only fuses, or that incorporate fuses common to both the VFD and the bypass will not be accepted Note that the intention of this portion of the specification is TO ALLOW THE VFD TO BE REMOVED WHILE IN BYPASS

.2 Door interlocked padlockable disconnect switch that will disconnect all input power from the drive and all internally mounted options.

.3 If Drive is located outdoors, a cabinet with thermostatically controlled heater, suitable for operation at -40^0 C continuous.

.11 The following operators shall be provided:

Bypass Hand-Off-Auto
Drive mode selector and light
Bypass mode selector and light
Bypass fault reset
Bypass LDC display, 2 lines, for programming and status / fault / warning indications

.1 Motor protection from single phase power conditions - The Bypass system must be able to detect a single phase input power condition while running in bypass, disengage the motor in a controlled fashion, and give a single phase input power indication. Bypass systems not incorporating single phase protection in Bypass mode are not acceptable.

.2 The systems (VFD and Bypass) tolerated voltage window shall allow the system to operate from a line of +30%, -35% nominal voltage as a minimum. The system shall incorporate circuitry that will allow the drive or bypass contactor to remain "sealed in" over this voltage tolerance at a minimum.

.3 The Bypass system shall NOT depend on the VFD for bypass operation. The bypass shall be completely functional in both Hand and Automatic modes even if the VFD has been removed from the enclosure for repair / replacement.

.4 Serial communications – the VFD shall be capable of being monitored and or controlled via serial communications. Provide communications protocols for ModBus; Johnson Controls N2; Siemens Building Technologies FLN (P1) and BACnet in the bypass controller.

.5 BACnet Serial communication bypass capabilities shall include, but not be limited to; bypass run-stop control; the ability to force the unit to bypass; and the ability to lock and unlock the keypad. The bypass shall have the capability of allowing the DDC to monitor feedback such as, bypass current (in amps), bypass kilowatt hours (resettable), bypass operating hours (resettable), and bypass logic board temperature. The DDC shall also be capable of monitoring the bypass relays output status, and all digital input status. All bypass diagnostic warning and fault information shall be transmitted over the serial communications bus. Remote bypass fault reset shall be possible. The following additional bypass status indications and settings shall be transmitted over the serial communications bus – keypad "Hand" or "Auto" selected, and bypass selected. The DDC system shall also be able to monitor if the motor is running under load in both VFD and

bypass (proof of flow) in the VFD mode over serial communications or Form-C relay output. A minimum of 40 field parameters shall be capable of being monitored in the bypass mode.

.6 Run permissive circuit - there shall be a run permissive circuit for damper or valve control. Regardless of the source of a run command (keypad, time-clock control, or serial communications) the VFD and bypass shall provide a dry contact closure that will allow the damper to open (VFD motor does not operate). When the damper is fully open, a normally open dry contact (end-switch) shall close. The closed end-switch is wired to a VFD system input and allows motor operation. Two separate safety interlock inputs shall be provided. When either safety is opened, the motor shall be commanded to coast to stop, and the damper shall be commanded to close.

.7 The bypass control shall monitor the status of the VFD and bypass contactors and indicate when there is a welded contactor contact or open contactor coil. This failed contactor operation shall be indicated on the Bypass LCD display as well as over the serial communications protocol.

.8 The bypass control shall include a programmable time delay for bypass start and keypad indication that this time delay is in process. This will allow VAV boxes to be driven open before the motor operates at full speed in the bypass mode. The time delay shall be field programmable from 0 – 120 seconds.

.9 The bypass control shall be programmable for manual or automatic transfer to bypass. The user shall be able to select via keypad programming which drive faults will generate an automatic transfer to bypass and which faults require a manual transfer to bypass.

.10 There shall be an adjustable motor current sensing circuit for the bypass and VFD mode to provide proof of flow indication. The condition shall be indicated on the keypad display, transmitted over the building automation protocol and on a relay output contact closure.

.11 The bypass controller shall have six programmable digital inputs, and five programmable Form-C relay outputs.

.12 The relay outputs from the bypass shall be programmable for any of the following indications.

- .1 System started
- .2 System running
- .3 Bypass override enabled
- .4 Drive fault
- .5 Bypass fault
- .6 Bypass H-O-A position
- .7 Motor proof of flow (broken belt)
- .8 Overload
- .9 Bypass selected
- .10 Bypass run
- .11 System started (damper opening)
- .12 Bypass alarm

.13 Over temperature

.13 The digital inputs for the system shall accept 24VAC or 24VDC. The bypass shall incorporate internally sourced power supply and not require an external control power source. The bypass power board shall supply 250 ma of 24 VDC for use by others to power external devices.

.14 Customer Interlock Terminal Strip – provide a separate terminal strip for connection of freeze, fire, smoke contacts, and external start command. All external safety interlocks shall remain fully functional whether the system is in VFD or Bypass mode. The remote start/stop contact shall operate in VFD and bypass modes. The terminal strip shall allow for independent connection of up to four (4) unique safety inputs.

.15 The user shall be able to select the text to be displayed on the keypad when the safety opens. Example text display indications include "Firestat", "Freezestat", "Over pressure" and "Low pressure". The user shall also be able to determine which of the four (4) safety contacts is open over the serial communications connection.

.16 Class 10, 20, or 30 (selectable) electronic motor overload protection shall be included.

.17 Standard of acceptance:

.1 ABB ACH Series or equivalent approved by NRC departmental representative. **Approval does not relieve supplier of specification requirements.**

Part 3 Execution

3.1 INSTALLATION

.1 Installation shall be the responsibility of the electrical contractor. The contractor shall install the drive in accordance with the requirements of the VFD manufacturer's installation manual.

.2 The contractor is to verify that the jobsite conditions for installation meet the factory recommendations and code required conditions for the VFD installation prior to installation. These shall include as a minimum:

.1 Clearance spacing.

.2 Compliance with environmental ratings of the VFD system.

.3 Separate conduit installation of the input wiring, the motor wiring, and control wiring. At no time does any of this wiring run in parallel with each other.

.4 All power and control wiring is complete.

.3 The VFD is to be covered and protected from installation dust and contamination until the environment is cleaned and ready for operation. The VFD system shall not be operated while the unit is covered.

3.2 ON-SITE STARTUP

.1 The manufacturer shall provide start-up and commissioning of the variable frequency drive and its optional circuits by a factory certified service technician who is experienced in start-up and repair services. The commissioning personnel shall be the same personnel that will provide the factory service and warranty repairs at the customer site. Sales personnel and other agents who are not factory certified technicians for drive repair shall not be acceptable as commissioning agents.

.2 Start-up services shall include checking for verification of proper operation and installation of the VFD, its options and its interface wiring to the building automation system. Included in this service shall be as a minimum:

.1 Verification of contractor wire terminations and conduit runs to and from the VFD.

.2 Up to four hours of customer operator training on the operation and service diagnostics at the time of commissioning. On-site training is to be provided by the same factory trained application engineering and service personnel to demonstrate full programming and operating features and procedures. Date and time for this training is to be coordinated with the NRC Departmental Representative.

.3 Measurement for verification of proper operation of the following:

.1 Motor voltage and frequency. Verification of proper motor operation.

.2 Control input for proper building automation system interface and control calibration.

.3 Calibration check for the following set-points:

.1 minimum speed

.2 maximum speed

.3 acceleration and deceleration rates.

.3 Commissioning agent to verify the programming of the VFD and to provide a written copy of the settings to the engineer.

.4 Commissioning agent to lock out critical frequencies throughout the operating curve of the equipment as identified and required by the engineer. The agent shall record amperages at six (minimum) different frequencies from minimum to maximum speed.

3.3 PRODUCT SUPPORT

.1 Factory trained application engineering and service personnel that are thoroughly familiar with the VFD products offered shall be locally available at both the specifying and installation locations. A toll free 24/365 technical support line shall be available.

.2 A computer based training CD or 8-hour professionally generated video (VCR format) shall be provided to the owner at the time of project closeout. The training shall include installation, programming and operation of the VFD, bypass and serial communication.

3.4 WARRANTY

.1 Warranty shall be 24 months from the date of certified start-up. The warranty shall include all parts, labor, travel time and expenses.

END OF SECTION 26 29 23

APPENDIX A – Device List

Item	Qty	Location	Service	Schematic Reference	Component Identification Item No.	Manufacturer	Model Number	Description	Notes
1	1	Main	Natural Gas	N/A		Homestead	Figure 612-CSA	8 " main shutoff valve	CSA approved
2	1	Main	Natural Gas	N/A		Homestead	Figure 612-CSA	6 " main shutoff valve Boiler 2	CSA approved
3	1	Main	Natural Gas	N/A		Homestead	Figure 612-CSA	6 " main shutoff valve Boiler 4	CSA approved
4	4	Ventilation	Air	5042-E04		Dwyer	Dwyer DH3-014	Ventilation System Interlock - Pressure Switch	
5	4	Ventilation	Air	N/A		BAPI	ZPS-ACC10-V	Outside Pressure Pickup Port	http://www.bapihvac.com/
6	1	Ventilation	Air	5042-E04		Phoenix	PSR-SCP-24VDC/SDC4/2X1/B and PSR-SCP-24VDC/URM4/4X1/2X2/B	Safety relay	
7	N/A	Boiler 1,3,4	Controls	N/A		ABB		PLC I/O cards as required	R&R to specify quantity and model
8	N/A	Boiler 1,3,4	Controls	N/A		ABB		PLC Modbus Interface cards as required	R&R to specify quantity and model
9	N/A	Boiler 1,3,4	Controls	N/A				BMS Panel Indicating Lights	R&R to specify manufacturer, quantity and model
10	3	Boiler 1,3,4	Controls	5042-E01,E02,E03		Fireye	YB110DC	chassis/amplifier	
11	3	Boiler 1,3,4	Controls	5042-E01,E02,E03		Fireye	YP102	programmer	
12	3	Boiler 1,3,4	Controls	5042-E01,E02,E03		Fireye	BLL510	LCD display	
13	3	Boiler 1,3,4	Controls	5042-E01,E02,E03		Fireye	60-2814-1	wiring base, terminal blocks, open end	
14	3	Boiler 1,3,4	Controls	5042-E01,E02,E03		Fireye	129-178-8	remote mounting kit	
15	3	Boiler 1,3,4	Controls	5042-E01,E02,E03		Fireye	YZ300	interlock annunciator ("First Out" for Troubleshooting)	
16	3	Boiler 1,3,4	Controls	5042-E01,E02,E03		Fireye	60-2874-1	wiring base, terminal blocks, open end	
17	3	Boiler 1,3,4	Controls	5042-E01,E02,E03		Fireye	ED-580-4	interconnection cable, 4ft	
18	3	Boiler 1,3,4	Controls	5042-E01,E02,E03		Fireye	ED610	ED 610 modbus	
19	3	Boiler 1,3,4	Controls	5042-E01,E02,E03		Fireye	ED512-4	ED512-4 ribbon cable	
20	1	Boiler 1	Air	N/A		ABB	ABB to specify	VFD	
21	1	Boiler 1	Natural Gas	5042-M01	2	Sure Flow	YF150	2 1/2" Y strainer, cast steel , 150# flange, 100 mesh ,gas service	
22	1	Boiler 1	Natural Gas	5042-M01	15	Maxon	250CMA11-BA11-BB22A0	Natural Gas Automatic Safety Shut-off Valve	replace existing manual reset type
23	1	Boiler 1	Natural Gas	5042-M01	14	Flextech or Senior Flexonics		2 1/2" Main Burner Flexible Hose : flange connection	CSA approved, CRN, contractor to verify size
24	1	Boiler 1	Natural Gas	5042-M01	28	Flextech or Senior Flexonics		3/4" Pilot Burner Flexible Hose : NPT	CSA approved, CRN, contractor to verify size
25	1	Boiler 1	#2 Fuel Oil	5042-M02	12	Flextech or Senior Flexonics		SS Flexible Hose, NPT	rating of 1000F, CRN, contractor to verify size
26	1	Boiler 1	Steam	5042-M02	21	Flextech or Senior Flexonics		SS Flexible Hose, NPT	rating of 1000F, CRN, contractor to verify size
27	1	Boiler 1	Steam	5042-M02	20	Velan		3/4" Gate Valve	suitable for steam
28	1	Boiler 1	Steam	5042-M02	17	Ashcroft	B4-24-S-XC8-200PSI	Burner Low Atomizing steam pressure switch	
29	1	Boiler 3	Natural Gas	5042-M03	1	Homestead	Figure 612-CSA	6 " main shutoff valve Boiler 3	CSA approved
30	1	Boiler 3	Natural Gas	5042-M03	5	Sure Flow	YF150	3" Y strainer, cast steel , 150# flange, 100 mesh ,gas service	
31	1	Boiler 3	Natural Gas	5042-M03	11	Maxon	400CMA11-BA11-BB22A0	Natural Gas Automatic Safety Shut-off Valve	replace existing manual reset type
32	1	Boiler 3	Natural Gas	5042-M03	8	Maxon	2 1/2" CV	Butterfly Valve for Control	Designed for gas use, R&R to specify model
33	2	Boiler 3	Natural Gas	5042-M03	21,26	MA Stewart	B-3	3/4" Manual Shutoff Valve	CSA approved
34	1	Boiler 3	Natural Gas	5042-M03	22	Fisher		3/4" pilot regulator	R&R to specify model
35	2	Boiler 3	Natural Gas	5042-M03	24,25	ASCO	S261SG02N3EG5	3/4" NC solenoid valve	CSA approved
36	1	Boiler 3	Natural Gas	5042-M03	27	Flextech or Senior Flexonics		3/4" Pilot Burner Flexible Hose : NPT	CSA approved, CRN, contractor to verify size
37	1	Boiler 3	#2 Fuel Oil	5042-M04	5	Endress & Hauser		Oil Flow Transmitter	R&R to specify model
38	1	Boiler 3	#2 Fuel Oil	5042-M04	15	Flextech or Senior Flexonics		SS Flexible Hose, NPT	rating of 1000F, CRN, contractor to verify size
39	1	Boiler 3	Steam	5042-M04	25	Flextech or Senior Flexonics		SS Flexible Hose, NPT	rating of 1000F, CRN, contractor to verify size
40	1	Boiler 3	Steam	5042-M04	19	Velan		3/4" Gate Valve	suitable for steam
41	1	Boiler 3	Steam	5042-M04	20	SOR	17RB-K2-M9-B1A-CS	Burner Low Atomizing steam/oil differential pressure switch	

APPENDIX B – TSSA Registration Documents

Technical Standards and Safety Authority

www.tssa.org

14th Floor - Centre Tower
3300 Bloor Street West
Toronto ON M8X 2X4
Tel.: 416.734.3348
Fax: 416.231.7525
Customer Service: 1.877.682.8772
E-mail: fssubmissions@tssa.org

Intake Group
OCT 31 2014
RECEIVED

Application for Field Approval of Appliances or Equipment

Technical Standards and Safety Act
Fuels Safety Regulations

1 - Dec 15

Please submit completed application and supporting documentation by mail, fax, or e-mail (in pdf format).

For Office Use Only
Intake Group
OCT 31 2014
SR #.... 1490906

Check applicable box(es)

- ☐ Digester Gas
- ☑ Fuel Oil
- ☐ Landfill
- ☑ Natural Gas
- ☐ Propane
- ☐ Other _____

Required Documentation (2 copies each)
☑ Bill of Materials ☑ Electrical Schematic
☑ Purge Calculations ☑ Valve Train / P&ID Drawing(s)

Type of Appliance/Equipment: Steam Boiler ☐ Mobile Appliance

Manufactured by: VOLCANO | No. of Units: 1

Model: D2-40R | Serial No.(s): W-1579

Main Supply Pressure: 20 PSIG NG / 100 PSI #2 OIL

Maximum Input: 65,000. CFH NG / 310 GPH IMP. | Minimum Input: 6,500. CFH NG / 40 GPH IMP

Burner/Manifold Operating Pressure: 10 PSIG NG / 80 PSIG OIL (MAX)

A. OWNER OF APPLIANCE OR EQUIPMENT

AT# 379314 | CT# 265310

Company Name: National Research Council of Canada | Ontario Corporation No., if applicable

Street Name / 911 Number/Address, if applicable: 1200 Montreal Rd.

Unit/Suite: Building M-6 | PO Box:

City/Town: Ottawa | Province: Ontario | Postal Code: K1A 0R6

Telephone No.: 613-993-5043 | Fax No.: 613-993-4041 | Cell No.: 613-223-8551

E-mail: randy.hedges@nrc-cnrc.gc.ca

Print Name of Contact Person: Randy Hedges | Signature of Contact Person:

B. LOCATION ADDRESS

Same as: ☑ A

(Where appliance/equipment is to be installed/inspected. Note this must be a delivery or fire route address.)

Company Name:

Street Name / 911 Number/Address, if applicable:

Unit/Suite:

City/Town: | Province: | Postal Code:

Telephone No.: | Fax No.: | Cell No.:

E-mail:

Print Name of Contact Person:

C. TECHNICAL CONTACT

Same as: ☐ A ☐ B ☐ D

(Company we should communicate with regarding engineering and inspection approval on behalf of the owner.)

Company Name: R&R Automation Inc.

Street Name / 911 Number/Address, if applicable: 5784 Longhearth Way

Unit/Suite: | PO Box:

City/Town: Manotick | Province: Ontario | Postal Code: K4M-1M1

Telephone No.: 613-692-6058 | Fax No.: 613-692-6859 | Cell No.: 613-558-9484

E-mail: rrautomation@rogers.com

Print Name of Contact Person: Kevin Nauss

Note: It is illegal to use an appliance, equipment, or work for its intended purpose unless it is approved.
Please note that this approval may be revoked or suspended if the relevant review and inspection fees are not paid in full.

Technical Standards and Safety Authority

14th Floor - Centre Tower
3300 Bloor Street West
Toronto ON M8X 2X4
Tel.: 416.734.3348
Fax: 416.231.7525
Customer Service: 1.877.682.8772
E-mail: fssubmissions@tssa.org

Application for Field Approval of Appliances or Equipment

Technical Standards and Safety Act
Fuels Safety Regulations

Location Address:

D. INVOICEE Same as: ☐ A
(Company responsible for fees invoiced for approval including engineering and inspection fees.) All 3108 le.

Company Name: R&R Automation Inc.			
Street Name / 911 Number/Address, if applicable: 5784 Longhearth Way			
Unit/Suite:	PO Box:		
City/Town: Manotick	Province: Ontario	Postal Code: K4M 1M1	
Telephone No.: 613-692-6058	Fax No.: 613-692-8659	Cell No.: 613-558-9484	
E-mail: rrautomation@rogers.com			
Print Name of Contact Person: Kevin Nauss	Signature of Contact Person:		

Date of Application (dd-mm-yyyy): 12-09-2014

FEES FOR ENGINEERING REVIEW AND INSPECTION

Check box to request type of service.

☑ **Regular Service:** 20-30 working days for engineering and inspection services.
Standard Fee: $169.50 (13% HST included) per hour for engineering review and inspection services.

☐ **Rush Engineering Service Only:** 5 to 10 working days.
Fee: 2 x Standard fee for engineering review.

☐ **Rush Engineering and Inspection Services:** 5 to 10 working days for each service.
Fee: 2 x Standard fee for engineering review and inspection services.

Legal Disclaimer - The owner agrees to hold harmless the Technical Standards and Safety Authority, its employees, agents, successors and assigns from any and all damages, actions, suits, claims or loss arising from the use, approval or refusal to approve of the appliance, equipment or work to which this approval applies. In the event of claims made against TSSA arising from the use of the appliance, equipment or work the owner accepts, on demand to defend such actions on behalf of TSSA and to assume any costs legal or otherwise for the defence or settlement of such claims. Failure to comply with any of the terms and conditions of the approval voids the approval.

Deposit Payment Method

Deposit of $593.25 (13% HST included) must accompany each application. Invoice will only be issued for the amount billed over and above the deposit.
HST Registration No.: 891131369

☐ Cheque or money order enclosed. Please make payable to: **Technical Standards and Safety Authority**

☑ Charge my credit card: ☐ VISA ☑ MASTERCARD

Card No. 5 5 8 3 4 6 0 0 0 1 0 4 2 5 3 0

Expiry Date: Month 0 3 / Year 1 5

Name of Card Holder Kevin Nauss / R&R Automation Inc. (First Name / Last Name) Telephone No. 613-692-6058

Signature of Card Holder X _____ Date 12-09-2014 (dd-mm-yyyy)

Payment Receipts can be requested by calling our Customer Contact Centre at 1.877.682.8772 only after the payment has been processed.

Purchase Order No. _____ Purchase Order number will be reflected on invoices and TSSA will not enter into any purchasing agreements.

NRC 1500 Montreal Rd.
OTTAWA ONTARIO

BUILDING M-6, CENTERAL HEATING PLANT.

Furnace and Stack Volume Cal.

Boiler #1	Volcano
Furnace:	956 cu ft.
Economizer:	165 cu ft.
Stack:	1222 cu ft.
	2343 cu ft.

F.D. Fan Data:	Northern Blower
Size:	3650
Design:	4270
Motor HP:	50
Volume Flow Rate:	**18,000 cu ft./min**

Boiler Purge Calculations.

Boiler Vol	Units		Req. Air Exchanges		Total Volume	Units
2343	cu ft.	X	8	=	18744	cu ft.

Total Volume	Units		Margin of Error %		New Total Volume	Units
18744	cu ft.	X	20	=	22493	cu ft.

Purge Time

New Total Volume	Units		Total Fan Vol. Flow		Purge Time in Min	Units
22493	cu ft.	/	18000	=	1.25	Min.

Total Purge Time for Boiler #1 will be: 1 Min 30 Sec.

Boiler #3	Foster Wheeler
Furnace:	1440 cu ft.
Economizer:	NA cu ft.
Stack:	1210 cu ft.
	2650 cu ft.

F.D. Fan Data:	ames Howard & Parsor
Size:	NO DATA
Design:	NO DATA
Motor HP:	
Volume Flow Rate:	**NO DATA cu ft./min**

Independent Air flow tests to be done before upgrade is to begin. Purge time will then be submitted.

Boiler Vol	Units		Req. Air Exchanges		Total Volume	Units
2650	cu ft.	X	8	=	21200	cu ft.

Total Volume	Units		Margin of Error %		New Total Volume	Units
21200	cu ft.	X	20	=	25440	cu ft.

Purge Time

New Total Volume	Units		Total Fan Vol. Flow		Purge Time in Min	Units
25440	cu ft.	/	0	=	#DIV/0!	Min.

Total Purge Time for Boiler #3 will be: TBD

Boiler #4	Babcock & Wilcox
Furnace:	1700 cu ft.
Economizer:	NA cu ft.
Stack:	1492 cu ft.
	3192 cu ft.

F.D. Fan Data:	Chicago Blower
Size:	4014
Design:	3S1
Motor HP:	100
Volume Flow Rate:	**25,160 cu ft./min**

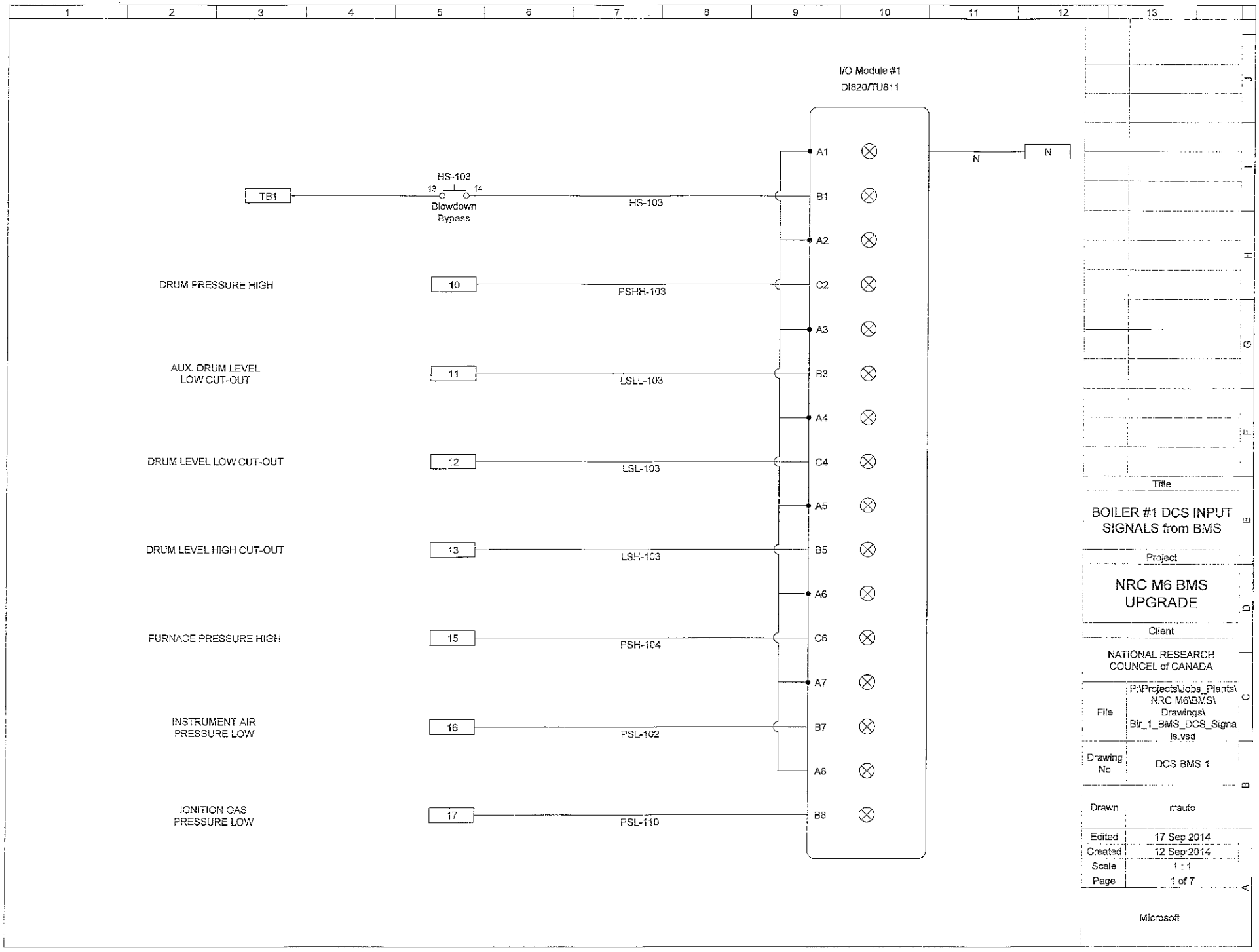
Boiler Vol	Units		Req. Air Exchanges		Total Volume	Units
3192	cu ft.	X	8	=	25536	cu ft.

Total Volume	Units		Margin of Error %		New Total Volume	Units
25536	cu ft.	X	20	=	30643	cu ft.

Purge Time

New Total Volume	Units		Total Fan Vol. Flow		Purge Time in Min	Units
30643	cu ft.	/	25160	=	1.22	Min.

Total Purge Time for Boiler #4 will be: 1 Min 30Sec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HS-103
13
14
Blowdown
Bypass
TB1
HS-103
A1
B1
A2
C2
A3
B3
A4
C4
A5
B5
A6
C6
A7
B7
A8
B8
N
N
DRUM PRESSURE HIGH
10
PSHH-103
AUX. DRUM LEVEL
LOW CUT-OUT
11
LSLL-103
DRUM LEVEL LOW CUT-OUT
12
LSL-103
DRUM LEVEL HIGH CUT-OUT
13
LSH-103
FURNACE PRESSURE HIGH
15
PSH-104
INSTRUMENT AIR
PRESSURE LOW
16
PSL-102
IGNITION GAS
PRESSURE LOW
17
PSL-110
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SIGNALS from BMS
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NRC M6 BMS
UPGRADE
Client
NATIONAL RESEARCH
COUNCEL of CANADA
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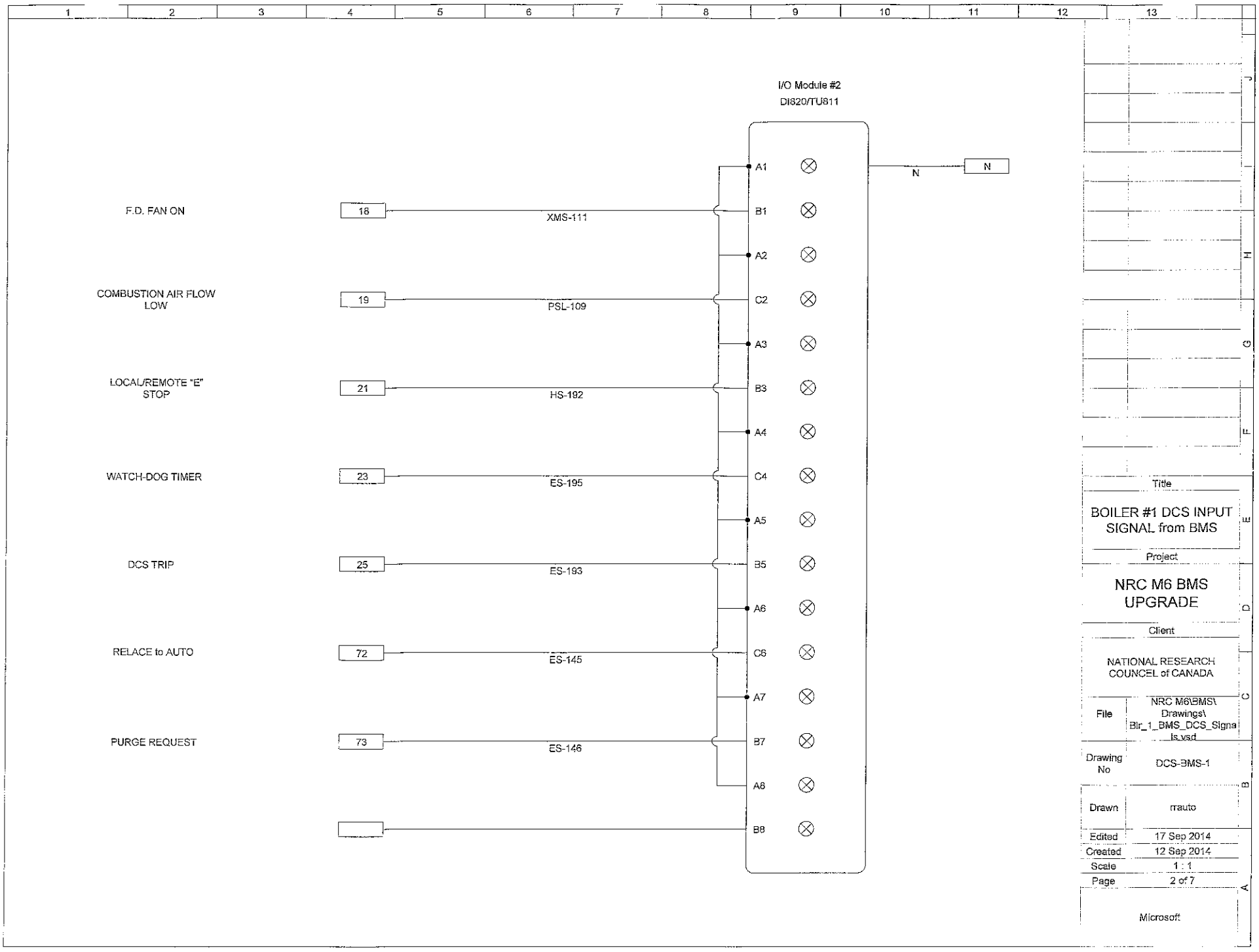
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DI820/TU811
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A2
C2
A3
B3
A4
C4
A5
B5
A6
C6
A7
B7
A8
B8
N
N
F.D. FAN ON
18
XMS-111
COMBUSTION AIR FLOW LOW
19
PSL-109
LOCAL/REMOTE "E" STOP
21
HS-192
WATCH-DOG TIMER
23
ES-195
DCS TRIP
25
ES-193
RELACE to AUTO
72
ES-145
PURGE REQUEST
73
ES-146
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NRC M6 BMS UPGRADE
Client
NATIONAL RESEARCH COUNCEL of CANADA
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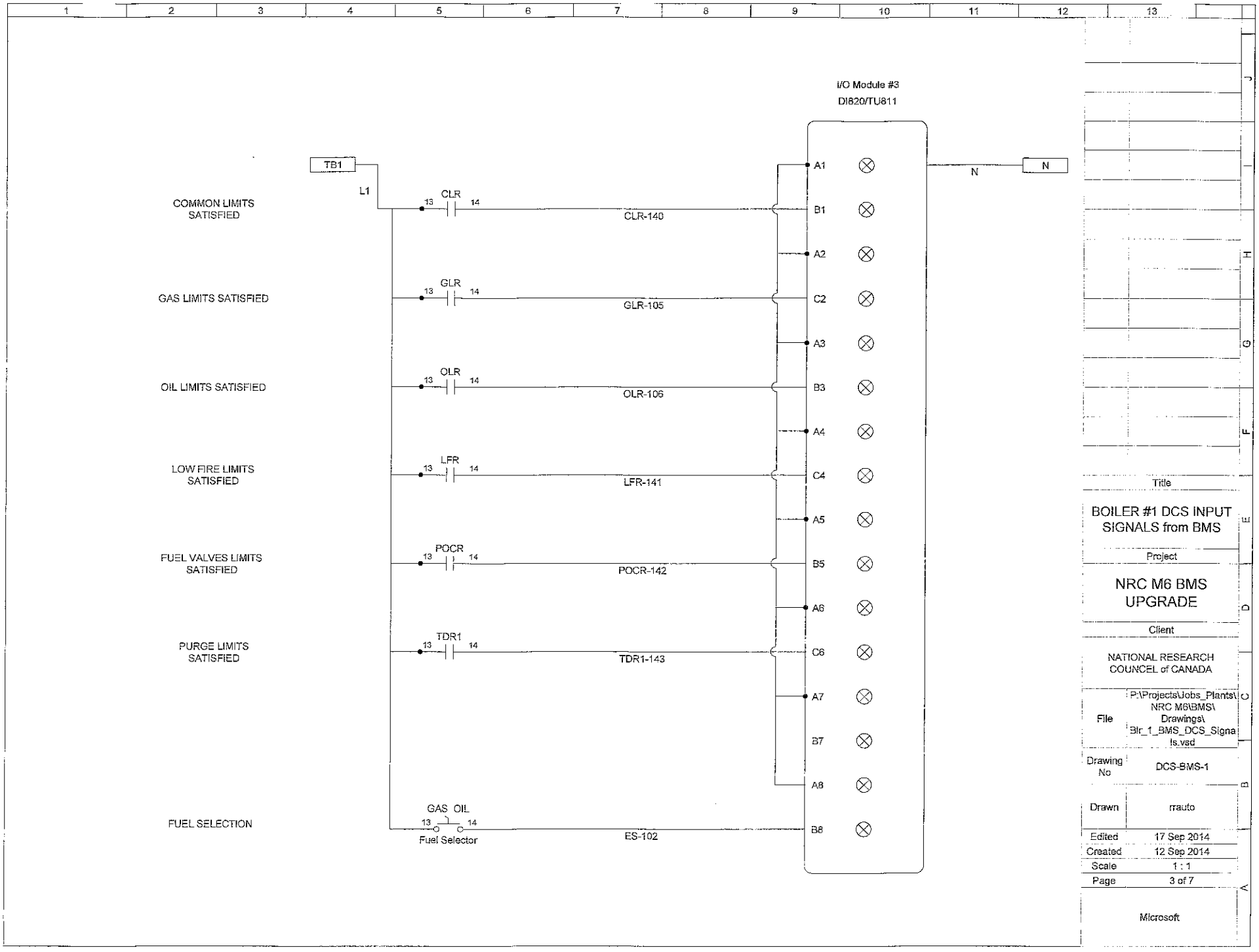

Title

BOILER #1 DCS INPUT SIGNALS from BMS

Project

NRC M6 BMS UPGRADE

Client

NATIONAL RESEARCH COUNCEL of CANADA

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Page	3 of 7

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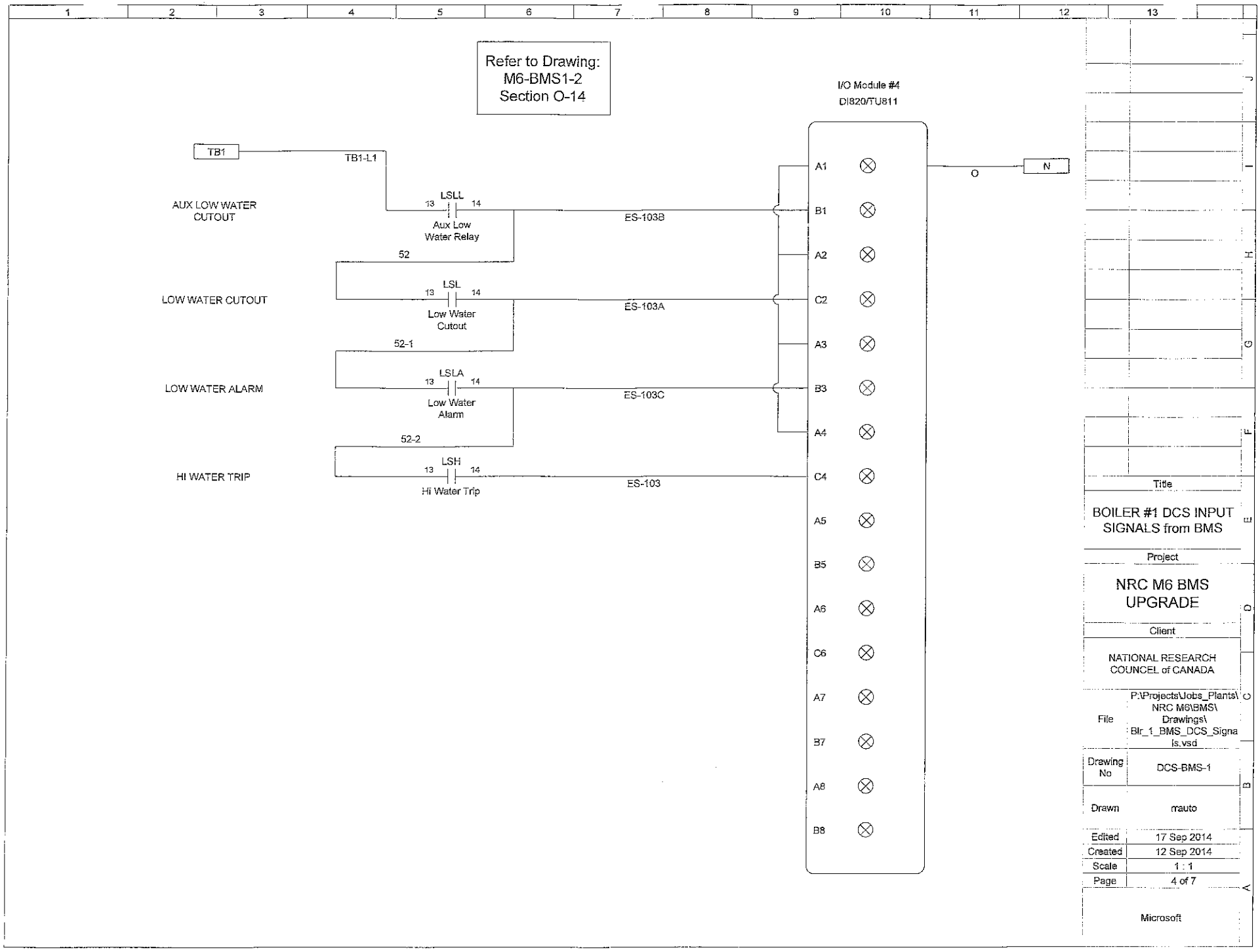
Refer to Drawing:
M6-BMS1-2
Section O-14
I/O Module #4
DI820/TU811
TB1
TB1-L1
AUX LOW WATER CUTOUT
LSLL
13
14
Aux Low Water Relay
ES-103B
52
LOW WATER CUTOUT
LSL
Low Water Cutout
ES-103A
52-1
LOW WATER ALARM
LSLA
Low Water Alarm
ES-103C
52-2
HI WATER TRIP
LSH
Hi Water Trip
ES-103
A1
B1
A2
C2
A3
B3
A4
C4
A5
B5
A6
C6
A7
B7
A8
B8
O
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Title
BOILER #1 DCS INPUT SIGNALS from BMS
Project
NRC M6 BMS UPGRADE
Client
NATIONAL RESEARCH COUNCEL of CANADA
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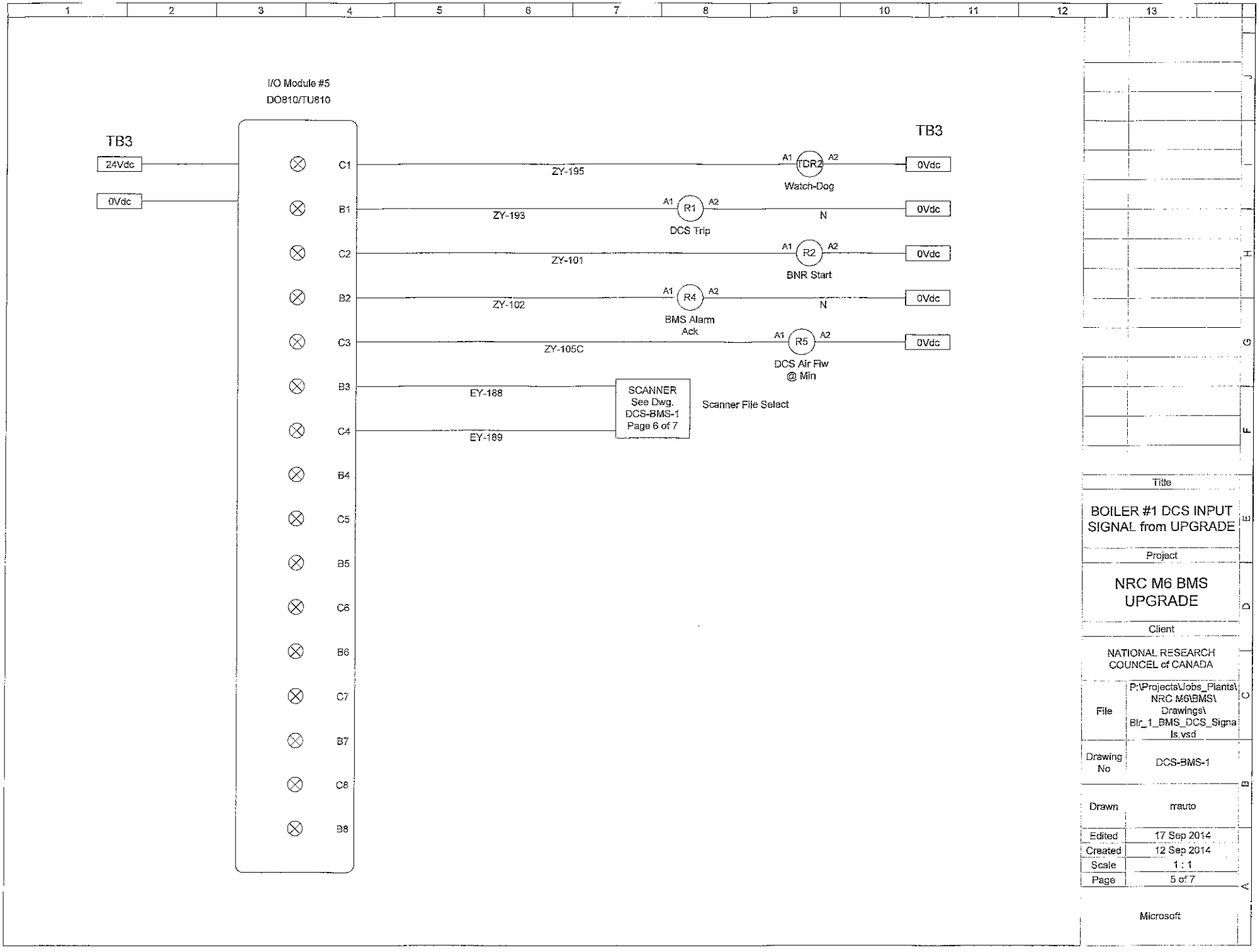

Title

BOILER #1 DCS INPUT SIGNAL from UPGRADE

Project

NRC M6 BMS UPGRADE

Client

NATIONAL RESEARCH COUNCEL of CANADA

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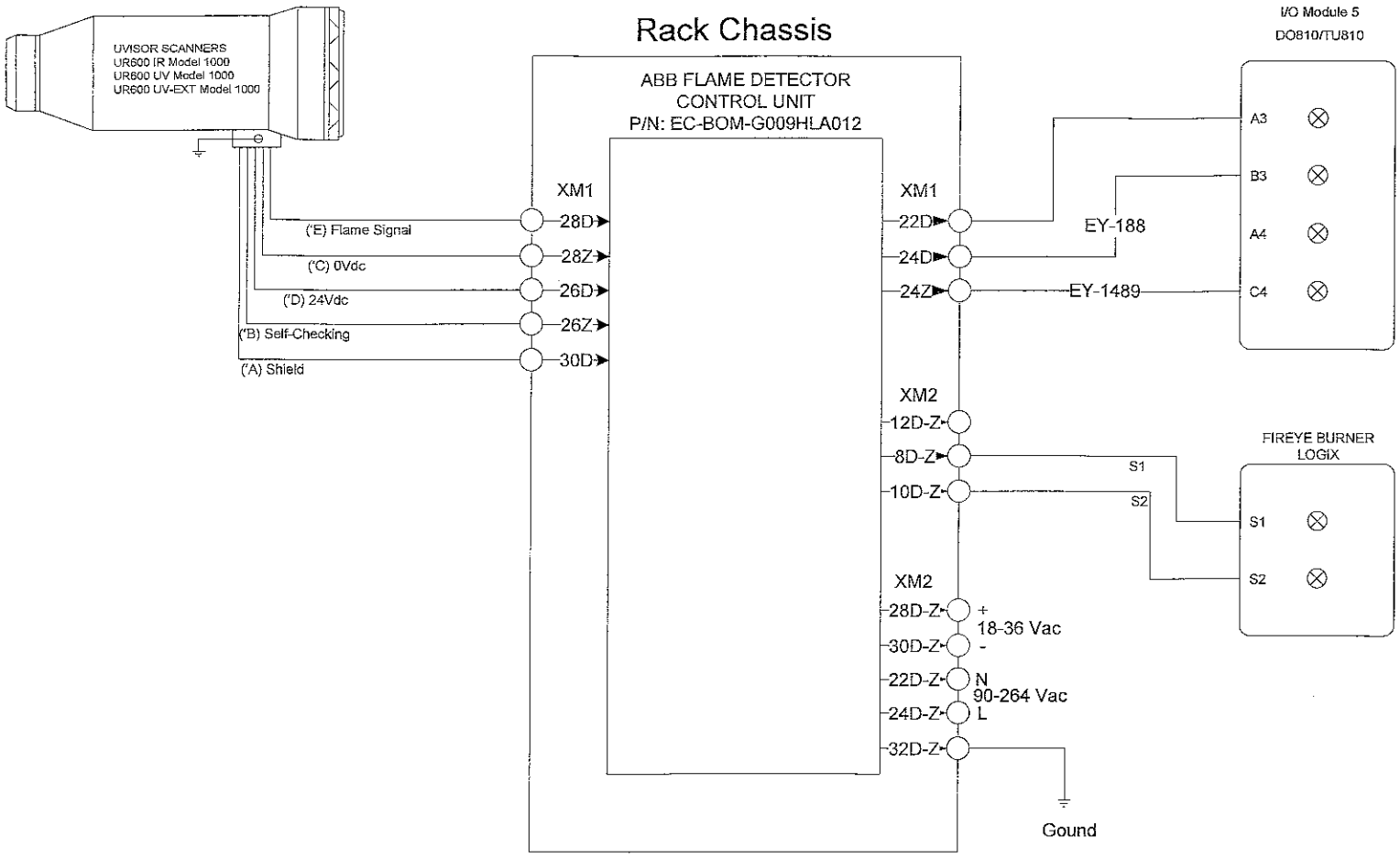
Page	5 of 7

Microsoft



Title

BOILER #1 FLAME SCANNER WIRING

Project

NRC M6 BMS UPGRADE

Client

NATIONAL RESEARCH COUNCEL of CANADA

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Created	12 Sep 2014
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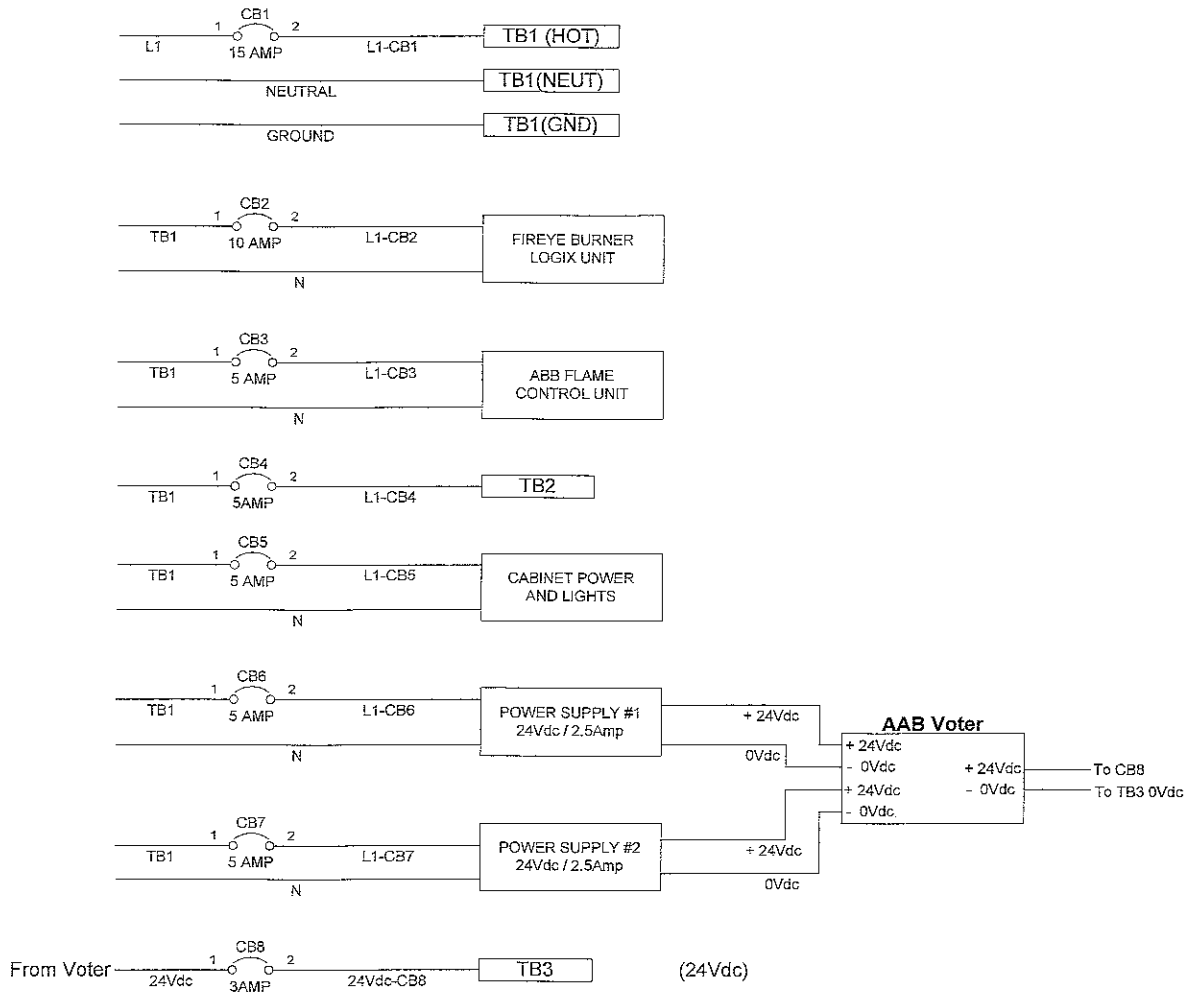
Page	6 of 7

Microsoft



Title

BOILER #1 CABINET POWER

Project

NRC M6 BMS UPGRADE

Client

NATIONAL RESEARCH COUNCEL of CANADA

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Edited	17 Sep 2014
Created	12 Sep 2014
Scale	1 : 1
Page	7 of 7

Microsoft

Laura Liu <lliu@tssa.org>

Your field approval application for boiler #1 #3 and #4 at National Reseach Council of Canada, 1200 Montreal Road, Building M-6, Ottawa, our SR 1490786, 810, 906

2 messages

Laura Liu <lliu@tssa.org> Tue, Nov 11, 2014 at 1:53 PM
To: Randy.hedges@nrc-cnrc.gc.ca, Kevin Nauss <rrautomation@rogers.com>

Dear Mr. Randy Hedges and Mr. Kevin Rauss,

Please find attached review comments for the applications as per subject. I will waiting for your response to my issues listed in the letter to continue with my review of your file.

Thanks and best regards,

Laura Liu, P. Eng
Fuels Safety Engineering
Tel: 416-734-3347
Fax: 416-231-7525
email: lliu@tssa.org

Technical Standards & Safety Authority - "Putting Public Safety First"
website: www.tssa.org
toll-free: 1-877-682-8772

3 attachments

review comments 1490786.pdf
104K

review comments 1490810.pdf
103K

review comments 1490906.pdf
103K

Hedges, Randy <Randy.Hedges@nrc-cnrc.gc.ca> Wed, Nov 12, 2014 at 9:34 AM
To: Laura Liu <lliu@tssa.org>

Dear Ms. Laura Liu,

Due to retirement I have been replaced as Chief Operating Engineer of the National Research Council of Canada. Mr. Gilles Leclair has replaced me. I will forward this e-mail to him. For the future if required, his e-mail address is gilles.leclair@nrc.cnrc.gc.ca .

Kind regards

From: Laura Liu [mailto:lliu@tssa.org]
Sent: November-11-14 1:53 PM
To: Hedges, Randy; Kevin Nauss
Subject: Your field approval application for boiler #1 #3 and #4 at National Reseach Council of Canada, 1200 Montreal Road, Building M-6, Ottawa, our SR 1490786, 810, 906

[Quoted text hidden]

TECHNICAL STANDARDS & SAFETY AUTHORITY
14th Floor, Centre Tower
3300 Bloor Street West
Toronto, Ontario
Canada M8X 2X4

E-MAIL

Date:	November 11, 2014		**Pages:**	3
To:	Randy Hedges, Kevin Nauss		**From:**	Laura Liu
Tel. No:	613-993-5043, 613-692-6058		**Tel. No:**	(416) 734-3347
E-Mail:	Randy.hedges@nrc-cnrc.gc.ca, rrautomation@rogers.com		**E-Mail:**	lliu@tssa.org
Fax No:			**Fax No:**	(416) 231-7525

Subject: **Field Approval for Steam Boiler, made by Volcano, model: D2-40R, serial: W-1579**
At National Research Council of Canada, 1200 Montreal Road, Building M-6, Ottawa, Ontario
Our SR Number: 1490906

This is in response to your Field Approval applications for the subject appliance.

The appliance will be field approved using the TSSA Field Approval Code, TSSA-FA-2012, adopting CSA-B149.3-10 Code for the Field Approval of Fuel Related Components and Equipment and The NFPA 85 "Boiler and Combustion Systems Hazards Code, 2011 Edition" prepared by NFPA International, as applicable to fuel oil systems. B149.3 requires all components of an appliance to be certified by an organization recognized under the Ontario Gas Utilization Code. It further dictates the valve train layout, and operating characteristics. Unless otherwise noted, the references in the remainder of this facsimile relate to clauses and sections within the B149.3 code.

Based on your application and accompanying documentation we would like to bring to your attention the following:

1. Please note, relay CLR, LFR, GLR, OLR and POCR are serving more than one safety interlocks, and please make necessary changes to comply with section 9.1.3 and 9.1.4.
   9.1.3
   Except as specified in Clause 9.1.4, where intermediate relays are used in the limit circuit or used to control safety shut off valves or used to control direct spark transformer igniters, a safety relay that provides redundancy and a self-monitoring function to ensure the contacts are operating properly, or an equivalent circuit, shall be used.
   9.1.4
   Intermediate relays may be used in the limit circuits, provided that each intermediate relay serves only one safety interlock.

   If you want to change to safety rated relays, please send me make and model number, and detailed wiring of the relay for me to verify your compliance.

2. There is a low water bypass function implemented. Please note
   7.6.10
   A safety limit or a safety relief device shall not be isolated, bypassed, or in any way made ineffective by a valve or other device except as permitted in Clause 9.7.2.3.1.

   Please submit a detailed procedure for this bypass operation and apply variance for us to consider allow this non-compliance;

3. Please provide more information of the method of fuel air ratio of the boiler;

4. Please let me know if there is any economizer or draft control installed for the boiler.

5. Please let me know how GLR and OLR wired in the safety limit circuit.

6. Please ensure all the components on the main gas and oil valve train are certified as per code requirements;

7. As per B149.1-10 clauses 4.2.1 and 4.7.1 requires approval under the Electrical Code. The only evidence of such approval acceptable to TSSA will be a label attached to the appliance. The label must be issued by a field evaluation agency recognized under the Ontario Electrical Safety Code and Ontario Regulation 438/07. The inspection must be for the control panel(s), and the wiring to and from the panel(s). If the ESA performs the inspection, then the label must have a serial number starting with a letter S. For further details please contact the Electrical Safety Authority at 1-800-ESA-SAFE.

8. Section 11 amendment requires rating plate shall be clearly legible, permanent and shall include the following information:
   (a) manufacturer's or vendor's name;
   (b) appliance type and identification number;
   (c) electrical specifications;
   (d) type of fuel(s);
   (e) maximum input rating in Btuh (kW);
   (f) minimum purge time
   (g) approval standard.

   For gas fired appliances, in addition to information required above, the following shall be provided on the rating plate:
   (a) inlet pressure at the point of connection;
   (b) maximum burner manifold fuel pressure;
   (c) minimum burner manifold fuel pressure, if applicable.

   For fuel oil fired appliances, in addition to information required in above, the following shall be provided on the rating plate:
   (a) where applicable, minimum and maximum fuel oil nozzle pressure
   (b) where applicable, minimum and maximum atomizing media type and pressure

(c) where applicable, nozzle sizes, angles and patterns.

Please reserve a 2" by 2" blank area for our approval label.
Thank you for your attention to these points. We will continue with your application after receipt of your letter addressing our concerns.

Please note that the appliance may be test fired by a certified gas technician, but it shall not be operated before final inspection.

If new drawings are created or modified during this application then the TSSA will require copies of them. These drawings must be received before a Field Inspection can take place. Drawings may be submitted as a hardcopy or as an Acrobat PDF file.

If you need a copy of the Field Approval Code (TSSA-FA-2012), or the Variance Application Form, then you can download a copy at: http://www.tssa.org/regulated/fuels/fieldApproval.aspx

Sincerely,

Technical Standards & Safety Authority

Laura Liu, P.Eng
Fuels Safety Engineering

Technical Standards and Safety Authority
www.tssa.org
14th Floor - Centre Tower
3300 Bloor Street West
Toronto ON M8X 2X4
Tel.: 416.734.3348
Fax: 416.231.7525
Customer Service: 1.877.682.8772
E-mail: fssubmissions@tssa.org

Intake Group
OCT 01 2014
RECEIVED

Application for Field Approval of Appliances or Equipment

Technical Standards and Safety Act
Fuels Safety Regulations

L-Drug

For Office Use Only
Intake Group
OCT 02 2014
SR # 1490186

Please submit completed application and supporting documentation by mail, fax, or e-mail (in pdf format).

Check applicable box(es)
- ☐ Digester Gas
- ☑ Fuel Oil
- ☐ Landfill
- ☑ Natural Gas
- ☐ Propane
- ☐ Other _____

Required Documentation (2 copies each)
- ☑ Bill of Materials
- ☑ Purge Calculations
- ☑ Electrical Schematic
- ☑ Valve Train / P&ID Drawing(s)

Type of Appliance/Equipment: Steam Boiler	☐ Mobile Appliance
Manufactured by: Foster Wheeler	No. of Units: 1
Model:	Serial No.(s):
Main Supply Pressure: 20 PSIG	
Maximum Input: 50,000. CFH NG / 2470 PPH #2 OIL	Minimum Input: 10,000. CFH NG / 490 PPH #2 OIL
Burner/Manifold Operating Pressure: 3 PSIG NG / 70 PSIG #2 OIL (MAX)	

A. OWNER OF APPLIANCE OR EQUIPMENT

A# 379314 | CH 265310

Company Name: National Research Council of Canada		Ontario Corporation No., if applicable
Street Name / 911 Number/Address, if applicable: 1200 Montreal Rd.		
Unit/Suite: M-6	PO Box:	
City/Town: Ottawa	Province: Ontario	Postal Code: K1A 0R6
Telephone No.: 613-993-5043	Fax No.: 613-993-4041	Cell No.: 613-223-8551
E-mail: randy.hedges@nrc-cnrc.gc.ca		
Print Name of Contact Person: Randy Hedges	Signature of Contact Person:	

B. LOCATION ADDRESS

Same as: ☑ A

(Where appliance/equipment is to be installed/inspected. Note this must be a delivery or fire route address.)

Company Name:		
Street Name / 911 Number/Address, if applicable:		
Unit/Suite:		
City/Town:	Province:	Postal Code:
Telephone No.:	Fax No.:	Cell No.:
E-mail:		
Print Name of Contact Person:		

C. TECHNICAL CONTACT

Same as: ☐ A ☐ B ☐ D

(Company we should communicate with regarding engineering and inspection approval on behalf of the owner.)

Company Name: RR Automation Inc.		
Street Name / 911 Number/Address, if applicable: 5784 Longhearth Way		
Unit/Suite:	PO Box:	
City/Town: Manotick	Province: Ontario	Postal Code: K4M-1M1
Telephone No.: 613-692-6058	Fax No.: 613-692-6859	Cell No.: 613-558-9484
E-mail: rrautomation@rogers.com		
Print Name of Contact Person: Kevin Nauss		

Note: It is illegal to use an appliance, equipment, or work for its intended purpose unless it is approved.
Please note that this approval may be revoked or suspended if the relevant review and inspection fees are not paid in full.

Technical
Standards and
Safety Authority

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E-mail: fssubmissions@tssa.org

Application for Field Approval of Appliances or Equipment

Technical Standards and Safety Act
Fuels Safety Regulations

Location Address:

D. INVOICEE Same as: ☐ A (Company responsible for fees invoiced for approval including engineering and inspection fees.) AF 3708116 | CA 790960.			
Company Name: R&R Automation Inc.			
Street Name / 911 Number/Address, if applicable: 5784 Longhearth Way			
Unit/Suite:	PO Box:		
City/Town: Manotick		Province: Ontario	Postal Code: K4M 1M1
Telephone No.: 613-692-6058	Fax No.: 613-692-8659		Cell No.: 613-558-9484
E-mail: rrautomation@rogers.com			
Print Name of Contact Person: Kevin Nauss		Signature of Contact Person:	

Date of Application (dd-mm-yyyy): 12-09-2014

FEES FOR ENGINEERING REVIEW AND INSPECTION

Check box to request type of service.

☑ **Regular Service:** 20-30 working days for engineering and inspection services.
Standard Fee: $169.50 (13% HST included) per hour for engineering review and inspection services.

☐ **Rush Engineering Service Only:** 5 to 10 working days.
Fee: 2 x Standard fee for engineering review.

☐ **Rush Engineering and Inspection Services:** 5 to 10 working days for each service.
Fee: 2 x Standard fee for engineering review and inspection services.

Legal Disclaimer - The owner agrees to hold harmless the Technical Standards and Safety Authority, its employees, agents, successors and assigns from any and all damages, actions, suits, claims or loss arising from the use, approval or refusal to approve of the appliance, equipment or work to which this approval applies. In the event of claims made against TSSA arising from the use of the appliance, equipment or work the owner accepts, on demand to defend such actions on behalf of TSSA and to assume any costs legal or otherwise for the defence or settlement of such claims. Failure to comply with any of the terms and conditions of the approval voids the approval.

NRC 1500 Montreal Rd.
OTTAWA ONTARIO

BUILDING M-6, CENTERAL HEATING PLANT.

Furnace and Stack Volume Cal.

Boiler #1	Volcano	
Furnace:	956	cu ft.
Economizer:	165	cu ft.
Stack:	1222	cu ft.
	2343	**cu ft.**

F.D. Fan Data:	Northern Blower
Size:	3650
Design:	4270
Motor HP:	50
Volume Flow Rate:	**18,000 cu ft./min**

Boiler Purge Calculations.

Boiler Vol	Units		Req. Air Exchanges		Total Volume	Units
2343	cu ft.	X	8	=	18744	cu ft.

Total Volume	Units		Margin of Error %		New Total Volume	Units
18744	cu ft.	X	20	=	22493	cu ft.

Purge Time

New Total Volume	Units		Total Fan Vol. Flow		Purge Time in Min	Units
22493	cu ft.	/	18000	=	1.25	Min.

Total Purge Time for Boiler #1 will be: 1 Min 30 Sec.

Boiler #3	Foster Wheeler	
Furnace:	1440	cu ft.
Economizer:	NA	cu ft.
Stack:	1210	cu ft.
	2650	cu ft.

F.D. Fan Data:	ames Howard & Parsor
Size:	NO DATA
Design:	NO DATA
Motor HP:	
Volume Flow Rate:	**NO DATA cu ft./min**

Independent Air flow tests to be done before upgrade is to begin. Purge time will then be submitted.

Boiler Vol	Units		Req. Air Exchanges		Total Volume	Units
2650	cu ft.	X	8	=	21200	cu ft.

Total Volume	Units		Margin of Error %		New Total Volume	Units
21200	cu ft.	X	20	=	25440	cu ft.

Purge Time

New Total Volume	Units		Total Fan Vol. Flow		Purge Time in Min	Units
25440	cu ft.	/	0	=	#DIV/0!	Min.

Total Purge Time for Boiler #3 will be: TBD

Boiler #4	Babcock & Wilcox	
Furnace:	1700	cu ft.
Economizer:	NA	cu ft.
Stack:	1492	cu ft.
	3192	cu ft.

F.D. Fan Data:	Chicago Blower
Size:	4014
Design:	3S1
Motor HP:	100
Volume Flow Rate:	**25,160 cu ft./min**

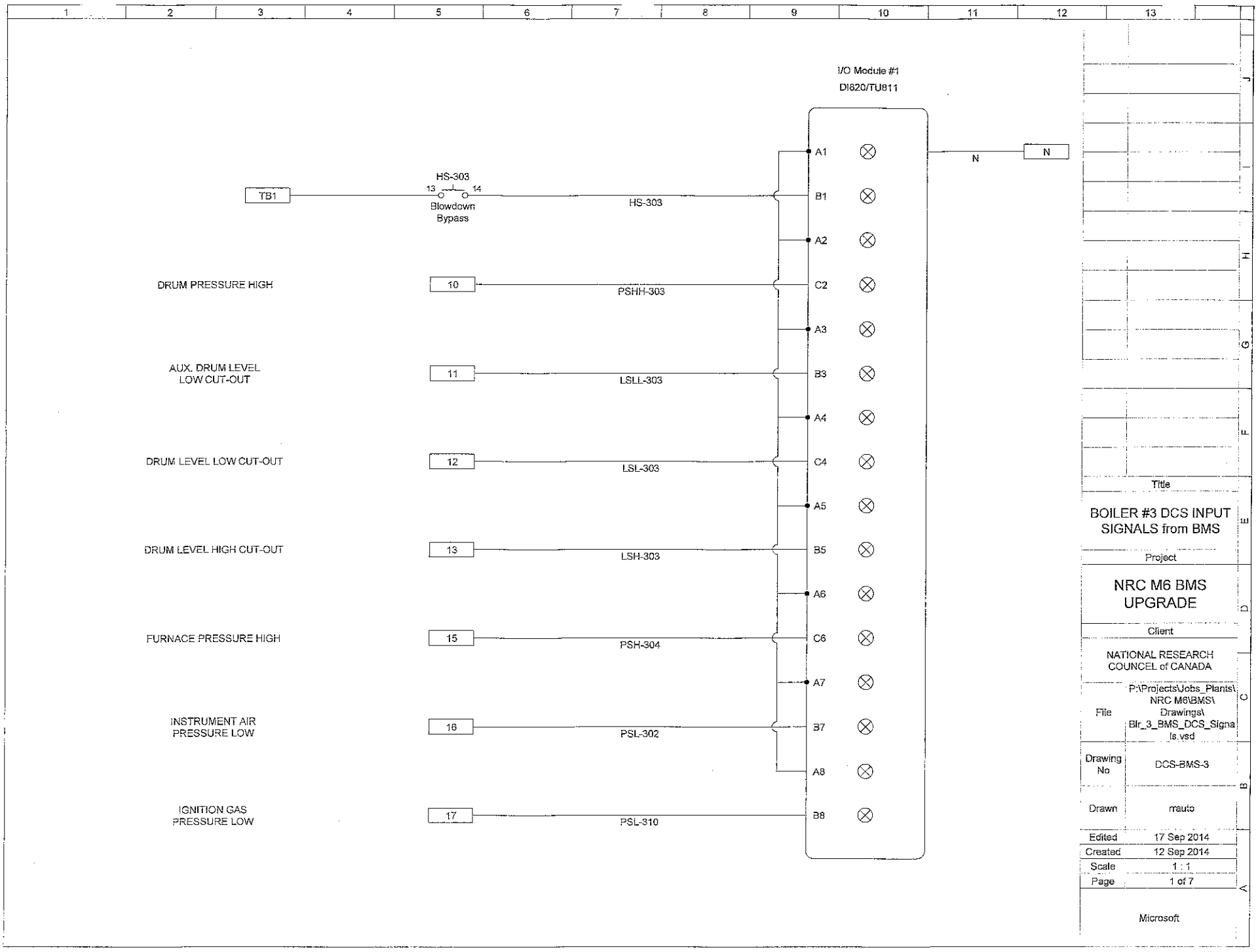
Boiler Vol	Units		Req. Air Exchanges		Total Volume	Units
3192	cu ft.	X	8	=	25536	cu ft.

Total Volume	Units		Margin of Error %		New Total Volume	Units
25536	cu ft.	X	20	=	30643	cu ft.

Purge Time

New Total Volume	Units		Total Fan Vol. Flow		Purge Time in Min	Units
30643	cu ft.	/	25160	=	1.22	Min.

Total Purge Time for Boiler #4 will be: 1 Min 30Sec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DI820/TU811
TB1
HS-303
13
14
Blowdown
Bypass
HS-303
A1
B1
A2
C2
A3
B3
A4
C4
A5
B5
A6
C6
A7
B7
A8
B8
N
N
DRUM PRESSURE HIGH
10
PSHH-303
AUX. DRUM LEVEL
LOW CUT-OUT
11
LSLL-303
DRUM LEVEL LOW CUT-OUT
12
LSL-303
DRUM LEVEL HIGH CUT-OUT
13
LSH-303
FURNACE PRESSURE HIGH
15
PSH-304
INSTRUMENT AIR
PRESSURE LOW
16
PSL-302
IGNITION GAS
PRESSURE LOW
17
PSL-310
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NRC M6 BMS
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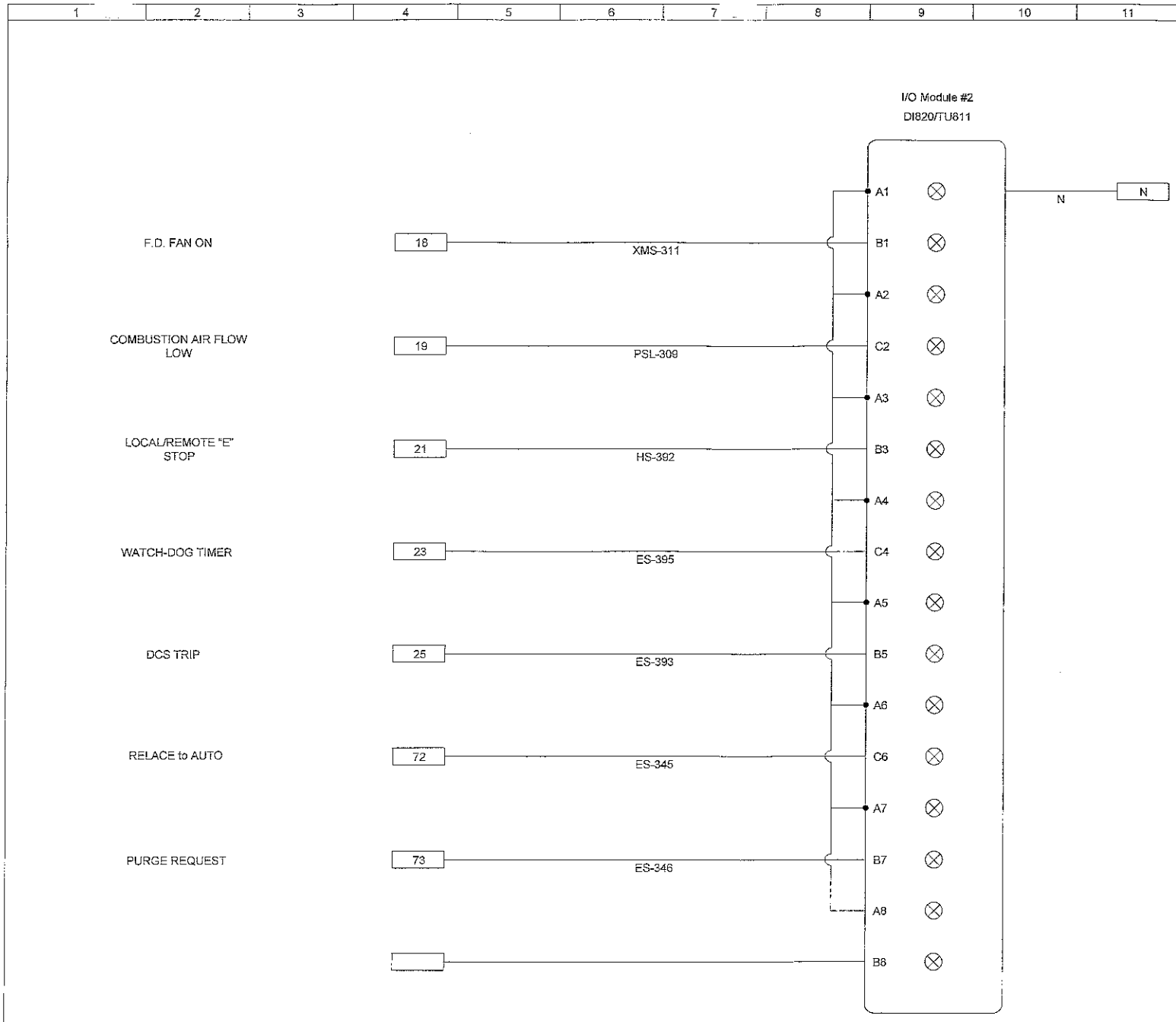

Title

BOILER #3 DCS INPUT SIGNAL from BMS

Project

NRC M6 BMS UPGRADE

Client

NATIONAL RESEARCH COUNCEL of CANADA

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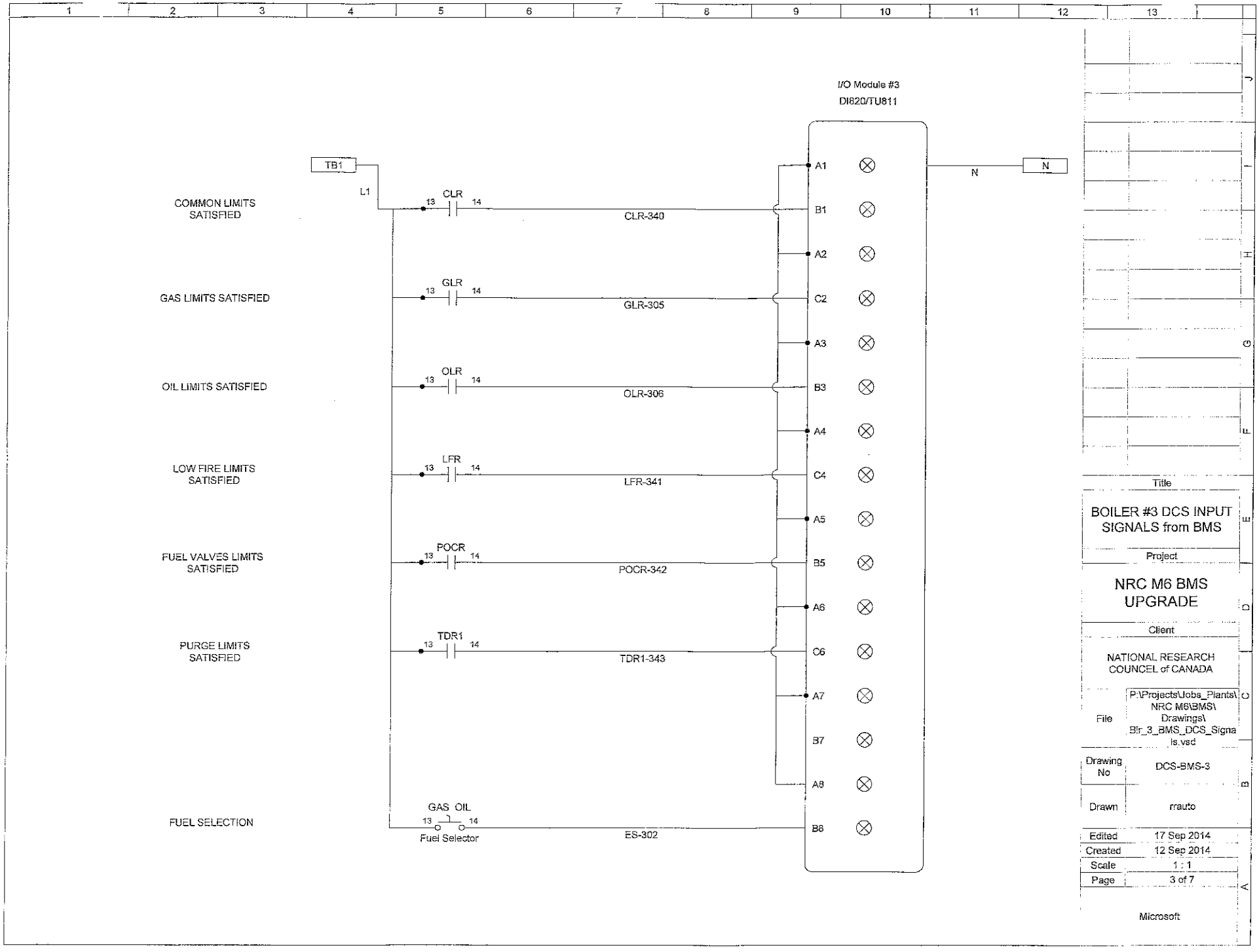
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DI820/TU811
TB1
L1
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COMMON LIMITS SATISFIED
CLR
13
14
CLR-340
A1
B1
GAS LIMITS SATISFIED
GLR
GLR-305
A2
C2
OIL LIMITS SATISFIED
OLR
OLR-306
A3
B3
LOW FIRE LIMITS SATISFIED
LFR
LFR-341
A4
C4
FUEL VALVES LIMITS SATISFIED
POCR
POCR-342
A5
B5
PURGE LIMITS SATISFIED
TDR1
TDR1-343
A6
C6
A7
B7
A8
B8
FUEL SELECTION
GAS OIL
Fuel Selector
ES-302
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BOILER #3 DCS INPUT SIGNALS from BMS
Project
NRC M6 BMS UPGRADE
Client
NATIONAL RESEARCH COUNCEL of CANADA
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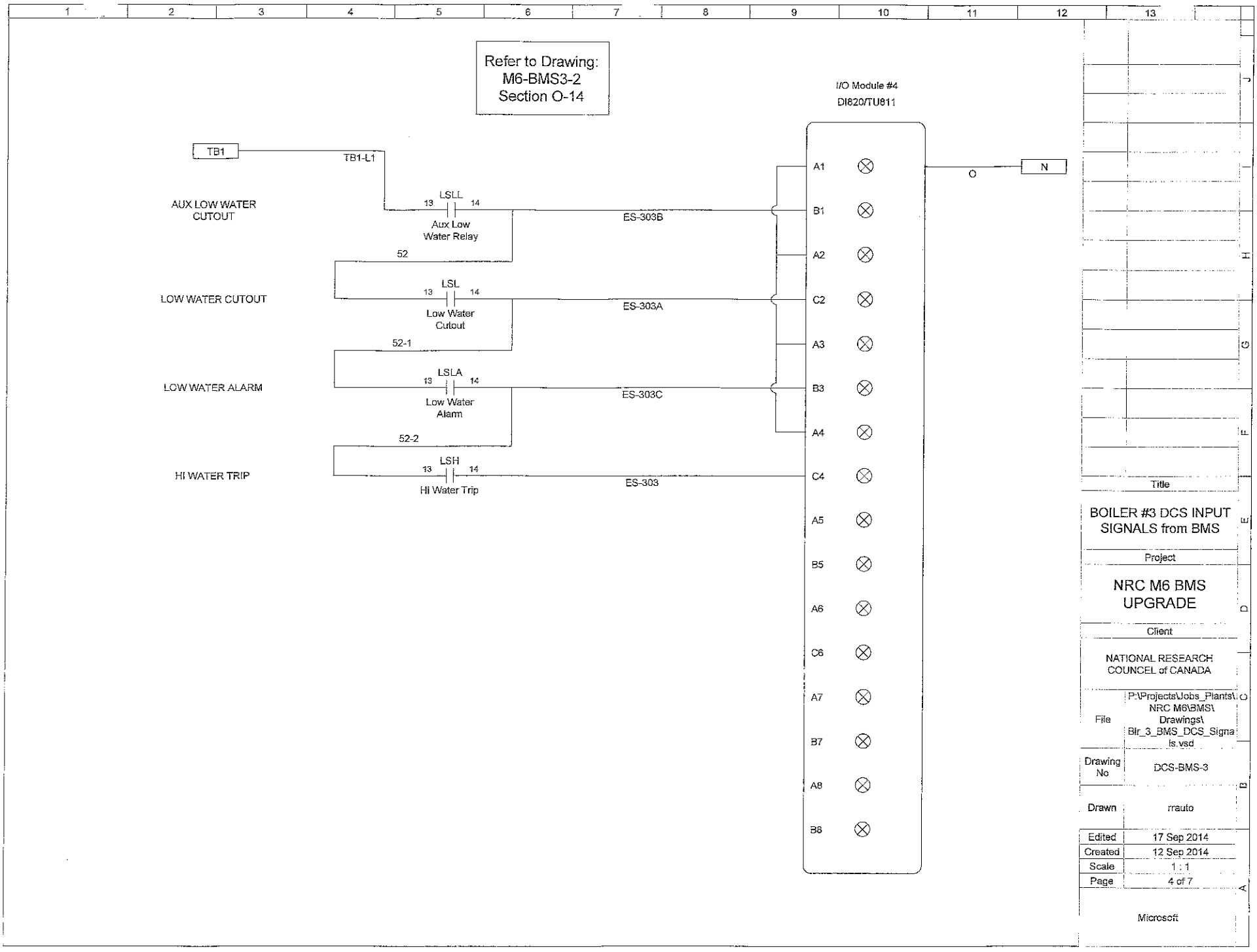
Refer to Drawing:
M6-BMS3-2
Section O-14
I/O Module #4
DI820/TU811
TB1
TB1-L1
AUX LOW WATER CUTOUT
LSLL
13
14
Aux Low Water Relay
ES-303B
52
LOW WATER CUTOUT
LSL
Low Water Cutout
ES-303A
52-1
LOW WATER ALARM
LSLA
Low Water Alarm
ES-303C
52-2
HI WATER TRIP
LSH
Hi Water Trip
ES-303
A1
B1
A2
C2
A3
B3
A4
C4
A5
B5
A6
C6
A7
B7
A8
B8
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NRC M6 BMS UPGRADE
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NATIONAL RESEARCH COUNCEL of CANADA
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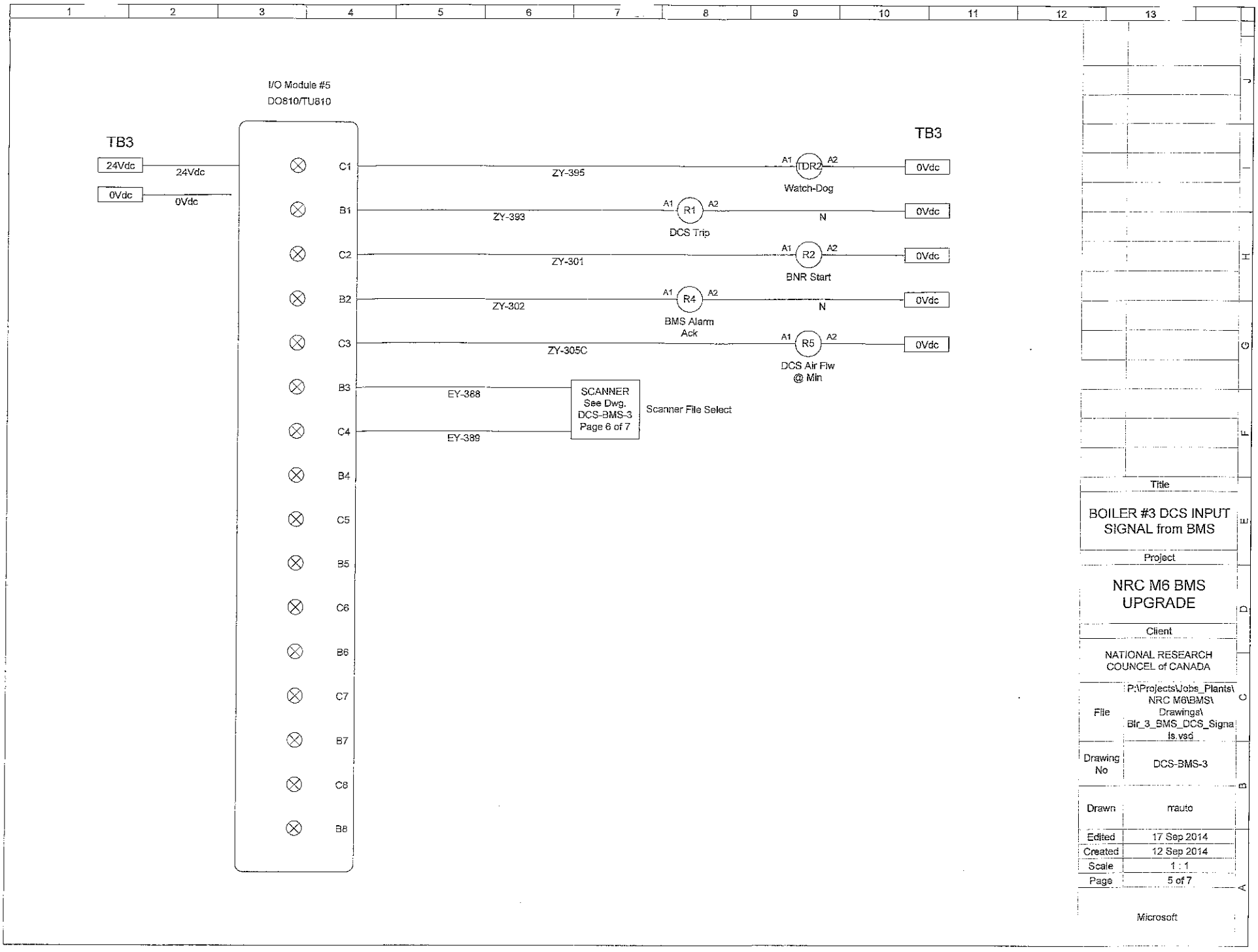
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DO810/TU810
TB3
24Vdc
0Vdc
24Vdc
0Vdc
C1
B1
C2
B2
C3
B3
C4
B4
C5
B5
C6
B6
C7
B7
C8
B8
ZY-395
ZY-393
ZY-301
ZY-302
ZY-305C
EY-388
EY-389
A1
A2
TDR2
Watch-Dog
R1
DCS Trip
R2
BNR Start
R4
BMS Alarm Ack
R5
DCS Air Flw @ Min
TB3
0Vdc
0Vdc
0Vdc
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NRC M6 BMS UPGRADE
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NATIONAL RESEARCH COUNCEL of CANADA
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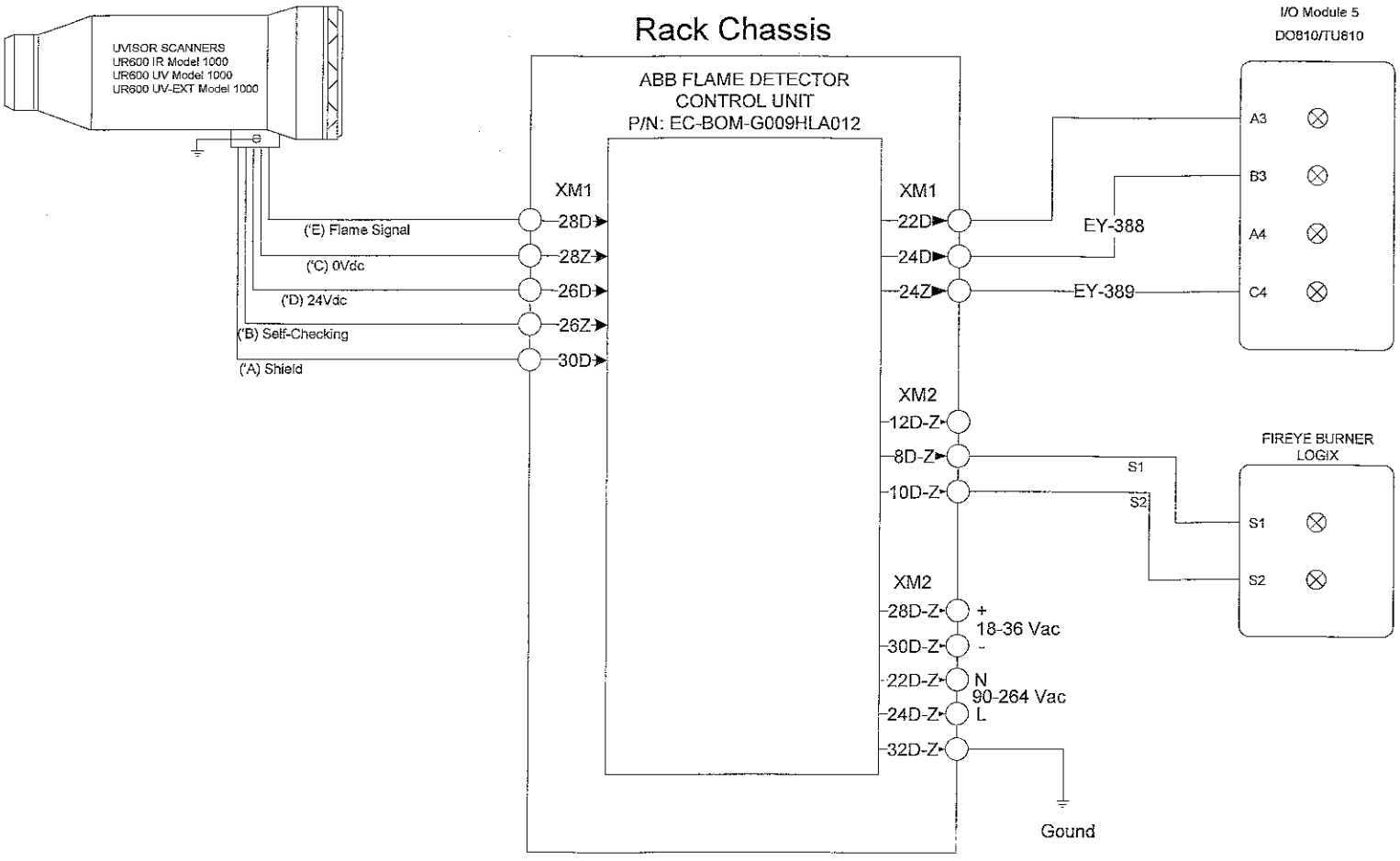

Title

BOILER #3 FLAME SCANNER WIRING

Project

NRC M6 BMS UPGRADE

Client

NATIONAL RESEARCH COUNCEL of CANADA

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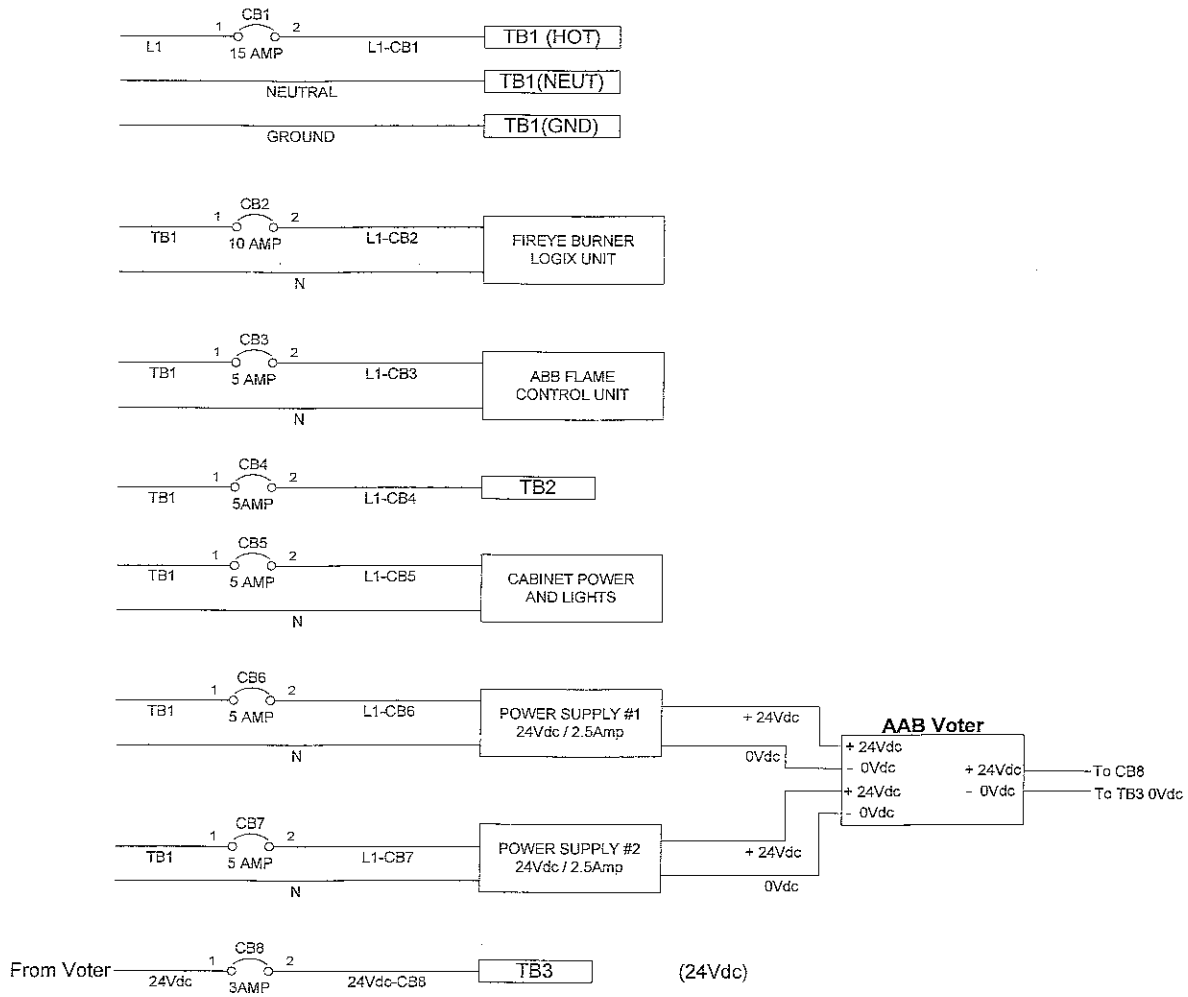

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Project	NRC M6 BMS UPGRADE
Client	NATIONAL RESEARCH COUNCEL of CANADA
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TECHNICAL STANDARDS &
SAFETY AUTHORITY
14th Floor, Centre Tower
3300 Bloor Street West
Toronto, Ontario
Canada M8X 2X4

E-MAIL

Date:	November 11, 2014		**Pages:**	3
To:	Randy Hedges, Kevin Nauss		**From:**	Laura Liu
Tel. No:	613-993-5043, 613-692-6058		**Tel. No:**	(416) 734-3347
E-Mail:	Randy.hedges@nrc-cnrc.gc.ca, rrautomation@rogers.com		**E-Mail:**	lliu@tssa.org
Fax No:			**Fax No:**	(416) 231-7525

Subject: **Field Approval for Steam Boiler, made by Foster Wheeler, boiler #3**
At National Research Council of Canada, 1200 Montreal Road, Building M-6, Ottawa, Ontario
Our SR Number: 1490786

This is in response to your Field Approval applications for the subject appliance.

The appliance will be field approved using the TSSA Field Approval Code, TSSA-FA-2012, adopting CSA-B149.3-10 Code for the Field Approval of Fuel Related Components and Equipment and The NFPA 85 "Boiler and Combustion Systems Hazards Code, 2011 Edition" prepared by NFPA International, as applicable to fuel oil systems. B149.3 requires all components of an appliance to be certified by an organization recognized under the Ontario Gas Utilization Code. It further dictates the valve train layout, and operating characteristics. Unless otherwise noted, the references in the remainder of this facsimile relate to clauses and sections within the B149.3 code.

Based on your application and accompanying documentation we would like to bring to your attention the following:

1. Please submit purge time for the boiler;

2. Please note, relay CLR, LFR, GLR, OLR and POCR are serving more than one safety interlocks, and please make necessary changes to comply with section 9.1.3 and 9.1.4.
   9.1.3
   Except as specified in Clause 9.1.4, where intermediate relays are used in the limit circuit or used to control safety shut off valves or used to control direct spark transformer igniters, a safety relay that provides redundancy and a self-monitoring function to ensure the contacts are operating properly, or an equivalent circuit, shall be used.
   9.1.4
   Intermediate relays may be used in the limit circuits, provided that each intermediate relay serves only one safety interlock.

   If you want to change to safety rated relays, please send me make and model number, and detailed wiring of the relay for me to verify your compliance.

3. There is a low water bypass function implemented. Please note
   7.6.10
   A safety limit or a safety relief device shall not be isolated, bypassed, or in any way made ineffective by a valve or other device except as permitted in Clause 9.7.2.3.1.

   Please submit a detailed procedure for this bypass operation and apply variance for us to consider allow this non-compliance;

4. Please provide more information of the method of fuel air ratio of the boiler;

5. Please let me know if there is any economizer or draft control installed for the boiler.

6. Please let me know how GLR and OLR wired in the safety limit circuit.

7. Please ensure all the components on the main gas and oil valve train are certified as per code requirements;

8. As per B149.1-10 clauses 4.2.1 and 4.7.1 requires approval under the Electrical Code. The only evidence of such approval acceptable to TSSA will be a label attached to the appliance. The label must be issued by a field evaluation agency recognized under the Ontario Electrical Safety Code and Ontario Regulation 438/07. The inspection must be for the control panel(s), and the wiring to and from the panel(s). If the ESA performs the inspection, then the label must have a serial number starting with a letter S. For further details please contact the Electrical Safety Authority at 1-800-ESA-SAFE.

9. Section 11 amendment requires rating plate shall be clearly legible, permanent and shall include the following information:
   (a) manufacturer's or vendor's name;
   (b) appliance type and identification number;
   (c) electrical specifications;
   (d) type of fuel(s);
   (e) maximum input rating in Btuh (kW);
   (f) minimum purge time
   (g) approval standard.

   For gas fired appliances, in addition to information required above, the following shall be provided on the rating plate:
   (a) inlet pressure at the point of connection;
   (b) maximum burner manifold fuel pressure;
   (c) minimum burner manifold fuel pressure, if applicable.

   For fuel oil fired appliances, in addition to information required in above, the following shall be provided on the rating plate:
   (a) where applicable, minimum and maximum fuel oil nozzle pressure

(b) where applicable, minimum and maximum atomizing media type and pressure
(c) where applicable, nozzle sizes, angles and patterns.

Please reserve a 2" by 2" blank area for our approval label.
Thank you for your attention to these points. We will continue with your application after receipt of your letter addressing our concerns.

Please note that the appliance may be test fired by a certified gas technician, but it shall not be operated before final inspection.

If new drawings are created or modified during this application then the TSSA will require copies of them. These drawings must be received before a Field Inspection can take place. Drawings may be submitted as a hardcopy or as an Acrobat PDF file.

If you need a copy of the Field Approval Code (TSSA-FA-2012), or the Variance Application Form, then you can download a copy at: http://www.tssa.org/regulated/fuels/fieldApproval.aspx

Sincerely,

Technical Standards & Safety Authority

Laura Liu, P.Eng
Fuels Safety Engineering

TP1 Amount Payable – General

1.1 Subject to any other provisions of the contract, Her Majesty shall pay the Contractor, at the times and in the manner hereinafter set out, the amount by which

1.1.1 the aggregate of the amounts described in TP2 exceeds

1.1.2 the aggregate of the amounts described in TP3

and the Contractor shall accept that amount as payment in full satisfaction for everything furnished and done by him in respect of the work to which the payment relates.

TP2 Amounts Payable to the Contractor

2.1 The amounts referred to in TP1.1.1 are the aggregate of

2.1.1 the amounts referred to in the Articles of Agreement, and

2.1.2 the amounts, if any, that are payable to the Contractor pursuant to the General Conditions.

TP3 Amounts Payable to Her Majesty

3.1 The amounts referred to in TP1.1.2 are the aggregate of the amounts, in any, that the Contractor is liable to pay Her Majesty pursuant to the contract.

3.2 When making any payments to the Contractor, the failure of Her Majesty to deduct an amount referred to in TP3.1 from an amount referred to in TP2 shall not be constitute a waiver of the right to do so, or an admission of lack of entitlement to do so in any subsequent payment to the Contractor.

TP4 Time of Payment

4.1 In these Terms of Payment

4.1.1 The "payment period" means a period of 30 consecutive days or such other longer period as is agreed between the Contractor and the Departmental Representative.

4.1.2 An amount is "due and payable" when it is due and payable by Her Majesty to the Contractor according to TP4.4, TP4.7 or TP4.10.

4.1.3 An amount is overdue when it is unpaid on the first day following the day upon which it is due and payable.

4.1.4 The "date of payment" means the date of the negotiable instrument of an amount due and payable by the Receiver General for Canada and given for payment.

4.1.5 The "Bank Rate" means the discount rate of interest set by the Bank of Canada in effect at the opening of business on the date of payment.

4.2 The Contractor shall, on the expiration of a payment period, deliver to the Departmental Representative in respect of that payment period a written progress claim that fully describes any part of the work that has been completed, and any material that was delivered to the work site but not incorporated into the work during that payment period.

4.3 The Departmental Representative shall, not later than ten days after receipt by him of a progress claim referred to in TP4.2,

4.3.1 inspect the part of the work and the material described in the progress claim; and

4.3.2 issue a progress report, a copy of which the Departmental Representative will give to the Contractor, that indicates the value of the part of the work and the material described in the progress claim that, in the opinion of the Departmental Representative,

4.3.2.1 is in accordance with the contract, and

4.3.2.2 was not included in any other progress report relating to the contract.

4.4 Subject to TP1 and TP4.5 Her Majesty shall, not later than 30 days after receipt by the Departmental Representative of a progress claim referred to in TP4.2, pay the Contractor

4.4.1 an amount that is equal to 95% of the value that is indicated in the progress report referred to in TP4.3.2 if a labour and material payment bond has been furnished by the Contractor, or

4.4.2 an amount that is equal to 90% of the value that is indicated in the progress report referred to in TP4.3.2 if a labour and material payment bond has not been furnished by the Contractor.

4.5 It is a condition precedent to Her Majesty's obligation under TP4.4 that the Contractor has made and delivered to the Departmental Representative,

4.5.1 a statutory declaration described in TP4.6 in respect of a progress claim referred to in TP4.2,

4.5.2 in the case of the Contractor's first progress claim, a construction schedule in accordance with the relevant sections of the Specifications, and

4.5.3 if the requirement for a schedule is specified, an update of the said schedule at the times identified in the relevant sections of the Specifications.

4.6 A statutory declaration referred to in TP4.5 shall contain a deposition by the Contractor that

4.6.1 up to the date of the Contractor's progress claim, the Contractor has complied with all his lawful obligations with respect to the Labour Conditions; and

4.6.2 up to the date of the Contractor's immediately preceding progress claim, all lawful obligations of the Contractor to subcontractors and suppliers of material in respect of the

work under the contract have been fully discharged.

4.7 Subject to TP1 and TP4.8, Her Majesty shall, not later than 30 days after the date of issue of an Interim Certificate of Completion referred to in GC44.2, pay the Contractor the amount referred to in TP1 less the aggregate of

4.7.1 the sum of all payments that were made pursuant to TP4.4;

4.7.2 an amount that is equal to the Departmental Representative's estimate of the cost to Her Majesty or rectifying defects described in the Interim Certificate of Completion; and

4.7.3 an amount that is equal to the Departmental Representative's estimate of the cost to Her Majesty of completing the parts of the work described in the Interim Certificate of Completion other than the defects referred to in TP4.7.2.

4.8 It is a condition precedent to Her Majesty's obligation under TP4.7 that the Contractor has made and delivered to the Departmental Representative,

4.8.1 a statutory declaration described in TP4.9 in respect of an Interim Certificate of Completion referred to in GC44.2, and

4.8.2 if so specified in the relevant sections of the Specifications, and update of the construction schedule referred to in TP4.5.2 and the updated schedule shall, in addition to the specified requirements, clearly show a detailed timetable that is acceptable to the Departmental Representative for the completion of any unfinished work and the correction of all defects.

4.9 A statutory declaration referred to in TP4.8 shall contain a deposition by the contractor that up to the date of the Interim Certificate of Completion the Contractor has

4.9.1 complied with all of the Contractor's lawful obligations with respect to the Labour Conditions;

4.9.2 discharged all of the Contractor's lawful obligations to the subcontractors and suppliers of material in respect of the work under the contract; and

4.9.3 discharged the Contractor's lawful obligations referred to in GC14.6.

4.10 Subject to TP1 and TP4.11, Her Majesty shall, not later than 60 days after the date of issue of a Final Certificate of Completion referred to in GC44.1, pay the Contractor the amount referred to in TP1 less the aggregate of

4.10.1 the sum of all payments that were made pursuant to TP4.4; and

4.10.2 the sum of all payments that were made pursuant to TP4.7.

4.11 It is a condition precedent to Her Majesty's obligation under TP4.10 that the Contractor has made and delivered a statutory declaration described in TP4.12 to the Departmental Representative.

4.12 A statutory declaration referred to in TP4.11 shall, in addition to the depositions described in TP4.9, contain a deposition by the Contractor that all of the Contractor's lawful obligations and any lawful claims against the Contractor that arose out of the performance of the contract have been discharged and satisfied.

TP5 Progress Report and Payment Thereunder Not Binding on Her Majesty

5.1 Neither a progress report referred to in TP4.3 nor any payment made by Her Majesty pursuant to these Terms of Payment shall be construed as an admission by Her Majesty that the work, material or any part thereof is complete, is satisfactory or is in accordance with the contract.

TP6 Delay in Making Payment

6.1 Nothwithstanding GC7 any delay by Her Majesty in making any payment when it is due pursuant to these Terms of Payment shall not be a breach of the contract by Her Majesty.

6.2 Her Majesty shall pay, without demand from the Contractor, simple interest at the Bank Rate plus 1 -1/4 per centum on any amount which is overdue pursuant to TP4.1.3, and the interest shall apply from and include the day such amount became overdue until the day prior to the date of payment except that

6.2.1 interest shall not be payable or paid unless the amount referred to in TP6.2 has been overdue for more that 15 days following

6.2.1.1 the date the said amount became due and payable, or

6.2.1.2 the receipt by the Departmental Representative of the Statutory Declaration referred to in TP4.5, TP4.8 or TP4.11,

whichever is the later, and

6.6.2 interest shall not be payable or paid on overdue advance payments if any.

TP7 Right of Set-off

7.1 Without limiting any right of set-off or deduction given or implied by law or elsewhere in the contract, Her Majesty may set off any amount payable to Her Majesty by the Contractor under this contract or under any current contract against any amount payable to the Contractor under this contract.

7.2 For the purposes of TP7.1, "current contract" means a contract between Her Majesty and the Contractor

7.2.1 under which the Contractor has an undischarged obligation to perform or supply work, labour or material, or

7.2.2 in respect of which Her Majesty has, since the date of which the Articles of Agreement were made, exercised any right to take the work that is the subject of the contract out of the Contractor's hands.

TP8 Payment in Event of Termination

8.1 If the contract is terminated pursuant to GC41, Her Majesty shall pay the Contractor any amount that is lawfully due and payable to the Contractor as soon as is practicable under the circumstances.

TP9 Interest on Settled Claims

9.1 Her Majesty shall pay to the Contractor simple interest on the amount of a settled claim at an average Bank Rate plus 1 ¼ per centum from the date the settled claim was outstanding until the day prior to the date of payment.

9.2 For the purposes of TP9.1,

9.2.1 a claim is deemed to have been settled when an agreement in writing is signed by the Departmental Representative and the Contractor setting out the amount of the claim to be paid by Her Majesty and the items or work for which the said amount is to be paid.

9.2.2 an "average Bank Rate" means the discount rate of interest set by the Bank of Canada in effect at the end of each calendar month averaged over the period the settled claim was outstanding.

9.2.3 a settled claim is deemed to be outstanding from the day immediately following the date the said claim would have been due and payable under the contract had it not been disputed.

9.3 For the purposes of TP9 a claim means a disputed amount subject to negotiation between Her Majesty and the Contractor under the contract.

GC1 Interpretation

1.1 In the contract

1.1.1 where reference is made to a part of the contract by means of numbers preceded by letters, the reference shall be construed to be a reference to the particular part of the contract that is identified by that combination of letters and numbers and to any other part of the contract referred to therein;

1.1.2 "contract" means the contract document referred to in the Articles of Agreement;

1.1.3 "contract security" means any security given by the Contractor to Her Majesty in accordance with the contract;

1.1.4 "Departmental Representative" means the officer or employee or Her Majesty who is designated pursuant to the Articles of Agreement and includes a person specially authorized by him to perform, on his behalf, any of his functions under the contract and is so designated in writing to the Contractor;

1.1.5 "material" includes all commodities, articles and things required to be furnished by or for the Contractor under the contract for incorporation into the work;

1.1.6 "Minister" includes a person acting for, or if the office is vacant, in place of the Minister and his successors in the office, and his or their lawful deputy and any of his or their representatives appointed for the purposes of the contract;

1.1.7 "person" includes, unless the context otherwise requires, a partnership, proprietorship, firm, joint venture, consortium and a corporation;

1.1.8 "plant" includes all animals, tools, implements, machinery, vehicles, buildings, structures, equipment and commodities, articles and things other than material, that are necessary for the due performance of the contract;

1.1.9 "subcontractor' means a person to whom the Contractor has, subject to GC4, subcontracted the whole or any part of the work;

1.1.10 "superintendant" means the employee of the Contractor who is designated by the Contractor to act pursuant to GC19;

1.1.11 "work includes, subject only to any express stipulation in the contract to the contrary, everything that is necessary to be done, furnished or delivered by the Contractor to perform the contract.

1.2 The headings in the contract documents, other than in the Plans and Specifications, form no part of the contract but are inserted for convenience of reference only.

1.3 In interpreting the contract, in the event of discrepancies or conflicts between anything in the Plans and Specifications and the General Conditions, the General Conditions govern.

1.4 In interpreting the Plans and Specifications, in the event of discrepancies or conflicts between

1.4.1 the Plans and Specifications, the Specifications govern;

1.4.2 the Plans, the Plans drawn with the largest scale govern; and

1.4.3 figured dimensions and scaled dimensions, the figured dimensions govern.

GC2 Successors and Assigns

2.1 The contract shall inure to the benefit of and be binding upon the parties hereto and their lawful heirs, executors, administrators, successors and assigns.

GC3 Assignment of Contract

3.1 The contract may not be assigned by the Contractor, either in whole or in part, without the written consent of the Minister.

GC4 Subcontracting by Contractor

4.1 Subject to this General Condition, the Contractor may subcontract any part of the work.

4.2 The Contractor shall notify the Departmental Representative in writing of his intention to subcontract.

4.3 A notification referred to in GC4.2 shall identify the part of the work, and the subcontractor with whom it is intended to subcontract.

4.4 The Departmental Representative may object to the intended subcontracting by notifying the Contractor in writing within six days of receipt by the Departmental Representative of a notification referred to in GC4.2.

4.5 If the Departmental Representative objects to a subcontracting pursuant to GC4.4, the Contractor shall not enter into the intended subcontract.

4.6 The contractor shall not, without the written consent of the Departmental Representative, change a subcontractor who has been engaged by him in accordance with this General Condition.

4.7 Every subcontract entered into by the Contractor shall adopt all of the terms and conditions of ths contract that are of general application.

4.8 Neither a subcontracting nor the Departmental Representative's consent to a subcontracting by the Contractor shall be construed to relieve the Contractor from any obligation under the contract or to impose any liability upon Her Majesty.

GC5 Amendments

5.1 No amendment or change in any of the provisions of the contract shall have any force or effect until it is reduced to writing.

GC6 No Implied Obligations

6.1 No implied terms or obligations of any kind by or on behalf of Her Majesty shall arise from anything in the contract and the express covenants and agreements therein contained and made by Her Majesty are the only covenants and agreements upon which any rights against Her Majesty are to be founded.

6.2 The contract supersedes all communications, negotiations and agreements, either written or oral, relating to the work that were made prior to the date of the contract.

GC7 Time of Essence

7.1 Time is of the essence of the contract.

GC8 Indemnification by Contractor

8.1 The Contractor shall indemnify and save Her Majesty harmless from and against all claims, demand, losses, costs, damages, actions, suits, or proceedings by whomever made, brought or prosecuted and in any manner based upon, arising out of, related to, occasioned by or attributable to the activities of the Contractor, his servants, agents, subcontractors and sub-subcontractors in performing the work including an infringement or an alleged infringement of a patent of invention or any other kind of intellectual property.

8.2 For the purpose of GC8.1, "activities" includes any act improperly carried out, any omission to carry out an act and any delay in carrying out an act.

GC9 Indemnification by Her Majesty

9.1 Her Majesty shall, subject to the Crown Liability Act, the Patent Act, and any other law that affects Her Majesty's rights, powers, privileges or obligations, indemnify and save the Contractor harmless from and against all claims, demands, losses, costs, damage, actions, suits or proceedings arising out of his activities under the contract that are directly attributable to

9.1.1 lack of or a defect in Her Majesty's title to the work site whether real or alleged; or

9.1.2 an infringement or an alleged infringement by the Contractor of any patent of invention or any other kind of intellectual property occurring while the Contractor was performing any act for the purposes of the contract employing a model, plan or design or any other thing related to the work that was supplied by Her Majesty to the Contractor.

GC10 Members of House of Commons Not to Benefit

10.1 As required by the Parliament of Canada Act, it is an express condition of the contract that no member of the House of Commons shall be admitted to any share of part of the contract or to any benefit arising therefrom.

GC11 Notices

11.1 Any notice, consent, order, decision, direction or other communication, other than a notice referred to in GC11.4, that may be given to the Contractor pursuant to the contract may be given in any manner.

11.2 Any notice, consent, order, decision, direction or other communication required to be given in writing, to any party pursuant to the contract shall, subject to GC11.4, be deemed to have been effectively given

11.2.1 to the Contractor, if delivered personally to the Contractor or the Contractor's superintendent, or forwarded by mail, telex or facsimile to the Contractor at the address set out in A4.1, or

11.2.2 to Her Majesty, if delivered personally to the Departmental Representative, or forwarded by mail, telex or facsimile to the Departmental Representative at the address set out in A1.2.1.

11.3 Any such notice, consent, order, decision, direction or other communication given in accordance with GC11.2 shall be deemed to have been received by either party

11.3.1 if delivered personally, on the day that it was delivered,

11.3.2 if forwarded by mail, on the earlier of the day it was received and the sixth day after it was mailed, and

11.3.3 if forwarded by telex or facsimile, 24 hours after it was transmitted.

11.4 A notice given under GC38.1.1, GC40 and GC41, if delivered personally, shall be delivered to the Contractor if the Contractor is doing business as sole proprietor or, if the Contractor is a partnership or corporation, to an officer thereof.

GC12 Material, Plant and Real Property Supplied by Her Majesty

12.1 Subject to GC12.2, the Contractor is liable to Her Majesty for any loss of or damage to material, plant or real property that is supplied or placed in the care, custody and control of the Contractor by Her Majesty for use in connection with the contract, whether or not that loss or damage is attributable to causes beyond the Contractor's control.

12.2 The Contractor is not liable to Her Majesty for any loss or damage to material, plant or real property referred to in GC12.1 if that loss or damage results from and is directly attributable to reasonable wear and tear.

12.3 The Contractor shall not use any material, plant or real property referred to in GC12.1 except for

the purpose of performing this contract.

12.4 When the Contractor fails to make good any loss or damage for which he is liable under GC12.1 within a reasonable time after being required to do so by the Departmental Representative, the Departmental Representative may cause the loss or damage to be made good at the Contractor's expense, and the Contractor shall thereupon be liable to Her Majesty for the cost thereof and shall, on demand, pay to Her Majesty an amount equal to that cost.

12.5 The Contractor shall keep such records of all material, plant and real property referred to in GC12.1 as the Departmental Representative from time to time requires and shall satisfy the Departmental Representative, when requested, that such material, plant and real property are at the place and in the condition which they ought to be.

GC13 Material, Plant and Real Property Become Property of Her Majesty

13.1 Subject to GC14.7 all material and plant and the interest of the Contractor in all real property, licenses, powers and privileges purchased, used or consumed by the Contractor for the contract shall, after the time of their purchase, use or consumption be the property of Her Majesty for the purposes of the work and they shall continue to be the property of Her Majesty.

13.1.1 in the case of material, until the Departmental Representative indicates that he is satisfied that it will not be required for the work, and

13.1.2 in the case of plant, real property, licenses, powers and privileges, until the Departmental Representative indicates that he is satisfied that the interest vested in Her Majesty therein is no longer required for the purposes of the work.

13.2 Material or plant that is the property of Her Majesty by virtue of GC13.1 shall not be taken away from the work site or used or disposed of except for the purposes of the work without the written consent of the Departmental Representative.

13.3 Her Majesty is not liable for loss of or damage from any cause to the material or plant referred to in GC13.1 and the Contractor is liable for such loss or damage notwithstanding that the material or plant is the property of Her Majesty.

GC14 Permits and Taxes Payable

14.1 The Contractor shall, within 30 days after the date of the contract, tender to a municipal authority an amount equal to all fees and charges that would be lawfully payable to that municipal authority in respect of building permits as if the work were being performed for a person other than Her Majesty.

14.2 Within 10 days of making a tender pursuant to GC14.1, the Contractor shall notify the Departmental Representative of his action and of the amount tendered and whether or not the municipal authority has accepted that amount.

14.3 If the municipal authority does not accept the amount tendered pursuant to GC14.1 the Contractor shall pay that amount to Her Majesty within 6 days after the time stipulated in GC14.2.

14.4 For the purposes of GC14.1 to GC14.3 "municipal authority" means any authority that would have jurisdiction respecting permission to perform the work if the owner were not Her Majesty.

14.5 Notwithstanding the residency of the Contractor, the Contractor shall pay any applicable tax arising from or related to the performance of the work under the contract.

14.6 In accordance with the Statutory Declaration referred to in TP4.9, a Contractor who has neither residence nor place of business in the province in which work under the contract is being performed shall provide Her Majesty with proof of registration with the provincial sales tax authorities in the said province.

14.7 For the purpose of the payment of any applicable tax or the furnishing of security for the payment of any applicable tax arising from or related to the performance of the work under the contract, the Contractor shall, notwithstanding the fact that all material, plant and interest of the Contractor in all real property, licenses, powers and privileges, have become the property of Her Majesty after the time of purchase, be liable, as a user or consumer, for the payment or for the furnishing of security for the payment of any applicable tax payable, at the time of the use or consumption of that material, plant or interest of the Contractor in accordance with the relevant legislation.

GC15 Performance of Work under Direction of Departmental Representative

15.1 The Contractor shall

15.1.1 permit the Departmental Representative to have access to the work and its site at all times during the performance of the contract;

15.1.2 furnish the Departmental Representative with such information respecting the performance of the contract as he may require; and

15.1.3 give the Departmental Representative every possible assistance to enable the Departmental Representative to carry out his duty to see that the work is performed in accordance with the contract and to carry out any other duties and exercise any powers specially imposed or conferred on the Departmental Representative under the contract.

CG16 Cooperation with Other Contractors

16.1 Where, in the opinion of the Departmental Representative, it is necessary that other contractors or workers with or without plant and material, be sent onto the work or its site, the Contractor shall, to the satisfaction of the Departmental Representative, allow them access and cooperate with them in the carrying out of their duties and obligation.

16.2 If

16.2.1 the sending onto the work or its site of other contractors or workers pursuant to GC16.1 could not have been reasonably foreseen or anticipated by the Contractor when entering into the contract, and

16.2.2 the Contractor incurs, in the opinion of the Departmental Representative, extra expense in complying with GC16.1, and

16.2.3 The Contractor has given the Departmental Representative written notice of his claim for the extra expense referred to in GC16.2.2 within 30 days of the date that the other contractors or workers were sent onto the work or its site,

Her Majesty shall pay the Contractor the cost, calculated in accordance with GC48 to GC50, of the extra labour, plant and material that was necessarily incurred.

GC17 Examination of Work

17.1 If, at any time after the commencement of the work but prior to the expiry of the warranty or guarantee period, the Departmental Representative has reason to believe that the work or any part thereof has not been performed in accordance with the contract, the Departmental Representative may have that work examined by an expert of his choice.

17.2 If, as a result of an examination of the work referred to in GC17.1, it is established that the work was not performed in accordance with the contract, then, in addition to and without limiting or otherwise affecting any of Her Majesty's rights and remedies under the contract either at law or in equity, the Contractor shall pay Her Majesty, on demand, all reasonable costs and expenses that were incurred by Her Majesty in having that examination performed.

GC18 Clearing of Site

18.1 The Contractor shall maintain the work and its site in a tidy condition and free from the accumulation of waste material and debris, in accordance with any directions of the Departmental Representative.

18.2 Before the issue of an interim certificate referred to in GC44.2, the Contractor shall remove all the plant and material not required for the performance of the remaining work, and all waste material and other debris, and shall cause the work and its site to be clean and suitable for occupancy by Her Majesty's servants, unless otherwise stipulated in the contract.

18.3 Before the issue of a final certificate referred to in GC44.1, the Contractor, shall remove from the work and its site all of the surplus plant and material and any waste material and other debris.

18.4 The Contractor's obligations described in GC18.1 to GC18.3 do not extend to waste material and other debris caused by Her Majesty's servants or contractors and workers referred to in GC16.1.

GC19 Contractor's Superintendent

19.1 The Contractor shall, forthwith upon the award of the contract, designate a superintendent.

19.2 The Contractor shall forthwith notify the Departmental Representative of the name, address and telephone number of a superintendent designate pursuant to GC19.1.

19.3 A superintendent designated pursuant to GC19.1 shall be in full charge of the operations of the Contractor in the performance of the work and is authorized to accept any notice, consent, order, direction, decision or other communication on behalf of the Contractor that may be given to the superintendent under the contract.

19.4 The Contractor shall, until the work has been completed, keep a competent superintendent at the work site during working hours.

19.5 The Contractor shall, upon the request of the Departmental Representative, remove any superintendent who, in the opinion of the Departmental Representative, is incompetent or has been conducting himself improperly and shall forthwith designate another superintendent who is acceptable to the Departmental Representative.

19.6 Subject to GC19.5, the Contractor shall not substitute a superintendent without the written consent of the Departmental Representative.

19.7 A breach by the Contractor of GC19.6 entitles the Departmental Representative to refuse to issue any certificate referred to in GC44 until the superintendent has returned to the work site or another superintendent who is acceptable to the Departmental Representative has been substituted.

GC20 National Security

20.1 If the Minister is of the opinion that the work is of a class or kind that involves the national security, he may order the Contractor

20.1.1 to provide him with any information concerning persons employed or to be employed by him for purposes of the contract; and

20.1.2 to remove any person from the work and its site if, in the opinion of the Minister, that person may be a risk to the national security.

20.2 The Contractor shall, in all contracts with persons who are to be employed in the performance of the contract, make provision for his performance of any obligation that may be imposed upon him under GC19 to GC21.

20.3 The Contractor shall comply with an order of the Minister under GC20.1

GC21 Unsuitable Workers

21.1 The Contractor shall, upon the request of the Departmental Representative, remove any person employed by him for purposes of the contract who, in the opinion of the Departmental Representative, is incompetent or has conducted himself improperly, and the Contractor shall not permit a person who has been removed to return to the work site.

GC22 Increased or Decreased Costs

22.1 The amount set out in the Articles of Agreement shall not be increased or decreased by reason of any increase or decrease in the cost of the work that is brought about by an increase or decrease in the cost of labour, plant or material or any wage adjustment arising pursuant to the Labour Conditions.

22.2 Notwithstanding GC22.1 and GC35, an amount set out in the Articles of Agreement shall be adjusted in the manner provided in GC22.3, if any change in a tax imposed under the Excise Act, the Excise Tax Act, the Old Age Security Act, the Customs Act, the Customs Tariff or any provincial sales tax legislation imposing a retail sales tax on the purchase of tangible personal property incorporated into Real Property

22.2.1 occurs after the date of the submission by the Contractor of his tender for the contract,

22.2.2 applies to material, and

22.2.3 affects the cost to the Contractor of that material.

22.3 If a change referred to in GC22.2 occurs, the appropriate amount set out in the Articles of Agreement shall be increased or decreased by an amount equal to the amount that is established by an examination of the relevant records of the Contractor referred to in GC51 to be the increase or decrease in the cost incurred that is directly attributable to that change.

22.4 For the purpose of GC22.2, where a tax is changed after the date of submission of the tender but public notice of the change has been given by the Minister of Finance before that date, the change shall be deemed to have occurred before the date of submission of the tender.

GC23 Canadian Labour and Material

23.1 The Contractor shall use Canadian labour and material in the performance of the work to the full extent to which they are procurable, consistent with proper economy and expeditious carrying out of the work.

23.2 Subject to GC23.1, the Contractor shall, in the performance of the work, employ labour from the locality where the work is being performed to the extent to which it is available, and shall use the offices of the Canada Employment Centres for the recruitment of workers wherever practicable.

23.3 Subject to GC23.1 and GC23.2, the Contractor shall, in the performance of the work, employ a reasonable proportion of persons who have been on active service with the armed forces of Canada and have been honourably discharged therefrom.

GC24 Protection of Work and Documents

24.1 The Contractor shall guard or otherwise protect the work and its site, and protect the contract, specifications, plans, drawings, information, material, plant and real property, whether or not they are supplied by Her Majesty to the Contractor, against loss or damage from any cause, and he shall not use, issue, disclose or dispose of them without the written consent of the Minister, except as may be essential for the performance of the work.

24.2 If any document or information given or disclosed to the Contractor is assigned a security rating by the person who gave or disclosed it, the Contractor shall take all measures directed by the Departmental Representative to be taken to ensure the maintenance of the degree of security that is ascribed to that rating.

24.3 The Contractor shall provide all facilities necessary for the purpose of maintaining security, and shall assist any person authorized by the Minister to inspect or to take security measures in respect of the work and its site.

24.4 The Departmental Representative may direct the Contractor to do such things and to perform such additional work as the Departmental Representative considers reasonable and necessary to ensure compliance with or to remedy a breach of GC24.1 to GC24.3.

GC25 Public Ceremonies and Signs

25.1 The Contractor shall not permit any public ceremony in connection with the work without the prior consent of the Minister.

25.2 The Contractor shall not erect or permit the erection of any sign or advertising on the work or its site without the prior consent of the Departmental Representative.

GC26 Precautions against Damage, Infringement of Rights, Fire, and Other Hazards

26.1 The Contractor shall, at his own expense, do whatever is necessary to ensure that

26.1.1 no person, property, right, easement or privilege is injured, damaged or infringed by reasons of the Contractor's activities in performing the contract;

26.1.2 pedestrian and other traffic on any public or private road or waterway is not unduly impeded, interrupted or endangered by the performance or existence of the work or plant;

26.1.3 fire hazards in or about the work or its site are eliminated and, subject to any direction that may be given by the Departmental Representative, any fire is promptly extinguished;

26.1.4 the health and safety of all persons employed in the performance of the work is not endangered by the method or means of its performance;

26.1.5 adequate medical services are available to all persons employed on the work or its site at all times during the performance of the work;

26.1.6 adequate sanitation measures are taken in respect of the work and its site; and

26.1.7 all stakes, buoys and marks placed on the work or its site by or under the authority of the Departmental Representative are protected and are not removed, defaced, altered or destroyed.

26.2 The Departmental Representative may direct the Contractor to do such things and to perform such additional work as the Departmental Representative considers reasonable and necessary to ensure

compliance with or to remedy a breach of GC26.1.

26.3 The Contractor shall, at his own expense, comply with a direction of the Departmental Representative made under GC26.2.

GC27 Insurance

27.1 The Contractor shall, at his own expense, obtain and maintain insurance contracts in respect of the work and shall provide evidence thereof to the Departmental Representative in accordance with the requirements of the Insurance Conditions "E".

27.2 The insurance contracts referred to in GC27.1 shall

27.2.1 be in a form, of the nature, in the amounts, for the periods and containing the terms and conditions specified in Insurance Conditions "E", and

27.2.2 provide for the payment of claims under such insurance contracts in accordance with GC28.

GC28 Insurance Proceeds

28.1 In the case of a claim payable under a Builders Risk/Installation (All Risks) insurance contract maintained by the Contractor pursuant to GC27, the proceeds of the claim shall be paid directly to Her Majesty, and

28.1.1 the monies so paid shall be held by Her Majesty for the purposes of the contract, or

28.1.2 if Her Majesty elects, shall be retained by Her Majesty, in which event they vest in Her Majesty absolutely.

28.2 In the case of a claim payable under a General Liability insurance contract maintained by the Contractor pursuant to GC27, the proceeds of the claim shall be paid by the insurer directly to the claimant.

28.3 If an election is made pursuant to GC28.1, the Minister may cause an audit to be made of the accounts of the Contractor and of Her Majesty in respect of the part of the work that was lost, damaged or destroyed for the purpose of establishing the difference, if any, between

28.3.1 the aggregate of the amount of the loss or damage suffered or sustained by Her Majesty, including any cost incurred in respect of the clearing and cleaning of the work and its site and any other amount that is payable by the Contractor to Her Majesty under the contract, minus any monies retained pursuant to GC28.12, and

28.3.2 the aggregate of the amounts payable by Her Majesty to the Contractor pursuant to the contract up to the date of the loss or damage.

28.4 A difference that is established pursuant to GC28.3 shall be paid forthwith by the party who is determined by the audit to be the debtor to the party who is determined by the audit to be the

creditor.

28.5 When payment of a deficiency has been made pursuant to GC28.4, all rights and obligations of Her Majesty and the Contractor under the contract shall, with respect only to the part of the work that was the subject of the audit referred to in GC28.3, be deemed to have been expended and discharged.

28.6 If an election is not made pursuant to GC28.1.2 the Contractor shall, subject to GC28.7, clear and clean the work and its site and restore and replace the part of the work that was lost, damaged or destroyed at his own expense as if that part of the work had not yet been performed.

28.7 When the Contractor clears and cleans the work and its site and restores and replaces the work referred to in GC 28.6, Her Majesty shall pay him out of the monies referred to in GC28.1 so far as they will thereunto extend.

28.8 Subject to GC28.7, payment by Her Majesty pursuant to GC28.7 shall be made in accordance with the contract but the amount of each payment shall be 100% of the amount claimed notwithstanding TP4.4.1 and TP4.4.2.

GC29 Contract Security

29.1 The Contractor shall obtain and deliver contract security to the Departmental Representative in accordance with the provisions of the Contract Security Conditions.

29.2 If the whole or a part of the contract security referred to in GC29.1 is in the form of a security deposit, it shall be held and disposed of in accordance with GC43 and GC45.

29.3 If a part of the contract security referred to in GC29.1 is in the form of a labour and material payment bond, the Contractor shall post a copy of that bond on the work site.

GC30 Changes in the Work

30.1 Subject o GC5, the Departmental Representative may, at any time before he issues his Final Certificate of Completion,

30.1.1 order work or material in addition to that provided for in the Plans and Specifications; and

30.1.2 delete or change the dimensions, character, quantity, quality, description, location or position of the whole or any part of the work or material proved for in the Plans and Specifications or in any order made pursuant to GC30.1.1,

if that additional work or material, deletion, or change is, in his opinion, consistent with the general intent of the original contract.

30.2 The Contractor shall perform the work in accordance with such orders, deletions and changes that are made by the Departmental Representative pursuant to GC30.1 from time to time as if they had appeared in and been part of the Plans and Specifications.

30.3 The Departmental Representative shall determine whether or not anything done or omitted by the Contractor pursuant to an order, deletion or change referred to in GC30.1 increased or decreased the cost of the work to the Contractor.

30.4 If the Departmental Representative determines pursuant to GC30.3 that the cost of the work to the Contractor has been increased, Her Majesty shall pay the Contractor the increased cost that the Contractor necessarily incurred for the additional work calculated in accordance with GC49 or GC50.

30.5 If the Departmental Representative determines pursuant to GC303.3 that the cost of the work to the Contractor has been decreased, Her Majesty shall reduce the amount payable to the Contractor under the contract by an amount equal to the decrease in the cost caused by the deletion or change referred to in GC30.1.2 and calculated in accordance with GC49.

30.6 GC30.3 to GC30.5 are applicable only to a contract or a portion of a contract for which a Fixed Price Arrangement is stipulated in the contract.

30.7 An order, deletion or change referred to in GC30.1 shall be in writing, signed by the Departmental Representative and given to the Contractor in accordance with GC11.

GC31 Interpretation of Contract by Departmental Representative

31.1 If, ar any time before the Departmental Representative has issued a Final Certificate of Completion referred to in GC44.1, any question arises between the parties about whether anything has been done as required by the contract or about what the Contractor is required by the contract to do, and, in particular but without limiting the generality of the foregoing, about

31.1.1 the meaning of anything in the Plans and Specification,

31.1.2 the meaning to be given to the Plans and Specifications in case of any error therein, omission therefrom, or obscurity or discrepancy in their working or intention,

31.1.3 whether or not the quality or quantity of any material or workmanship supplied or proposed to be supplied by the Contractor meets the requirements of the contract,

31.1.4 whether or not the labour, plant or material provided by the Contractor for performing the work and carrying out the contract are adequate to ensure that the work will be performed in accordance with the contract and that the contract will be carried out in accordance with its terms,

31.1.5 what quantity of any kind of work has been completed by the Contractor, or

31.1.6 the timing and scheduling of the various phases of the performance of the work,

the question shall be decided by the Departmental Representative whose decision shall be final and conclusive in respect of the work.

31.2 The Contractor shall perform the work in accordance with any decisions of the Departmental

Representative that are made under GC31.1 and in accordance with any consequential directions given by the Departmental Representative.

GC32 Warranty and Rectification of Defects in Work

32.1 Without restricting any warranty or guarantee implied or imposed by law or contained in the contract documents, the Contractor shall, at his own expense,

32.1.1 rectify and make good any defect or fault that appears in the work or comes to the attention of the Minister with respect to those parts of the work accepted in connection with the Interim Certificate of Completion referred to GC44.2 within 12 months from the date of the Interim Certificate of Completion;

32.1.2 rectify and make good any defect or fault that appears in or comes to the attention of the Minister in connection with those parts of the work described in the Interim Certificate of Completion referred to in GC44.2 within 12 months from the date of the Final Certificate of Completion referred to in GC44.1.

32.2 The Departmental Representative may direct the Contractor to rectify and make good any defect or fault referred to in GC32.1 or covered by any other expressed or implied warranty or guarantee.

32.3 A direction referred to in GC32.2 shall be in writing, may include a stipulation in respect of the time within which a defect or fault is required to be rectified and made good by the Contractor, and shall be given to the Contractor in accordance with GC11.

32.4 The Contractor shall rectify and make good any defect or fault described in a direction given pursuant to GC32.2 within the time stipulated therein.

GC33 Non-Compliance by Contractor

33.1 If the Contractor fails to comply with any decision or direction given by the Departmental Representative pursuant to GC18, GC24, GC26, GC31 or GC32, the Departmental Representative may employ such methods as he deems advisable to do that which the Contractor failed to do.

33.2 The Contractor shall, on demand, pay Her Majesty an amount that is equal to the aggregate of all cost, expenses and damage incurred or sustained by Her Majesty by reason of the Contractor's failure to comply with any decision or direction referred to in GC33.1, including the cost of any methods employed by the Departmental Representative pursuant to GC33.1.

GC34 Protesting Departmental Representative's Decisions

34.1 The Contractor may, within ten days after the communication to him of any decision or direction referred to in GC30.3 or GC33.1, protest that decision or direction.

34.2 A protest referred to in GC34.1 shall be in writing, contain full reasons for the protest, be signed

by the Contractor and be given to Her Majesty by delivery to the Departmental Representative.

34.3 If the Contractor gives a protest pursuant to GC34.2, any compliance by the Contractor with the decision or direction that was protested shall not be construed as an admission by the Contractor of the correctness of that decision or direction, or prevent the Contractor from taking whatever action he considers appropriate in the circumstances.

34.4 The giving of a protest by the Contractor pursuant to GC34.2 shall not relieve him from complying with the decision or direction that is the subject of the protest.

34.5 Subject to GC34.6, the Contractor shall take any action referred to in GC34.3 within three months after the date that a Final Certificate of Completion is issued under GC44.1 and not afterwards.

34.6 The Contractor shall take any action referred to in GC34.3 resulting from a direction under GC32 within three months after the expiry of a warranty or guarantee period and not afterwards.

34.7 Subject to GC34.8, if Her Majesty determines that the Contractor's protest is justified, Her Majesty shall pay the Contractor the cost of the additional labour, plant and material necessarily incurred by the Contractor in carrying out the protested decision or direction.

34.8 Costs referred to in GC34.7 shall be calculated in accordance with GC48 to GC50.

GC35 Changes in Soil Conditions and Neglect or Delay by Her Majesty

35.1 Subject to GC35.2 no payment, other than a payment that is expressly stipulated in the contract, shall be made by Her Majesty to the Contractor for any extra expense or any loss or damage incurred or sustained by the Contractor.

35.2 If the Contractor incurs or sustains any extra expense or any loss or damage that is directly attributable to

35.2.1 a substantial difference between the information relating to soil conditions at the work site that is contained in the Plans and Specifications or other documents supplied to the Contractor for his use in preparing his tender or a reasonable assumption of fact based thereon made by the Contractor, and the actual soil conditions encountered by the Contractor at the work site during the performance of the contract, or

35.2.2 any neglect or delay that occurs after the date of the contract on the part of Her Majesty in providing any information or in doing any act that the contract either expressly requires Her Majesty to do or that would ordinarily be done by an owner in accordance with the usage of the trade,

he shall, within ten days of the date the actual soil conditions described in GC35.2.1 were encountered or the neglect or delay described in GC35.2.2 occurred, give the Departmental Representative written notice of his intention to claim for that extra expense or that loss or damage.

35.3 When the Contractor has given a notice referred to in GC35.2, he shall give the Departmental Representative a written claim for extra expense or loss or damage within 30 days of the date that

a Final Certificate of Completion referred to in GC44.1 is issued and not afterwards.

35.4 A written claim referred to in GC35.3 shall contain a sufficient description of the facts and circumstances of the occurrence that is the subject of the claim to enable the Departmental Representative to determine whether or not the claim is justified and the Contractor shall supply such further and other information for that purpose as the Departmental Representative requires from time to time.

35.5 If the Departmental Representative determines that a claim referred to in GC35.3 is justified, Her Majesty shall make an extra payment to the Contractor in an amount that is calculated in accordance with GC47 to GC50.

35.6 If, in the opinion of the Departmental Representative, an occurrence described in GC35.2.1 results in a savings of expenditure by the Contractor in performing the contract, the amount set out in the Articles of Agreement shall, subject to GC35.7, be reduced by an amount that is equal to the saving.

35.7 The amount of the saving referred to in GC35.6 shall be determined in accordance with GC47 to GC49.

35.8 If the Contractor fails to give a notice referred to in GC35.2 and a claim referred to in GC35.3 within the times stipulated, an extra payment shall not be made to him in respect of the occurrence.

GC36 Extension of Time

36.1 Subject to GC36.2, the Departmental Representative may, on the application of the Contractor made before the day fixed by the Articles of Agreement for completion of the work or before any other date previously fixed under this General Condition, extend the time for its completion by fixing a new date if, in the opinion of the Departmental Representative, causes beyond the control of the Contractor have delayed its completion.

36.2 An application referred to in GC36.1 shall be accompanied by the written consent of the bonding company whose bond forms part of the contract security.

GC37 Assessments and Damages for Late Completion

37.1 For the purposes of this General Condition

37.1.1 the work shall be deemed to be completed on the date that an Interim Certificate of Completion referred to in GC44.2 is issued, and

37.1.2 "period of delay" means the number of days commencing on the day fixed by the Articles of Agreement for completion of the work and ending on the day immediately preceding the day on which the work is completed but does not include any day within a period of extension granted pursuant to GC36.1, and any other day on which, in the opinion of the Departmental Representative, completion of the work was delayed for reasons beyond the control of the Contractor.

37.2 If the Contractor does not complete the work by the day fixed for its completion by the Articles of Agreement but completes it thereafter, the Contractor shall pay Her Majesty an amount equal to the aggregate of

37.2.1 all salaries, wages and travelling expenses incurred by Her Majesty in respect of persons overseeing the performance of the work during the period of delay;

37.2.2 the cost incurred by Her Majesty as a result of the inability to use the completed work for the period of delay; and

37.2.3 all other expenses and damages incurred or sustained by Her Majesty during the period of delay as a result of the work not being completed by the day fixed for its completion.

37.3 The Minister may waive the right of Her Majesty to the whole or any part of the amount payable by the Contractor pursuant to GC37.2 I , in the opinion of the Minister, it is in the public interest to do so.

GC38 Taking the Work Out of the Contractor's Hands

38.1 The Minister may, at his sole discretion, by giving a notice in writing to the Contractor in accordance with GC11, take all or any part of the work out of the Contractor's hands, and may employ such means as he sees fit to have the work completed if the Contractor

38.1.1 Has not, within six days of the Minister or the Departmental Representative giving notice to the Contractor in writing in accordance with GC11, remedied any delay in the commencement or any default in the diligent performance of the work to the satisfaction of the Departmental Representative;

38.1.2 has defaulted in the completion of any part of the work within the time fixed for its completion by the contract;

38.1.3 has become insolvent;

38.1.4 has committed an act of bankruptcy;

38.1.5 has abandoned the work;

38.1.6 has made an assignment of the contract without the consent required by GC3.1; or

38.1.7 has otherwise failed to observe or perform any of the provisions of the contract.

38.2 If the whole or any part of the work is taken out of the Contractor's hands pursuant to GC38.1,

38.2.1 the Contractor's right to any further payment that is due or accruing due under the contract is, subject only to GC38.4, extinguished, and

38.2.2 the Contractor is liable to pay Her Majesty, upon demand, an amount that is equal to the amount of all loss and damage incurred or sustained by Her Majesty in respect of the

Contractor's failure to complete the work.

38.3 If the whole or any part of the work that is taken out of the Contractor's hands pursuant to GC38.1 is completed by Her Majesty, the Departmental Representative shall determine the amount, if any, of the holdback or a progress claim that had accrued and was due prior to the date on which the work was taken out of the Contractor's hands and that is not required for the purposes of having the work performed or of compensating Her Majesty for any other loss or damage incurred or sustained by reason of the Contractor's default.

38.4 Her Majesty may pay the Contractor the amount determined not to be required pursuant to GC38.3.

GC39 Effect of Taking the Work Out of the Contractor's Hands

39.1 The taking of the work or any part thereof out of the Contractor's hands pursuant to GC38 does not operate so as to relieve or discharge him from any obligation under the contract or imposed upon him by law except the obligation to complete the performance of that part of the work that was taken out of his hands.

39.2 If the work or any part thereof is taken out of the Contractor's hands pursuant to GC38, all plant and material and the interest of the Contractor is all real property, licenses, powers and privileges acquired, used or provided by the Contractor under the contract shall continue to be the property of Her Majesty without compensation to the Contractor.

39.3 When the Departmental Representative certifies that any plant, material, or any interest of the Contractor referred to in GC39.2 is no longer required for the purposes of the work, or that it is not in the interest of Her Majesty to retain that plant, material or interest, it shall revert to the Contractor.

G40 Suspension of Work by Minister

40.1 The Minister may, when in his opinion it is in the public interest to do so, require the Contractor to suspend performance of the work either for a specified or an unspecified period by giving a notice of suspension in wiring to the Contractor in accordance with GC11.

40.2 When a notice referred to in GC40.1 is received by the Contractor in accordance with GC11, he shall suspend all operations in respect of the work except those that, in the opinion of the Departmental Representative, are necessary for the care and preservation of the work, plant and material.

40.3 The Contractor shall not, during a period of suspension, remove any part of the work, plant or material from its site without the consent of the Departmental Representative.

40.4 If a period of suspension is 30 days or less, the Contractor shall, upon the expiration of that period, resume the performance of the work and he is entitled to be paid the extra cost, calculated in accordance with GC48 to GC50, of any labour, plant and material necessarily incurred by him as a result of the suspension.

40.5 If, upon the expiration of a period of suspension of more than 30 days, the Minister and the Contractor agree that the performance of the work will be continued by the Contractor, the Contractor shall resume performance of the work subject to any terms and conditions agreed upon by the Minister and the Contractor.

40.6 If, upon the expiration of a period of suspension of more than 30 days, the Minister and the Contractor do not agree that performance of the work will be continued by the Contractor or upon the terms and conditions under which the Contractor will continue the work, the notice of suspension shall be deemed to be a notice of termination pursuant to GC41.

GC41 Termination of Contract

41.1 The Minister may terminate the contract at any time by giving a notice of termination in writing to the Contractor in accordance with GC11.

41.2 When a notice referred to in GC41.1 is received by the Contractor in accordance with GC11, he shall, subject to any conditions stipulated in the notice, forthwith cease all operations in performance of the contract.

41.3 If the contract is terminated pursuant to GC41.1, Her Majesty shall pay the Contractor, subject to GC41.4, an amount equal to

41.3.1 the cost to the contractor of all labour, plant and material supplied by him under the contract up to the date of termination in respect of a contract or part thereof for which a Unit Price Arrangement is stipulated in the contract, or

41.3.2 the lesser of

41.3.2.1 an amount, calculated in accordance with the Terms and Payment, that would have been payable to the Contractor had he completed the work, and

41.3.2.2 an amount that is determined to be due to the Contractor pursuant to GC49 in respect of a contract or part thereof for which a Fixed Price Arrangement is stipulated in the contract

less the aggregate of all amounts that were paid to the Contractor by Her Majesty and all amounts that are due to Her Majesty from the Contractor pursuant to the contract.

41.4 If Her Majesty and the Contractor are unable to agree about an amount referred to in GC41.3 that amount shall be determined by the method referred to in GC50.

GC42 Claims Against and Obligations of the Contractor or Subcontractor

42.1 Her Majesty may, in order to discharge lawful obligations of and satisfy claims against the Contractor or a subcontractor arising out of the performance of the contract, pay any amount that is due and payable to the Contractor pursuant to the contract directly to the obligees of and the claimants against the Contractor or the subcontractor but such amount if any, as is paid by Her Majesty, shall not exceed that amount which the Contractor would have been obliged to pay to

such claimant had the provisions of the Provincial or Territorial lien legislation, or, in the Province of Quebec, the law relating to privileges, been applicable to the work. Any such claimant need not comply with the provisions of such legislation setting out the steps by way of notice, registration or otherwise as might have been necessary to preserve or perfect any claim for lien or privilege which claimant might have had;

42.2 Her Majesty will not make any payment as described in GC42.1 unless and until that claimant shall have delivered to Her Majesty:

42.2.1 a binding and enforceable Judgment or Order of a court of competent jurisdiction setting forth such amount as would have been payable by the Contractor to the claimant pursuant to the provisions of the applicable Provincial or Territorial lien legislation, or, in the Province of Quebec, the law relating to privileges, had such legislation been applicable to the work; or

42.2.2 a final and enforceable award of an arbitrator setting forth such amount as would have been payable by the Contractor to the claimant pursuant to the provisions of the applicable Provincial or Territorial lien legislation, or, in the Province of Quebec, the law relating to privileges, had such legislation been applicable to the work; or

42.2.3 the consent of the Contractor authorizing a payment.

For the purposes of determining the entitlement of a claimant pursuant to GC42.2.1 and GC42.2.2, the notice required by GC42.8 shall be deemed to replace the registration or provision of notice after the performance of work as required by any applicable legislation and no claim shall be deemed to have expired, become void or unenforceable by reason of the claimant not commencing any action within the time prescribed by any applicable legislation.

42.3 The Contractor shall, by the execution of his contract, be deemed to have consented to submit to binding arbitration at the request of any claimant those questions that need be answered to establish the entitlement of the claimant to payment pursuant to the provisions of GC42.1 and such arbitration shall have as parties to it any subcontractor to whom the claimant supplied material, performed work or rented equipment should such subcontractor wish to be adjoined and the Crown shall not be a party to such arbitration and, subject to any agreement between the Contractor and the claimant to the contrary, the arbitration shall be conducted in accordance with the Provincial or Territorial legislation governing arbitration applicable in the Province or Territory in which the work is located.

42.4 A payment made pursuant to GC42.1 is, to the extent of the payment, a discharge of Her Majesty's liability to the Contractor under the contract and may be deducted from any amount payable to the Contractor under the contract.

42.5 To the extent that the circumstances of the work being performed for Her Majesty permit, the Contractor shall comply with all laws in force in the Province or Territory where the work is being performed relating to payment period, mandatory holdbacks, and creation and enforcement of mechanics' liens, builders' liens or similar legislation or in the Province of Quebec, the law relating to privileges.

42.6 The Contractor shall discharge all his lawful obligations and shall satisfy all lawful claims against him arising out of the performance of the work at least as often as the contract requires Her

Majesty to pay the Contractor.

42.7 The Contractor shall, whenever requested to do so by the Departmental Representative, make a statutory declaration deposing to the existence and condition of any obligations and claims referred to in GC42.6.

42.8 GC42.1 shall only apply to claims and obligations

42.8.1 the notification of which has been received by the Departmental Representative in writing before payment is made to the Contractor pursuant to TP4.10 and within 120 days of the date on which the claimant

42.8.1.1 should have been paid in full under the claimant's contract with the Contractor or subcontractor where the claim is for money that was lawfully required to be held back from the claimant; or

42.8.1.2 performed the last of the services, work or labour, or furnished the last of the material pursuant to the claimant's contract with the Contractor or subcontractor where the claim is not for money referred to in GC42.8.1.1, and

42.8.2 the proceedings to determine the right to payment of which, pursuant to GC42.2. shall have commenced within one year from the date that the notice referred to in GC42.8.1 was received by the Departmental Representative, and

the notification required by GC42.8.1 shall set forth the amount claimed to be owing and the person who by contract is primarily liable.

42.9 Her Majesty may, upon receipt of a notice of claim under GC42.8.1, withhold from any amount that is due and payable to the Contractor pursuant to the contract the full amount of the claim or any portion thereof.

42.10 The Departmental Representative shall notify the Contractor in writing of receipt of any claim referred to in GC42.8.1 and of the intention of Her Majesty to withhold funds pursuant to GC42.9 and the Contractor may, at any time thereafter and until payment is made to the claimant, be entitled to post, with Her Majesty, security in a form acceptable to Her Majesty in an amount equal to the value of the claim, the notice of which is received by the Departmental Representative and upon receipt of such security Her Majesty shall release to the Contractor any funds which would be otherwise payable to the Contractor, that were withheld pursuant to the provisions of GC42.9 in respect of the claim of any claimant for whom the security stands.

GC43 Security Deposit – Forfeiture or Return

43.1 If

43.1.1 the work is taken out of the Contractor's hands pursuant to GC38,

43.1.2 the contract is terminated pursuant to GC41, or

43.1.3 the Contractor is in breach of or in default under the contract,

Her Majesty may convert the security deposit, if any, to Her own use.

43.2 If Her Majesty converts the contract security pursuant to GC43.1, the amount realized shall be deemed to be an amount due from Her Majesty to the Contractor under the contract.

43.3 Any balance of an amount referred to in GC43.2 that remains after payment of all losses, damage and claims of Her Majesty and others shall be paid by Her Majesty to the Contractor if, in the opinion of the Departmental Representative, it is not required for the purposes of the contract.

GC44 Departmental Representative's Certificates

44.1 On the date that

44.1.1 the work has been completed, and

44.1.2 the Contractor has complied with the contract and all orders and directions made pursuant thereto,

both to the satisfaction of the Departmental Representative, the Departmental Representative shall issue a Final Certificate of Completion to the Contractor.

44.2 If the Departmental Representative is satisfied that the work is substantially complete he shall, at any time before he issues a certificate referred to in GC44.1, issue an Interim Certificate of Completion to the Contractor, and

44.2.1 for the purposes of GC44.2 the work will be considered to be substantially complete,

44.2.1.1 when the work under the contract or a substantial part thereof is, in the opinion of the Departmental Representative, ready for use by Her Majesty or is being used for the purpose intended; and

44.2.1.2 when the work remaining to be done under the contract is, in the opinion of the Departmental Representative, capable of completion or correction at accost of not more that

44.2.1.2.1 -3% of the first $500,000, and

44.2.1.2.2 -2% of the next $500,000, and

44.2.1.2.3 -1% of the balance

of the value of the contract at the time this cost is calculated.

44.3 For the sole purpose of GC44.2.1.2, where the work or a substantial part thereof is ready for use or is being used for the purposes intended and the remainder of the work or a part thereof cannot be completed by the time specified in A2.1, or as amended pursuant to GC36, for reasons beyond the control of the Contractor or where the Departmental Representative and the Contractor agree not to complete a part of the work within the specified time, the cost of that part of the work

which was either beyond the control of the Contractor to complete or the Departmental Representative and the Contractor have agreed not to complete by the time specified shall be deducted from the value of the contract referred to GC44.2.1.2 and the said cost shall not form part of the cost of the work remaining to be done in determining substantial completion.

44.4 An Interim Certificate of Completion referred to in GC44.2 shall describe the parts of the work not completed to the satisfaction of the Departmental Representative and all things that must be done by the Contractor

44.4.1 before a Final Certificate of Completion referred to in GC44.1 will be issued, and

44.4.2 before the 12-month period referred to in GC32.1.2 shall commence for the said parts and all the said things.

44.5 The Departmental Representative may, in addition to the parts of the work described in an Interim Certificate of Completion referred to in GC44.2, require the Contractor to rectify any other parts of the work not completed to his satisfaction and to do any other things that are necessary for the satisfactory completion of the work.

44.6 If the contract or a part thereof is subject to a Unit Price Arrangement, the Departmental Representative shall measure and record the quantities of labour, plant and material, performed, used and supplied by the Contractor in performing the work and shall, at the request of the Contractor, inform him of those measurements.

44.7 The Contractor shall assist and co-operate with the Departmental Representative in the performance of his duties referred to in GC44.6 and shall be entitled to inspect any record made by the Departmental Representative pursuant to GC44.6.

44.8 After the Departmental Representative has issued a Final Certificate of Completion referred to in GC44.1, he shall, if GC44.6 applies, issue a Final Certificate of Measurement.

44.9 A Final Certificate of Measurement referred to in GC44.8 shall

44.9.1 contain the aggregate of all measurements of quantities referred to in GC44.6, and

44.9.2 be binding upon and conclusive between Her Majesty and the Contractor as to the quantities referred to therein.

GC45 Return of Security Deposit

45.1 After an Interim Certificate of Completion referred to in GC44.2 has been issued, Her Majesty shall, if the Contractor is not in breach of or in default under the contract, return to the Contractor all or any part of the security deposit that, in the opinion of the Departmental Representative, is not required for the purposes of the contract.

45.2 After a Final Certificate of Completion referred to in GC44.1 has been issued, Her Majesty shall return to the Contractor the remainder of any security deposit unless the contract stipulates otherwise.

45.3 If the security deposit was paid into the Consolidated Revenue Fund of Canada, Her Majesty shall pay interest thereon to the Contractor at a rate established from time to time pursuant to section 21(2) of the Financial Administration Act.

GC46 Clarification of Terms in GC47 to GC50

46.1 For the purposes of GC47 to GC50,

46.1.1 "Unit Price Table" means the table set out in the Articles of Agreement, and

46.1.2 "plant" does not include tools customarily provided by a tradesman in practicing his trade.

GC47 Additions or Amendments to Unit Price Table

47.1 Where a Unit Price Arrangement applies to the contract or a part thereof the Departmental Representative and the Contractor may, by an agreement in writing,

47.1.1 add classes of labour or material, and units of measurement, prices per unit and estimated quantities to the Unit Price Table if any labour, plant or material that is to be included in the Final Certificate of Measurement referred to in GC44.8 is not included in any class of labour, plant or material set out in the Unit Price Table; or

47.1.2 subject to GC47.2 and GC47.3, amend a price set out in the Unit Price Table for any class of labour, plant or material included therein if the Final Certificate of Measurement referred to in GC44.8 shows or is expected to show that the total quantity of that class of labour, plant or material actually performed, used or supplied by the Contractor in performing the work is

47.1.2.1 less than 85% of that estimated total quantity, or

47.1.2.2 in excess of 115% of that estimated total quantity.

47.2 In no event shall the total cost of an item set out in the Unit Price Table that has been amended pursuant to GC47.1.2.1 exceed the amount that would have been payable to the Contractor had the estimated total quantity actually been performed, used or supplied.

47.3 An amendment that is made necessary by GC47.1.2.2 shall apply only to the quantities that are in excess of 115%.

47.4 If the Departmental Representative and the Contractor do not agree as contemplated in GC47.1, the Departmental Representative shall determine the class and the unit of measurement of the labour, plant or material and, subject to GC47.2 and GC47.3, the price per unit therefore shall be determined in accordance with GC50.

GC48 Determination of Cost – Unit Price Table

48.1 Whenever, for the purposes of the contract, it is necessary to determine the cost of labour, plant or material, it shall be determined by multiplying the quantity of that labour, plant or material expressed in the unit set out in column 3 of the Unit Price Table by the price of that unit set out in column 5 of the Unit Price Table.

GC49 Determination of Cost – Negotiation

49.1 If the method described in GC48 cannot be used because the labour, plant or material is of a kind or class that is not set out in the Unit Price Table, the cost of that labour, plant or material for the purposes of the contract shall be the amount agreed upon from time to time by the Contractor and the Departmental Representative.

49.2 For the purposes of GC49.1, the Contractor shall submit to the Departmental Representative any necessary cost information requested by the Departmental Representative in respect of the labour, plant and material referred to in GC49.1

GC50 Determination of Cost – Failing Negotiation

50.1 If the methods described in GC47, GC48 or GC49 fail for any reason to achieve a determination of the cost of labour, plant and material for the purposes referred to therein, that cost shall be equal to the aggregate of

50.1.1 all reasonable and proper amounts actually expended or legally payable by the Contractor in respect of the labour, plant and material that falls within one of the classes of expenditure described in GC50.2 that are directly attributable to the performance of the contract,

50.1.2 an allowance for profit and all other expenditures or costs, including overhead, general administration cost, financing and interest charges, and every other cost, charge and expenses, but not including those referred to in GC50.1.1 or GC50.1.3 or a class referred to in GC50.2, in an amount that is equal to 10% of the sum of the expenses referred to in GC50.1.1, and

50.1.3 interest on the cost determined under GC50.1.1 and GC50.1.2, which interest shall be calculated in accordance with TP9,

provide that the total cost of an item set out n the Unit Price Table that is subject to the provisions of GC47.1.2.1 does not exceed the amount that would have been payable to the Contractor had the estimated total quantity of the said item actually be performed, used or supplied.

50.2 For purposes of GC50.1.1 the classes of expenditure that may be taken into account in determining the cost of labour, plant and material are,

50.2.1 payments to subcontractors;

50.2.2 wages, salaries and travelling expenses of employees of the Contractor while they are actually and properly engaged on the work, other than wages, salaries, bonuses, living

and travelling expenses of personnel of the Contractor generally employed at the head office or at a general office of the Contractor unless they are engaged at the work site with the approval of the Departmental Representative,

50.2.3 assessments payable under any statutory authority relating to workmen's compensation, unemployment insurance, pension plan or holidays with pay;

50.2.4 rent that is paid for plant or an amount equivalent of the said rent if the plant is owned by the Contractor that is necessary for and used in the performance of the work, if the rent of the equivalent amount is reasonable and use of that plant has been approved by the Departmental Representative;

50.2.5 payments for maintaining and operating plant necessary for and used in the performance of the work, and payments for effecting such repairs thereto as, in the opinion of the Departmental Representative, are necessary to the proper performance of the contract other than payments for any repairs to the plant arising out of defects existing before its allocation to the work;

50.2.6 payments for material that is necessary for and incorporated in the work, or that is necessary for and consumed in the performance of the contract;

50.2.7 payments for preparation, delivery, handling, erection, installation, inspection protection and removal of the plant and material necessary for and used in the performance of the contract; and

50.2.8 any other payments made by the Contractor with the approval of the Departmental Representative that are necessary for the performance of the contract.

GC51 Records to be kept by Contractor

51.1 The Contractor shall

51.1.1 maintain full records of his estimated and actual cost of the work together with all tender calls, quotations, contracts, correspondence, invoices, receipts and vouchers relating thereto.

51.1.2 make all records and material referred to in GC5.1.1 available to audit and inspection by the Minister and the Deputy Receiver General for Canada or by persons acting on behalf of either of both of them, when requested;

51.1.3 allow any of the person referred to in GC51.1.2 to make copies of and to take extracts from any of the records and material referred to in GC51.1.1; and

51.1.4 furnish any person referred to in GC51.1.2 with any information he may require from time to time in connection with such records and material.

51.2 The records maintained by the Contractor pursuant to GC51.1.1 shall be kept intact by the Contractor until the expiration of two years after the date that a Final Certificate of Completion referred to in GC44.1 was issued or until the expiration of such other period of time as the

Minister may direct.

51.3 The Contractor shall cause all subcontractors and all other persons directly or indirectly controlled by or affiliated with the Contractor and all persons directly or indirectly having control of the Contractor to comply with GC51.1 and GC51.2 as if they were the Contractor.

GC52 Conflict of Interest

52.1 It is a term of this contract that no former public office holder who is not in compliance with the Conflict of Interest and Post-Employment Code for Public Office Holders shall derive a direct benefit from this contract.

GC53 Contractor Status

53.1 The Contractor shall be engaged under the contract as an independent contractor.

53.2 The Contractor and any employee of the said Contractor is not engaged by the contract as an employee, servant or agent of Her Majesty.

53.3 For the purposes of GC53.1 and GC53.2 the Contractor shall be solely responsible for any and all payments and deductions required to be made by law including those required for Canada or Quebec Pension Plans, Unemployment Insurance, Worker's Compensation or Income Tax.

GENERAL CONDITONS

IC 1 Proof of Insurance
IC 2 Risk Management
IC 3 Payment of Deductible
IC 4 Insurance Coverage

GENERAL INSUANCE COVERAGES

GCI 1 Insured
GIC 2 Period of Insurance
GIC 3 Proof of Insurance
GIC 4 Notification

COMMERCIAL GENERAL LIABILITY

CGL 1 Scope of Policy
CGL 2 Coverages/Provisions
CGL 3 Additional Exposures
CGL 4 Insurance Proceeds
CGL 5 Deductible

BUILDER'S RISK – INSTALLATION FLOATER – ALL RISKS

BR 1 Scope of Policy
BR 2 Property Insured
BR 3 Insurance Proceeds
BR 4 Amount of Insurance
BR 5 Deductible
BR 6 Subrogation
BR 7 Exclusion Qualifications

INSURER'S CERTIFICATE OF INSURANCE

General Conditions

IC 1 Proof of Insurance
(02/12/03)

Within thirty (30) days after acceptance of the Contractor's tender, the Contractor shall, unless otherwise directed in writing by the Contracting Officer, deposit with the Contracting Officer an Insurer's Certificate of Insurance in the form displayed in this document and, if requested by the Contracting Officer, the originals or certified true copies of all contracts of insurance maintained by the Contractor pursuant to the Insurance Coverage Requirements shown hereunder.

IC 2 Risk Management
(01/10/94)

The provisions of the Insurance Coverage Requirements contained hereunder are not intended to cover all of the Contractor's obligations under GC8 of the General Conditions "C" of the contract. Any additional risk management measures or additional insurance coverages the Contractor may deem necessary to fulfill its obligations under GC8 shall be at its own discretion and expense.

IC 3 Payment of Deductible
(01/10/94)

The payment of monies up to the deductible amount made in satisfaction of a claim shall be borne by the Contactor.

IC 4 Insurance Coverage
(02/12/03)

The Contractor has represented that it has in place and effect the appropriate and usual liability insurance coverage as required by these Insurance Conditions and the Contractor has warranted that it shall obtain, in a timely manner and prior to commencement of the Work, the appropriate and usual property insurance coverage as required by these Insurance Conditions and, further, that it shall maintain all required insurance policies in place and effect as required by these Insurance Conditions.

INSURANCE COVERAGE REQUIREMENTS

PART I
GENERAL INSUANCE COVERAGES (GIC)

GCI 1 Insured
(02/12/03)

Each insurance policy shall insure the Contractor, and shall include, as an Additional Named Insured, Her Majesty the Queen in right of Canada, represented by the National Research Council Canada.

GIC 2 Period of Insurance
(02/12/03)

Unless otherwise directed in writing by the Contracting Officer or otherwise stipulated elsewhere in these Insurance Conditions, the policies required hereunder shall be in force and be maintained from the date of the contract award until the day of issue of the Departmental Representative's Final Certificate of Completion.

GIC 3 Proof of Insurance
(01/10/94)

Within twenty five (25) days after acceptance of the Contractor's tender, the Insurer shall, unless otherwise directed by the Contractor, deposit with the Contractor an Insurer's Certificate of Insurance in the form displayed in the document and, if requested, the originals or certified true copies of all contracts of insurance maintained by the Contractor pursuant to the requirements of these Insurance Coverages.

GIC 4 Notification
(01/10/94)

Each Insurance policy shall contain a provision that (30) days prior written notice shall be given by the Insurer to Her Majesty in the event of any material change in or cancellation of coverage. Any such notice received by the Contractor shall be transmitted forthwith to Her Majesty.

PART II
COMMERCIAL GENERAL LIABILITY

CGL 1 Scope of Policy
(01/10/94)

The policy shall be written on a form similar to that known and referred to in the insurance industry as IBC 2100 – Commercial General Liability policy (Occurrence form) and shall provide for limit of liability of not less than $2,000,000 inclusive for Bodily Injury and Property Damage for any one occurrence or series of occurrences arising out of one cause. Legal or defence cost incurred in respect of a claim or claims shall not operate to decrease the limit of liability.

CGL 2 Coverages/Provisions
(01/10/94)

The policy shall include but not necessarily be limited to the following coverages/provisions.

2.1 Liability arising out of or resulting from the ownership, existence, maintenance or use of premises by the Contractor and operations necessary or incidental to the performance of this contract.

2.2 "Broad Form" Property Damage including the loss of use of property.

2.3 Removal or weakening of support of any building or land whether such support be natural or otherwise.

2.4 Elevator liability (including escalators, hoists and similar devices).

2.5 Contractor's Protective Liability

2.6 Contractual and Assumed Liabilities un this contact.

2.7 Completed Operations Liability – The insurance, including all aspects of this Part II of these Insurance Conditions shall continue for a period of at least one (1) year beyond the date of the Departmental Representative's Final Certificate of Completion for the Completed Operations.

2.8 Cross Liability – The Clause shall be written as follows:

Cross Liability – The insurance as is afforded by this policy shall apply in respect to any claim or action brought against any one Insured by any other Insured. The coverage shall apply in the same manner and to the same extent as though a separate policy had been issued to each Insured. The inclusion herein of more than one Insured shall not increase the limit of the Insurer's liability.

2.9 Severability of Interests – The Clause shall be written as follows:

Severability of Interests – This policy, subject to the limits of liability stated herein, shall apply separately to each Insured in the same manner and to the same extent as if a separate policy had been issued to each. The inclusion herein of more than one insured shall not increase the limit of the Insurer's liability.

CGL 3 Additional Exposures
(02/12/03)

The policy shall either include or be endorsed to include the following exposures of hazards if the Work is subject thereto:

3.1 Blasting

3.2 Pile driving and calsson work

3.3 Underpinning

3.4 Risks associated with the activities of the Contractor on an active airport

3.5 Radioactive contamination resulting from the use of commercial isotopes

3.6 Damage to the portion of an existing building beyond that directly associated with an addition, renovation or installation contract.

3.7 Marine risks associated with the contraction of piers, wharves and docks.

CGL 4 Insurance Proceeds
(01/10/94)

Insurance Proceeds from this policy are usually payable directly to a Claimant/Third Party.

CGL 5 Deductible
(02/12/03)

This policy shall be issued with a deductible amount of not more than $10,000 per occurrence applying to Property Damage claims only.

PART III
BUILDER'S RISK – INSTALLATION FLOATER – ALL RISKS

BR 1 Scope of Policy
(01/10/94)

The policy shall be written on an "All Risks" basis granting coverages similar to those provided by the forms known and referred to in the insurance industry as "Builder's Risk Comprehensive Form" or "Installation Floater – All Risks".

BR 2 Property Insured
(01/10/94)

The property insured shall include:

2.1 The Work and all property, equipment and materials intended to become part of the finished Work at the site of the project while awaiting, during and after installation, erection or construction including testing.

2.2 Expenses incurred in the removal from the construction site of debris of the property insured, including demolition of damaged property, de-icing and dewatering, occasioned by loss, destruction or damage to such property and in respect of which insurance is provided by this policy.

BR 3 Insurance Proceeds
(01/10/94)

3.1 Insurance proceeds from this policy are payable in accordance with GC28 of the General Conditions "C" of the contract.

3.2 This policy shall provide that the proceeds thereof are payable to Her Majesty or as the Minister may direct.

3.3 The Contractor shall do such things and execute such documents as are necessary to effect payment of the proceeds.

BR 4 Amount of Insurance
(01/10/94)

The amount of insurance shall not be less than the sum of the contract value plus the declared value (if any) set forth in the contract documents of all material and equipment supplied by Her Majesty at the site of the project to be incorporated into and form part of the finished Work.

BR 5 Deductible
(02/12/03)

The Policy shall be issued with a deductible amount of not more than $10,000.

BR 6 Subrogation
(01/10/94)

The following Clause shall be included in the policy:

"All rights of subrogation or transfer of rights are hereby waived against any corporation, firm, individual or other interest, with respect to which, insurance is provided by this policy".

BR 7 Exclusion Qualifications
(01/10/94)

The policy may be subject to the standard exclusions but the following qualifications shall apply:

7.1 Faulty materials, workmanship or design may be excluded only to the extent of the cost of making good thereof and shall not apply to loss or damage resulting therefrom.

7.2 Loss or damage caused by contamination by radioactive material may be excluded except for loss or damage resulting from commercial isotopes used for industrial measurements, inspection, quality control radiographic or photographic use.

7.3 Use and occupancy of the project or any part of section thereof shall be permitted where such use and occupancy is for the purpose for which the project is intended upon completion.

INSURER'S CERTIFICATE OF INSURANCE

(TO BE COMPLETED BY INSURER (NOT BOKER) AND DELIVERD TO NATIONAL RESEARCH COUNCIL CANADA WITH 30 DAYS FOLLOWING ACCEPTANCE OF TENDER)

CONTRACT

DESCRIPTION OF WORK	CONTRACT NUMBER	AWARD DATE
LOCATION		

INSURER

NAME
ADDRESS

BROKER

NAME
ADDRESS

INSURED

NAME OF CONTRACTOR
ADDRESS

ADDITIONAL INSURED

HER MAJESTY THE QUEEN IN RIGHT OF CANADA AS REPRESENTED BY THE NATIONAL RESEARCH COUNCIL CANADA

THIS DOCUENT CERTIFIES THAT THE FOLLOWING POLICES OF INSURANCE ARE AT PRESENT IN FORCE COVERING ALL OPERATIONS OF THE INSURE IN CONNECTION WITH THE CONTRACT MADE BETWEEN THE NAMED INSURED AND THE NATIONAL RESEARCH COUNCIL CANADA AND IN ACCORDANCE WITH THE INSURANCE CONDITIONS "E"

POLICY					
TYPE	NUMBER	INCEPTION DATE	EXPIRY DATE	LIMITS OF LIABILITY	DEDUCTIBLE
COMMERCIAL GENERAL LIABILITY					
BUILDERS RISK "AL RISKS"					
INSTALLATION FLOATER "ALL RISKS"					

THE INSURER AGREES TO NOTIFY THE NATIONAL RESEARCH COUNCIL CANADA IN WRITING 30 DAYS PRIOR TO ANY MATERIAL CHANGE IN OR CANCELLATION OF ANY POLICY OR COVERAGE SPECIFICALLY RELATED TO THE CONTRACT

NAME OF INSURER'S OFFICER OR AUTHORIZED EMPLOYEE	SIGNATURE	DATE:
		TELEPHONE NUMBER:

ISSUANCE OF THIS CERTIFIATE SHALL NOT LIMIT OR RESTRICT THE RIGHT OF THE NATIONAL RESEARCH COUNCIL CANADA TO REQUEST AT ANY TIME DUPLICATE COPIES OF SAID INSURANCE POLICIES

CS1 Obligation to provide Contract Security

1.1 The Contractor shall, at the Contractor's own expense, provide one or more of the forms of contract security prescribed in CS2.

1.2 The Contractor shall deliver to the Departmental Representative the contract security referred to in CS1.1 within 14 days after the date that the Contractor receives notice that the Contractor's tender or offer was accepted by Her Majesty.

CS2 Prescribed Types and Amounts of Contract Security

2.1 The Contractor shall deliver to the Departmental Representative pursuant to CS1

2.1.1 a performance bond and a labour and material payment bond each in an amount that is equal to not less than 50% of the contract amount referred to in the Articles of Agreement, or

2.1.2 a labour and material payment bond in an amount that is equal to not less than 50% of the contract amount referred to in the Articles of Agreement, and a security deposit in an amount that is equal to

2.1.2.1 not less than 10% of the contract amount referred to in the Articles of Agreement where that amount does not exceed $250,000, or

2.1.2.2 $25,000 plus 5% of the part of the contract amount referred to in the Articles of Agreement that exceeds $250,000, or

2.1.3 a security deposit in an amount prescribed by CS2.12 plus an additional amount that is equal to 10% of the contract amount referred to in the Articles of Agreement.

2.2 A performance bond and a labour and material payment bond referred to in CS2.1 shall be in a form and be issued by a bonding or surety company that is approved by Her Majesty.

2.3 The amount of a security deposit referred to in CS2.1.2 shall not exceed $250,000 regardless of the contract amount referred to in the Articles of Agreement.

2.4 A security deposit referred to in CS2.1.2 and CS2.1.3 shall be in the form of

2.4.1 a bill of exchange made payable to the Receiver General of Canada and certified by an approved financial institution or drawn by an approved financial institution on itself, or

2.4.2 bonds of or unconditionally guaranteed as to principal and interest by the Government of Canada.

2.5 For the purposes of CS2.4

2.5.1 a bill of exchange is an unconditional order in writing signed by the Contractor and addressed to an approved financial institution, requiring the said institution to pay, on demand, at a fixed or determinable future time a sum certain of money to, or to the order

of, the Receiver General for Canada, and

2.5.2 If a bill of exchange is certified by a financial institution other than a chartered bank then it must be accompanied by a letter or stamped certification confirming that the financial institution is in a t least one of the categories referred to in CS2.5.3

2.5.3 an approved financial institution is

2.5.3.1 any corporation or institution that is a member of the Canadian Payments Association,

2.5.3.2 a corporation that accepts deposits that are insured by the Canada Deposit Insurance Corporation or the Régie de l'assurance-dépôts du Québec to the maximum permitted by law,

2.5.3.3 a credit union as defined in paragraph 137(6)(b) of the *Income Tax Act*,

2.5.3.4 a corporation that accepts deposits from the public, if repayment of the deposit is guaranteed by Her Majesty in right of a province, or

2.5.3.5 The Canada Post Corporation.

2.5.4 the bonds referred to in CS2.4.2 shall be

2.5.4.1 made payable to bearer, or

2.5.4.2 accompanied by a duly executed instrument of transfer of the bonds to the Receiver General for Canada in the form prescribed by the Domestic Bonds of Canada Regulations, or

2.5.4.3 registered, as to principal or as to principal and interest in the name of the Receiver General for Canada pursuant to the Domestic Bonds of Canada Regulations, and

2.5.4.4 provided on the basis of their market value current at the date of the contract.

Government of Canada / Gouvernement du Canada

Contract Number / Numéro du contrat	
Security Classification / Classification de sécurité	

SECURITY REQUIREMENTS CHECK LIST (SRCL)
LISTE DE VÉRIFICATION DES EXIGENCES RELATIVES À LA SÉCURITÉ (LVERS)

PART A - CONTRACT INFORMATION / PARTIE A - INFORMATION CONTRACTUELLE

1. Originating Government Department or Organization / Ministère ou organisme gouvernemental d'origine	2. Branch or Directorate / Direction générale ou Direction
National Research Council	ASPM/SAGI

3. a) Subcontract Number / Numéro du contrat de sous-traitance	3. b) Name and Address of Subcontractor / Nom et adresse du sous-traitant

4. Brief Description of Work / Brève description du travail

The general scope of work for this project involves the TSSA field approval of Boiler#1 and Boiler #3, which involves but is not limited to all required mechanical, electrical and controls work associated with the following: replacement of main shut-off valves, modifications and rework of the existing fuel trains and/or vent piping, demolition and re-work to the existing controls, installation of a VFD for Boiler#1 and all associated instrumentation and controls modificaitons.

5. a) Will the supplier require access to Controlled Goods? Le fournisseur aura-t-il accès à des marchandises contrôlées?	☒ No Non	☐ Yes Oui
5. b) Will the supplier require access to unclassified military technical data subject to the provisions of the Technical Data Control Regulations? Le fournisseur aura-t-il accès à des données techniques militaires non classifiées qui sont assujetties aux dispositions du Règlement sur le contrôle des données techniques?	☒ No Non	☐ Yes Oui
6. Indicate the type of access required / Indiquer le type d'accès requis		
6. a) Will the supplier and its employees require access to PROTECTED and/or CLASSIFIED information or assets? Le fournisseur ainsi que les employés auront-ils accès à des renseignements ou à des biens PROTÉGÉS et/ou CLASSIFIÉS? (Specify the level of access using the chart in Question 7. c) (Préciser le niveau d'accès en utilisant le tableau qui se trouve à la question 7. c)	☒ No Non	☐ Yes Oui
6. b) Will the supplier and its employees (e.g. cleaners, maintenance personnel) require access to restricted access areas? No access to PROTECTED and/or CLASSIFIED information or assets is permitted. Le fournisseur et ses employés (p. ex. nettoyeurs, personnel d'entretien) auront-ils accès à des zones d'accès restreintes? L'accès à des renseignements ou à des biens PROTÉGÉS et/ou CLASSIFIÉS n'est pas autorisé.	☐ No Non	☒ Yes Oui
6. c) Is this a commercial courier or delivery requirement with no overnight storage? S'agit-il d'un contrat de messagerie ou de livraison commerciale sans entreposage de nuit?	☒ No Non	☐ Yes Oui

7. a) Indicate the type of information that the supplier will be required to access / Indiquer le type d'information auquel le fournisseur devra avoir accès

Canada ☒	NATO / OTAN ☐	Foreign / Étranger ☐
7. b) Release restrictions / Restrictions relatives à la diffusion		
No release restrictions / Aucune restriction relative à la diffusion ☒	All NATO countries / Tous les pays de l'OTAN ☐	No release restrictions / Aucune restriction relative à la diffusion ☐
Not releasable / À ne pas diffuser ☐		
Restricted to: / Limité à : Specify country(ies): / Préciser le(s) pays : ☐	Restricted to: / Limité à : Specify country(ies): / Préciser le(s) pays : ☐	Restricted to: / Limité à : Specify country(ies): / Préciser le(s) pays : ☐
7. c) Level of information / Niveau d'information		
PROTECTED A / PROTÉGÉ A ☐	NATO UNCLASSIFIED / NATO NON CLASSIFIÉ ☐	PROTECTED A / PROTÉGÉ A ☐
PROTECTED B / PROTÉGÉ B ☐	NATO RESTRICTED / NATO DIFFUSION RESTREINTE ☐	PROTECTED B / PROTÉGÉ B ☐
PROTECTED C / PROTÉGÉ C ☐	NATO CONFIDENTIAL / NATO CONFIDENTIEL ☐	PROTECTED C / PROTÉGÉ C ☐
CONFIDENTIAL / CONFIDENTIEL ☐	NATO SECRET / NATO SECRET ☐	CONFIDENTIAL / CONFIDENTIEL ☐
SECRET / SECRET ☐	COSMIC TOP SECRET / COSMIC TRÈS SECRET ☐	SECRET / SECRET ☐
TOP SECRET / TRÈS SECRET ☐		TOP SECRET / TRÈS SECRET ☐
TOP SECRET (SIGINT) / TRÈS SECRET (SIGINT) ☐		TOP SECRET (SIGINT) / TRÈS SECRET (SIGINT) ☐

TBS/SCT 350-103(2004/12)

Security Classification / Classification de sécurité

Canada

Government of Canada / Gouvernement du Canada

Contract Number / Numéro du contrat

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PART A *(continued)* / PARTIE A *(suite)*

8. Will the supplier require access to PROTECTED and/or CLASSIFIED COMSEC information or assets? ☒ No / Non ☐ Yes / Oui
Le fournisseur aura-t-il accès à des renseignements ou à des biens COMSEC désignés PROTÉGÉS et/ou CLASSIFIÉS?
If Yes, indicate the level of sensitivity:
Dans l'affirmative, indiquer le niveau de sensibilité :

9. Will the supplier require access to extremely sensitive INFOSEC information or assets? ☒ No / Non ☐ Yes / Oui
Le fournisseur aura-t-il accès à des renseignements ou à des biens INFOSEC de nature extrêmement délicate?

Short Title(s) of material / Titre(s) abrégé(s) du matériel :
Document Number / Numéro du document :

PART B - PERSONNEL (SUPPLIER) / PARTIE B - PERSONNEL (FOURNISSEUR)

10. a) Personnel security screening level required / Niveau de contrôle de la sécurité du personnel requis

☒ RELIABILITY STATUS / COTE DE FIABILITÉ	☐ CONFIDENTIAL / CONFIDENTIEL	☐ SECRET / SECRET	☐ TOP SECRET / TRÈS SECRET
☐ TOP SECRET– SIGINT / TRÈS SECRET – SIGINT	☐ NATO CONFIDENTIAL / NATO CONFIDENTIEL	☐ NATO SECRET / NATO SECRET	☐ COSMIC TOP SECRET / COSMIC TRÈS SECRET
☐ SITE ACCESS / ACCÈS AUX EMPLACEMENTS			

Special comments:
Commentaires spéciaux : _____

NOTE: If multiple levels of screening are identified, a Security Classification Guide must be provided.
REMARQUE : Si plusieurs niveaux de contrôle de sécurité sont requis, un guide de classification de la sécurité doit être fourni.

10. b) May unscreened personnel be used for portions of the work? ☒ No / Non ☐ Yes / Oui
Du personnel sans autorisation sécuritaire peut-il se voir confier des parties du travail?
If Yes, will unscreened personnel be escorted? ☒ No / Non ☐ Yes / Oui
Dans l'affirmative, le personnel en question sera-t-il escorté?

PART C - SAFEGUARDS (SUPPLIER) / PARTIE C - MESURES DE PROTECTION (FOURNISSEUR)

INFORMATION / ASSETS / RENSEIGNEMENTS / BIENS

11. a) Will the supplier be required to receive and store PROTECTED and/or CLASSIFIED information or assets on its site or premises? ☒ No / Non ☐ Yes / Oui
Le fournisseur sera-t-il tenu de recevoir et d'entreposer sur place des renseignements ou des biens PROTÉGÉS et/ou CLASSIFIÉS?

11. b) Will the supplier be required to safeguard COMSEC information or assets? ☒ No / Non ☐ Yes / Oui
Le fournisseur sera-t-il tenu de protéger des renseignements ou des biens COMSEC?

PRODUCTION

11. c) Will the production (manufacture, and/or repair and/or modification) of PROTECTED and/or CLASSIFIED material or equipment occur at the supplier's site or premises? ☒ No / Non ☐ Yes / Oui
Les installations du fournisseur serviront-elles à la production (fabrication et/ou réparation et/ou modification) de matériel PROTÉGÉ et/ou CLASSIFIÉ?

INFORMATION TECHNOLOGY (IT) MEDIA / SUPPORT RELATIF À LA TECHNOLOGIE DE L'INFORMATION (TI)

11. d) Will the supplier be required to use its IT systems to electronically process, produce or store PROTECTED and/or CLASSIFIED information or data? ☒ No / Non ☐ Yes / Oui
Le fournisseur sera-t-il tenu d'utiliser ses propres systèmes informatiques pour traiter, produire ou stocker électroniquement des renseignements ou des données PROTÉGÉS et/ou CLASSIFIÉS?

11. e) Will there be an electronic link between the supplier's IT systems and the government department or agency? ☒ No / Non ☐ Yes / Oui
Disposera-t-on d'un lien électronique entre le système informatique du fournisseur et celui du ministère ou de l'agence gouvernementale?

Government of Canada / Gouvernement du Canada

Contract Number / Numéro du contrat
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PART C - *(continued)* / PARTIE C - *(suite)*

For users completing the form **manually** use the summary chart below to indicate the category(ies) and level(s) of safeguarding required at the supplier's site(s) or premises.
Les utilisateurs qui remplissent le formulaire **manuellement** doivent utiliser le tableau récapitulatif ci-dessous pour indiquer, pour chaque catégorie, les niveaux de sauvegarde requis aux installations du fournisseur.

For users completing the form **online** (via the Internet), the summary chart is automatically populated by your responses to previous questions.
Dans le cas des utilisateurs qui remplissent le formulaire **en ligne** (par Internet), les réponses aux questions précédentes sont automatiquement saisies dans le tableau récapitulatif.

SUMMARY CHART / TABLEAU RÉCAPITULATIF

Category / Catégorie	PROTECTED / PROTÉGÉ			CLASSIFIED / CLASSIFIÉ			NATO				COMSEC					
	A	B	C	CONFIDENTIAL / CONFIDENTIEL	SECRET	TOP SECRET / TRÈS SECRET	NATO RESTRICTED / NATO DIFFUSION RESTREINTE	NATO CONFIDENTIAL / NATO CONFIDENTIEL	NATO SECRET	COSMIC TOP SECRET / COSMIC TRÈS SECRET	PROTECTED / PROTÉGÉ A	PROTECTED / PROTÉGÉ B	PROTECTED / PROTÉGÉ C	CONFIDENTIAL / CONFIDENTIEL	SECRET	TOP SECRET / TRES SECRET
Information / Assets / Renseignements / Biens																
Production	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
IT Media / Support TI	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
IT Link / Lien électronique	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

12. a) Is the description of the work contained within this SRCL PROTECTED and/or CLASSIFIED?
La description du travail visé par la présente LVERS est-elle de nature PROTÉGÉE et/ou CLASSIFIÉE?

☒ No / Non ☐ Yes / Oui

If Yes, classify this form by annotating the top and bottom in the area entitled "Security Classification".
Dans l'affirmative, classifier le présent formulaire en indiquant le niveau de sécurité dans la case intitulée « Classification de sécurité » au haut et au bas du formulaire.

12. b) Will the documentation attached to this SRCL be PROTECTED and/or CLASSIFIED?
La documentation associée à la présente LVERS sera-t-elle PROTÉGÉE et/ou CLASSIFIÉE?

☒ No / Non ☐ Yes / Oui

If Yes, classify this form by annotating the top and bottom in the area entitled "Security Classification" and indicate with attachments (e.g. SECRET with Attachments).
Dans l'affirmative, classifier le présent formulaire en indiquant le niveau de sécurité dans la case intitulée « Classification de sécurité » au haut et au bas du formulaire et indiquer qu'il y a des pièces jointes (p. ex. SECRET avec des pièces jointes).

Government of Canada / Gouvernement du Canada

Contract Number / Numéro du contrat	
Security Classification / Classification de sécurité	

PART D - AUTHORIZATION / PARTIE D - AUTORISATION

13. Organization Project Authority / Chargé de projet de l'organisme

Name (print) - Nom (en lettres moulées)	Title – Titre	Signature
Bruno Vallieres	Manager Facilities Engineering Unit	Bruno Vallieres

Telephone No. - N° de téléphone	Facsimile No. - N° de télécopieur	E-mail address - Adresse courriel	Date
991-5586	957-9828	bruno.vallieres@nrc-cnrc.gc.ca	03 Mar 2016

14. Organization Security Authority / Responsable de la sécurité de l'organisme

Name (print) - Nom (en lettres moulées)	Title – Titre	Signature
Charlotte Carrier FOR JODI NORRIS	***Controlled Goods and Contracts Security Coordinator***	

Telephone No. - N° de téléphone	Facsimile No. - N° de télécopieur	E-mail address - Adresse courriel	Date
(613) 993-8956	(613) 990-0946	Charlotte.Carrier@nrc-cnrc.gc.ca	MAR 0 3 2016

15. Are there additional instructions (e.g. Security Guide, Security Classification Guide) attached?
Des instructions supplémentaires (p. ex. Guide de sécurité, Guide de classification de la sécurité) sont-elles jointes?

☒ No / Non ☐ Yes / Oui

16. Procurement Officer / Agent d'approvisionnement

Name (print) - Nom (en lettres moulées)	Title – Titre	Signature
M. BEDARD	Senior Contracting Officer	

Telephone No. - N° de téléphone	Facsimile No. - N° de télécopieur	E-mail address - Adresse courriel	Date
613 993-2274			7/3/16

17. Contracting Security Authority / Autorité contractante en matière de sécurité

Name (print) - Nom (en lettres moulées)	Title – Titre	Signature

Telephone No. - N° de téléphone	Facsimile No. - N° de télécopieur	E-mail address - Adresse courriel	Date