Municipality of Sanikiluaq

Operation and Maintenance Manual

Volume I

Type of Document
Final

Project Name
Water Truck Fill Station

Project Number
OTCD00020127A

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Date Submitted
15.07.11

Government of Nunavut

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Date	Description of Change
_____, 2010	Initial Release

1 Introduction

This Manual has been produced to establish standard operation and maintenance protocols for the truck fill station within the Hamlet of Sanikiluaq. Information presented in this manual has been developed based on the document “Specifications *for Operations and Maintenance Manuals;* Northwest Territories Public Works and Highways, 1987”.

The purpose of this Operations and Maintenance Manual (O&M Manual) is to assist Hamlet staff with the proper operation and maintenance of the truck fill station. This manual will outline the description for how the facility is to be operated and maintained as well as outline the required testing and maintenance operations.

1.1 Hamlet of Sanikiluaq

The Hamlet of Sanikiluaq (Hamlet) is located on the north end of Flaherty Island, a large central island of the Belcher islands in Hudson Bay. The typical vegetation in the area consists of Arctic Tundra, predominately mosses and lichens. The average daily temperatures for July range from mean high and low temperatures of 25.6°C and 3.3°C, respectively. The average daily temperatures for January range from mean high and low temperatures of -22.8°C and -42.8°C respectively (N.W.T. Data Book, 1986/87).

1.2 Existing Water Supply

The Hamlet’s source of domestic water is Lake Sanikiluaq which is located near the edge of the Community. Water distribution within the community is by a trucked delivery service. The water is pumped from Lake Sanikiluaq into the water trucks at the Hamlet’s Truck Fill Station which is located at the edge of the lake and centrally located within the community.

Chlorination is required for disinfection of the raw water, and treated drinking water is delivered by water truck to homes and facilities within the Hamlet.

Figure 1-1: Location Plan

2 Background and Design Data

2.1 Population Projections

The population projections will be based on "Nunavut: Community Population Projections" as published by the Nunavut Bureau of Statistics, March 2000. The Nunavut Bureau of Statistics projections provide projected populations of the Nunavut communities to the year 2020.

Table 2-1: Population Projections

Year	Population	Year	Population	Year	Population	Year	Population
2001	722	2006	816	2011	981	2016	1029
2002	740	2007	834	2012	939	2017	1050
2003	758	2008	853	2013	963	2018	1069
2004	776	2009	873	2014	987	2019	1090
2005	796	2010	896	2015	1008	**2020**	**1108**

2.2 Consumption Rates

The residential water usage (RWU) for a community is based on the method of water delivery and sewage collection in the community. The per capita water usage rates for the different methods of water delivery and sewage collection are summarized in the Table 1-3.

The population projections are used as a measure to determine the approximate water usage the Hamlet will consume over a period of time. The Hamlet, being a trucked water and sewage system, therefore uses the Residential Water Usage (RWU) for the community from table 1-3 equal to 90 lpcd.

Table 2-2: Residential Water Usage

Service Method	Residential Water Usage (RWU)
Trucked water and sewage	90 lpcd
Piped water and sewage	225 lpcd
Piped water supply and truck sewage pump out	110 lpcd
Trucked water delivery and individual septic fields	100 lpcd

Non-residential water usage by a community tends to increase with increases in the population. To determine the Total Community Water Usage (TCWU), the Residential Water Usage is adjusted based on population to provide a Total Water Usage Per Capital. The daily water

consumption by the community is equal to the population multiplied by the Total Water Usage Per Capital. The Total Water Usage Per Capital, including residential and non residential activities, is estimated based on the equations in Table 1-4 Total Community Water Usage.

Table 2-3: Total Community Water Usage

Community Population	Total Water Use Per Capita
0 – 2000	RWU x (1.0 + 0.00023 x Population)
2000 – 10,000	RWU x [-1.0 + {0.323 x Ln(Population)}]
Over 10,000	RWU x 2.0

The daily water consumption by the community is equal to the population multiplied by the Total Water Usage Per Capital. Projected population of 1108 for the year 2020, and a total water usage per capita rate calculated to be 113 lpcd, the daily consumption rate is equal to 125,000 lpd.

The consumption rate is a benchmark number which the single Truck Fill Station has to be capable of achieving throughout the course of regular daily operations.

A pumping capacity of 1,000 litres per minute during fire suppression operations set the flow requirements of the two pumps within the station. Under normal operations the pumps will produce 500 litres per minute. At this rate, the station will be capable of fulfilling the daily community consumption quantities for the projected year 2020 within 250 minutes.

2.3 Raw Water Testing

Raw water is drawn from Sanikiluaq Lake, which is situated immediately adjacent to the community. This lake was selected as the long term water source during the mid 1970's as it was sufficiently deep enough to avoid excessive freeze during the winter season. It is reported that this source has provided acceptable water quality over the service life of the previous truck fill station.

Water was sampled in July 27, 2009. An analysis for some basic chemical parameters was conducted by Caduceon Environmental Laboratories and a copy of the laboratory report is attached in Appendix A. The raw water sample met the current Guidelines for Canadian Drinking Water Quality for all of the tested parameters. It should, however, be noted that the tested list of parameters did not capture the full list of parameters that is typically included among the requirements for a Water License.

Turbidity is a measure of cloudiness in water, which can be caused by soil erosion, waste discharge and runoff. In more technical terms, turbidity describes the optical condition of water with suspended partials.

2.4 Water Treatment

Turbidity, as reported from the sample taken July 27, 2009, was less than the criteria of 1 NTU as set out in the Guidelines for Canadian Drinking Water Quality. It should be noted that this is a single result and that higher turbidity is likely at some points during the year, such as spring runoff. The Guidelines for Canadian Drinking Water Quality do not provide relief from the requirement for filtration due to low measured turbidity in source water. These guidelines include the following health related direction regarding turbidity:

> *"Waterworks systems that use a surface water source or a groundwater source under the direct influence of surface water should filter the source water to meet the following health-based turbidity limits..."*

Cartridge filtration, a process train consisting of 20, 5 and 1 micron filters, will be the primary filtration. The intent of this process train is to provide finished water turbidity that meets the current guidelines. It is also consistent with the expectations of the Water Board.

Chlorination is the primary disinfection. Calcium hypochlorite is shipped to the community as a dry chemical in bags. A mixing tank, equipped with an electrical mixer, is used to make up a hypochlorite solution from the dry bagged chemical. This solution is then decanted into a storage tank for feed to the chemical metering pump. The chemical metering pump will be energized simultaneously with the submersible water supply pumps. Chemical dosing rates are to be adjusted by operating staff to obtain a suitable residual in the treated water. A separate metering pump activates during fire service as the chlorine dose must be doubled during these operations:

- Hypochlorite solution is metered into the potable water supply at the following locations:
- Upstream of the filter train to pre-treat and reduce the risk of contamination growth within the filters.
- Downstream of the filter train to assure a chlorine residual in the delivered water.
- Into the fire water supply because of the higher water flow rates and lack of filtration during fire fighting operations.

2.5 Contact List

Title	Phone Number
Senior Administrative Officer (SAO)	867-266-7900
Baffin Regional Director (Timoon Toonoo)	867-897-3601
Baffin Regional Engineer (Bhabesh Roy)	867-899-7314
Engineering, exp. (Steve Burden)	613-688-1899
Spill Contact: Territorial 24-hour Spill Line	867-920-8130
Indian and Northern Affairs Canada Inspector	867-669-2761

GN-Emergency Measures Officer	888-624-4043
Sanikiluaq Health Centre	867-266-8965
RCMP (Sanikiluaq)	867-266-0123
Environment Canada (Emergency) Yellowknife	867-669-4725
GN Environment Health Office	867-975-4817

3 Component Details

3.1 Water Intakes

The inclined shaft water intakes into the facility are from the original water fill station of 1977. These intake pipes consist of a 200mm polyethylene main with 50 mm of polyurethane foam insulation protected by a steel cladding.

Both intake lines are anchored by a series of concrete blocks beginning near the high water line where they emerge out of the granular beach, inland 30+ metres. These concrete blocks were installed to prevent lateral movement due to the forces of the sea ice.

The water intake shafts are an integral part of the truck fill system and should be kept in good working order. Damage, and sections which appear to be compromised, must be repaired immediately. It is vital that the shafts are inspected every spring once the ice has retreated

3.2 Building

The building houses the various pieces of equipment including the filters, generator, electrical supply, chlorinators and instrumentation. The building itself has an inside dimension of 11.3 metres wide by 4.4 metres. This building is constructed using a steel pipe pile foundation, wood frame, concrete floor, metal cladding and a sloped roof. A separate room is provided for the electrical equipment and generator which will isolate potential fuels spills within the generator room.

3.3 Pumps

Pumps are rated at 450 litres per minute (120 USGPM) at 24 metres (80 feet) of head. The pumps are equipped with single phase motors, which is consistent with the electrical supply to the site. The general details of these pumps, including rated capacity, are presented in *Volume II* of the Operation and Maintenance manual. It should be noted that these are the largest pumps that are available with single phase motors. During normal truck fill operations these pumps will provide approximately 500 litres per minute.

3.4 Truck Fill Arm

The truck fill arm is secured to the building. A control station is incorporated into the truck fill arm to allow the operator to turn on and off the pumps. A mechanism is also provided to permit the rapid lowering and rising of the end section of the truck fill piping into the fill hatch on the top of the delivery truck tank. This mechanism reduces potential water spillage during truck filling.

Pump operation is achieved using an external control station. The delivery truck driver should not be required to routinely enter the building to operate pumps.

3.5 Site Works

The principal site works that must be provided relate to truck access. The looped access road under the truck fill arm will be maintained so that the driveable surface is suitable. The looped access will reduce the requirements for truck reversing as well as enhance site safety.

3.6 Heating

A pair of fuel fired unit heaters, one heater in the filter room and a second heater in the generator room; provide the heat for the building. A double walled exterior fuel storage tank is located outside the structure.

3.7 Freeze Protection

The segments of the Truck Fill Station that are most vulnerable to freeze are the inclined shaft intakes from the lake and the truck fill arm. The truck fill arm will drain through the supply piping into the lake at the end of each pumping cycle. A valve has been incorporated into the piping to provide a vent to assure the required drainage.

Freeze protection of the intake will be achieved by the draining of the piping, electric heat tracing and insulation of the intake casing pipe. The pumps are not equipped with check valves; this permits drainage of the supply piping into the lake at the end of each pump cycle. The portion of the piping that is located within the ice on the lake surface, or which is situated between the lake and the rear of the truck fill station is exposed to the risk of freeze. This section is equipped with heat tracing that is controlled based upon the temperature within the casing pipe. The existing casing pipe is protected with 50 mm of polyurethane foam insulation.

3.8 Plumbing

A water storage tank and pressure system is installed. There is also a hand wash sink that will provide water for chemical mixing. Drains are provided for the cartridge filters which are directed to a trench drain, which in turn, will be connected to a sump. Water pumped from this sump will be directed to a sewage storage tank equipped with an external service connection. Waste water produced at the truck fill station will be removed using the existing hamlet sewage trucks.

Water quantities will be measured as the system operates. These water quantities will give an indication of the Hamlet's actual water consumption, and provide information on the growth of the community for future development, and potential water infrastructure needs.

3.9 Electric Power

A single phase 120/240 volt electrical supply is used for the truck fill station.

3.10 **Chlorination**

Water is disinfected with the use of calcium hypochlorite, and is injected into the water stream before and after the filtration stage. Standby chlorination equipment is available as a safeguard against malfunction.

3.11 **Site Personal**

The responsibility of the Hamlets operations are overseen by the Senior Administrative Officer (SAO). The SAO is responsible for the Forman who conducts the day to day operation and maintenance of the facility together with one or two Hamlet employed labors to operate the water delivery vehicles and help maintain the system.

3.12 **Component Specifications**

Refer to **Volume II** of the Operation and Maintenance manual for component specifications and manufactures details.

4 Operational Procedures

4.1 Operation and Maintenance Duties

Daily

- Deliveries of municipal potable water from truck fill station, to household and facility holding tanks.
- Check chlorine levels within mixing tank and assure proper quantities are attained.
- Minimize spills, and immediately clean up when they occur.
- Visual inspection of all equipment.
- Repairs to Equipment when breakdowns occur.
- Maintain access to building and truck turning pads as required free of snow.
- Record Operation and Maintenance information as required.

Weekly

- Full facility clean-up, ensure floors and counters are clean and free of contaminants. All documents and reporting information is properly filed and organized.
- Assess truck fill arm and exterior of building for damage.
- Complete visual inspection of all mechanical and electrical components to ensure normal operational conditions.
- Record Operation and Maintenance information as required.

Monthly

- Preventative measures and maintenance on water delivery trucks.
- Assess inventory of parts for truck maintenance.
- Assess inventory of parts for truck fill station maintenance.
- Assess inventory of chemicals for truck fill operations.
- Grade and maintain the access road as required.
- Conduct monitoring program as required.
- Record Operation and Maintenance information as required.

Yearly

- Conduct annual monitoring and inspection program.
- Review the operation and maintenance records to evaluate the effectiveness of the water fill station and plan for the upcoming year.

4.2 Normal Operating Procedures

Under normal operating procedures, the driver will be able to drive up to the truck fill arm, position the truck tank intake under the spout, and with the external controls turn the pump on, fill the truck tank, then turn the pumps off. The operator should not have to enter the building on a regular basis throughout the day.

Chlorine levels should be monitored in the morning to ensure that the levels will be sufficient for the daily schedule.

An overview and quick inspection of all mechanical parts, pipes, and structures should be completed on a daily basis.

4.3 Fire Flow Procedures

In the case of a fire within the community, operation flows will be increased to 1000 lpm to facilitate the required GN fire flow. The water truck operator or Hamlet employee will enter the building and manually turn on the fire flow switch. Both pumps will be engaged to full operational capacity, and bypass the filters for minimum resistance. Once the fire has been contained and the maximum flows are no longer needed, the operator will be required to manually turn the system back to normal operating conditions.

4.4 Maintenance

Whenever maintenance is required to the water system, it is important that after works are completed the entire system is flushed and disinfected.

All tanks and pipework to be disinfected shall be thoroughly cleaned prior to disinfection.

Pipework shall be disinfected by adding a chlorine compound to the filling water during the pipe pressure test to produce an initial even concentration of at least 25 mg/L of free chlorine. The pipes shall be left full of chlorinated water for 24 hours and the free chlorine residual after 24 hours shall not be less than 10 mg/L.

Structures and tanks shall be disinfected using either of the following (2) methods:

- Structure or tank shall be filled to the overflow level with water, with an initial even concentration of at least 25 mg/L of free chlorine. After 24 hours, the free residual shall be at least 10 mg/L. If not, then the procedure shall be repeated.
- A solution of 200 mg/L available chlorine shall be applied directly to the surface of all parts of the tank or structure, including the underside of the roof. The solution shall be applied by suitable brushes or spray equipment and shall thoroughly coat all surfaces. The disinfected surfaces shall remain in contact with the solution for at least 30 minutes.

After the disinfection process is completed, the heavily chlorinated water shall be drained and disposed of in an approved manner.

Heavily chlorinated water shall be discharged to the local sewage disposal area.

If other disposal methods are impractical, de-chlorinate the water using methods outlined in AWWA C653-97.

4.5 Record Keeping and Recording

Records should be kept to assist in planning for yearly operations and to assist in the evaluation of the effectiveness of the water truck fill station. Copies of records pertaining to operation and maintenance of the station should be kept at both the Hamlet Office and the fill station and be maintained by the Hamlet Forman. Information that must be included in these records is listed below:

- Approximate monthly volume of water treated.
- Details of any maintenance undertaken at site.
- Dates of collecting and submitting samples to laboratory.
- Record sheets.
- Copy of the Hamlet's water license.
- Copies of all manuals pertaining to the operation and maintenance of the truck fill station.

4.6 Health and Safety

Due to the potential health hazards associated with handling chemicals, the following safety procedures should be obeyed in order to minimize health risks to personnel working in the truck fill station:

- Equipment is to be kept clean.
- Wear protective clothing such as gloves and boots at all times.
- Work cloths should not be worn home.
- Hands to be washed frequently, as a minimum before eating and after work.
- Personnel should receive appropriate vaccinations and ensure they are kept up-to-date.
- Personnel should be trained in proper handling procedures of chlorine.
- Visit the Health Clinic for all injuries.

4.7 QA/QC Program

The QA/QC program will follow the guidelines set out in the report, and found in Appendix B:

> *"For use by Class "B" Water License in Collecting Representative Water Samples in the Field"*

Department of Indian and Northern Affairs Canada

Water Resources Division

And the

Northwest Territories Water Board

July 1996

4.8 Testing and Commissioning

Testing and commissioning certification can be found in Appendix C.

Appendix A –
Lake Sanikiluaq Water Testing

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: 124916 **REPORT No. B09-23214**

Report To:

Trow Consulting Engineers Ltd.
154 Colonnade Rd South
Ottawa, ON, K2E 7J5
Attention: Shawn Doherty

Caduceon Environmental Laboratories
2378 Holly Lane
Ottawa, Ontario, K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 31-Jul-09
DATE REPORTED: 11-Aug-09
SAMPLE MATRIX: Surface Water

JOB/PROJECT NO.: Nunavut
P.O. NUMBER: OTCD000200172A
WATERWORKS NO.

			Client I.D.:		Surface Water			
			Sample I.D.:		B09-23214-1			
			Date Collected:		26-Jul-09			
Parameter	**Units**	**M.D.L.**	**Reference Method**	**Date/Site Analyzed**				
Hardness (as CaCO3)	mg/L	1	SM 3120	06-Aug-09/O	163			
Alkalinity (as CaCO3)	mg/L	5	EPA 310.2	31-Jul-09/O	58			
Conductivity	µmho/cm	1	SM 2510	31-Jul-09/O	859			
pH	pH Units		EPA 150.1	31-Jul-09/O	6.06			
Colour	TCU	1	SM 2120	06-Aug-09/O	7			
Turbidity	NTU	0.1	SM 2130	07-Aug-09/O	0.4			
UV transmittance	%		In-House	06-Aug-09/K	88.4			
Fluoride	mg/L	0.1	EPA 300.0	31-Jul-09/O	< 0.1			
Chloride	mg/L	0.5	EPA 300.0	31-Jul-09/O	202			
Nitrite (N)	mg/L	0.1	EPA 300.0	31-Jul-09/O	< 0.1			
Nitrate (N)	mg/L	0.1	EPA 300.0	31-Jul-09/O	< 0.1			
Sulphate	mg/L	1	EPA 300.0	31-Jul-09/O	47			
Calcium	mg/L	0.02	SM 3120	06-Aug-09/O	34.6			
Magnesium	mg/L	0.01	SM 3120	06-Aug-09/O	18.7			
Sodium	mg/L	0.2	SM 3120	06-Aug-09/O	96.6			
Potassium	mg/L	0.1	SM 3120	06-Aug-09/O	2.1			
Iron (Total)	mg/L	0.005	SM 3120	06-Aug-09/O	< 0.005			
Manganese (Total)	mg/L	0.001	SM 3120	06-Aug-09/O	0.005			
Silica	mg/L	0.02	SM 3120	06-Aug-09/O	0.42			
Ammonia (N)-Total	mg/L	0.01	EPA 350.2	31-Jul-09/O	< 0.01			
Total Kjeldahl Nitrogen	mg/L	0.05	EPA 351.2	05-Aug-09/O	0.26			
Organic Nitrogen	mg/L	0.05	EPA 351.2	05-Aug-09/O	0.26			
Dissolved Organic Carbon	mg/L	0.2	EPA 415.1	07-Aug-09/O	2.0			
Phenolics	mg/L	0.001	EPA 420.2	05-Aug-09/O	< 0.001			
Tannins and Lignins	mg/L	0.1	SM5500B	11-Aug-09/O	0.2			
Anion Sum	meq/L		Calc.	07-Aug-09/O	7.83			
Cation Sum	meq/L		Calc.	07-Aug-09/O	7.52			

Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

M.D.L. = Method Detection Limit
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,P-Peterborough,M-Moncton

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			Client I.D.:		Surface Water			
			Sample I.D.:		B09-23214-1			
			Date Collected:		26-Jul-09			
Parameter	**Units**	**M.D.L.**	**Reference Method**	**Date/Site Analyzed**				
% Difference	%		Calc.	07-Aug-09/O	2.05			
Ion Ratio	AS/CS		Calc.	07-Aug-09/O	1.04			
Sodium Adsorption Ratio	-		Calc.	07-Aug-09/O	3.29			
TDS(ion sum calc.)	mg/L		Calc.	07-Aug-09/O	436			
Conductivity (calc.)	µmho/cm		Calc.	07-Aug-09/O	852			
TDS(calc.)/EC(actual)	-		Calc.	07-Aug-09/O	0.507			
EC(calc.)/EC(actual)	-		Calc.	07-Aug-09/O	0.991			
Langelier Index(25°C)	S.I.		Calc.	07-Aug-09/O	-2.10			

Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

M.D.L. = Method Detection Limit
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,P-Peterborough,M-Moncton

Appendix B –
QA/QC Program

QUALITY ASSURANCE (QA) AND QUALITY CONTROL (QC)

GUIDELINES

FOR USE BY CLASS "B" LICENSEES IN COLLECTING REPRESENTATIVE WATER SAMPLES IN THE FIELD

AND FOR SUBMISSION OF A QA/QC PLAN

JULY 1996

DEPARTMENT OF INDIAN AND NORTHERN AFFAIRS CANADA
WATER RESOURCES DIVISION
AND THE
NORTHWEST TERRITORIES WATER BOARD

Table of Contents

1.0 Introduction and Definitions

The purpose of this guideline is to provide an outline for Licensees to follow when preparing a site-specific Quality Assurance/Quality Control (QA/QC) plan. The QA/QC plan will help ensure that water samples taken in the field maintain a high degree of quality, so that they accurately reflect the physical and chemical nature of the water being tested.

This guideline is divided into three sections:

1) Sample Collection
2) Sample Handling
3) Lab Analysis

It is recognized that there may be different interpretations as to what is covered by "Quality Assurance/Control" due to the fact that certain Licensees have their own laboratories, while others only use commercial laboratories. For licence purposes, "Quality Assurance" and "Quality Control" refer to the following:

Quality Assurance: is the system of activities designed to better ensure that quality control is done effectively; while

Quality Control: is the use of established procedures to achieve standards of measurement for the three principal components of quality: precision, accuracy and reliability.

2.0 Sample Collection

2.1 Location

A QA/QC plan must identify the locations of all sampling stations and the markers used to identify the stations. If the Surveillance Network Program (SNP) of the Water Licence does not specify sampling locations, locations should be chosen with help from an Inspector.

Buoys and landmarks identify sampling stations in tailings ponds and lakes, while sign post positioning usually marks stream sample stations. Stations should be

used repeatedly, with the same personnel and techniques to reduce operational error. The use of Global Positioning System (GPS) to identify Latitude and Longitude for sampling stations is recommended.

2.2 Sampling Equipment

The Plan must include a detailed section on the equipment used for sampling and the rationale behind the choices of equipment. Equipment and bottles should be selected so that they do not contaminate or otherwise alter the concentrations of parameters of interest.

Sampling devices, sample bottles and filtration devices should be constructed of non-metallic material. Most samples are now collected in containers constructed of high density polyethylene plastic. However, there are some exceptions, when testing for oil and grease or phenols glass containers are to be used. When conducting a fish bioassay, plastic drums are used while hydrocarbon based containers are not to be used for the collection of organic samples.

This section should also identify whether new or used bottles are used for each sample analysis. New bottles are preferred, but sample containers may be used repeatedly with proper handling measures.

If old bottles are used, a detailed description should be included, noting how they are maintained, stored and cleaned. Usually, this will closely resemble the product manufacturer's instructions. An example of how bottles should be cleaned is outlined below:

- Rinse well with hot tap water for one minute or more.
- Empty bottle and add 30% HNO_3 to approximately 1/3 container capacity. Shake well for three to four minutes.
- Rinse vigorously with hot tap water for two minutes.
- Rinse thoroughly three times with tap water and three times with distilled water.
- Store with 0.2% HNO_3 for a minimum of one week.
- Rinse again with distilled water at least three times.

Bottles that are to be used for bacteria testing should be acid washed or autoclaved if possible.

Note: Additional information on bottle washing is also available from Water

Resources Division.

2.3 Sampling Methods

This Section will include details on how the samples are collected and the equipment that is to be used for each section.

In lakes and ponds, regular sample bottles are used the majority of the time, but Van Dorn samples are often utilized. The sample or the sample bottle is usually lowered to mid depth and washed three times before collecting the sample on the fourth submersion. Approximately 2% of the sample container capacity should remain to provide for mixing, preservative addition and thermal expansion.

Stream water sampling is usually done by plunging a sample bottle toward the current and allowing it to fill. Once again, the bottle should be rinsed three times before filling and room should be left for preservative addition and mixing.

A glass bottle should be used when sampling for oil and grease with the sample being collected during the first submersion and not rinsed three times first.

This section should also describe how often field blanks and replicate samples are to be collected. Field blanks are samples of distilled/deionized water that are to be treated in exactly the same manner as the other samples. Blanks should therefore be taken to the field and handled and preserved as part of the sample program. They indicate when a sample may be contaminated and are indicative of general sample integrity. Replicate samples (duplicates and triplicates) are two or three samples collected from the same station at the same time. They help to ensure sample precision at the laboratory.

3.0 Sample Handling

3.1 Preservation

After collection, most samples must be preserved in order to prevent chemical or biochemical changes to the sample. The QA/QC plan must describe how samples from each station are to be preserved.

Preservation is generally done by the addition of certain chemicals into the bottle immediately after the sample is collected. **Table 1** is a general guide to preservatives and their appropriate concentrations. The QA/QC plan should contain more detailed information on the concentrations and amount of preservatives that will be used.

3.2 Sample Identification

The plan should include a description of the system used to identify samples. The system must provide positive sample identification and ensure that the identification is maintained. It is advisable to keep a logbook of samples that have already been delivered.

The identification can be maintained by marking the bottle itself or a label, with a water resistant, non-smear felt pen. The information should be clear to persons uninvolved in the sampling and may include such details as company name, sample area, SNP number, time and date.

3.3 Transportation

The section on transportation will describe how sample integrity will be ensured from the time of collection to completion of delivery. Delivery to the lab should be done as soon as possible after the samples have been collected.

Usually, samples are sealed and stored upright in a box with other samples to provide a snug, immobile storage space during transfer. Any samples that require refrigeration for preservation should be kept cool during transport.

4.0 Lab Analysis

4.1 Lab Accreditation

The Licensee will identify in the plan the name of the commercial laboratory that will be conducting the analyses. A letter must be provided from the commercial lab indicating that they are accredited to conduct analyses on each of the required sampling parameters. Ideally, the lab should be accredited by the Canadian Associated for Environmental Analytical Laboratories (C.A.E.A.L.) and should

provide a certificate stating parameters for which they are accredited.

4.2 Detection Limits

Detection limits for the commercial lab should be identified for all parameters and should be reported when any SNP data is submitted.

4.3 Methodology

Descriptions should be included for any methods of analysis used that are not outlined in "Standard Methods for the Examination of Water and Wastewater".

4.4 Reporting Requirements

The Licensee shall outline the number of replicate samples that will be collected and submitted with each SNP report. It is recommended that one set of duplicates or triplicates from an assigned SNP site, as well as the results from field blanks, be submitted with each required SNP report. These will serve as an internal/external check for the Licensee and the commercial lab.

FOR FURTHER INFORMATION, CONTACT THE WATER RESOURCES DIVISION AT:

Box 1500
Yellowknife, NWT
X1A 2R3
(403)669-2651 Phone
(403)669-2716 Fax

Appendix 1
Table 1: General Summary of Special Sampling or Handling Techniques

Determination	Container	Minimum Sample Size (ml)	Preservation	Maximum Storage Recommended
BOD	Sterile polyethylene	1000	Refrigerate 4°C	24 hours
Conductivity	Polyethylene	500	Refrigerate 4°C	28 days
Total Cyanide	Polyethylene	500	Add NaOH to raise pH>12 refrigerate in dark	24 hours
Hardness	Polyethylene	100	Add Conc. HNO_3 to lower pH<2 OR (*) unpreserved	6 months
Metals, General	Polyethylene	250	For dissolved metals filter immediately, add Conc. HNO_3 to pH<2	6 months
Mercury	Glass (rinsed with 1 + 1 HNO_3)	500	Add Conc. HNO_3 or pH<2 or H_2SO_4 + 1 ml of 5% $K_2Cr_2O_7$, refrigerate 4°C	28 days
Nitrogen				
Ammonia	Polyethylene	500	Analyze as soon as possible or add H_2SO_4 to pH<2, refrigerate OR (*) unpreserved	7 days
Nitrate	Polyethylene	100	Analyze as soon as possible or refrigerate	48 hours
Oil and Grease	Glass or wide-mouth calibrated	1000	Add H_2SO_4 to pH<2, refrigerate	28 days
pH	Polyethylene	--	Analyze immediately	2 hours
Suspended Solids	Polyethylene	--	Refrigerate	7 days
Temperature	Polyethylene	--	Analyze immediately	0
Turbidity	Polyethylene	--	Analyze same day; store in dark up to 24 hours, refrigerate	24 hours
Bacteria	Polyethylene (sterilized)	--	None: Keep cool	6 - 48 hours

(*) Unpreserved = check with lab that will be analyzing the samples

Appendix 2

References:

Gilbert, Andrew (1993). "Echo Bay Mines Ltd. Environmental Laboratory Quality Assurance Plan".

Soniassy, R. (1980). "A Guide for the Collection of Water and Effluent Samples"; pp 1-16; INAC

"Standard Methods for the Examination of Water and Wastewater" (1989); AHPA, AWWA and WPCF, 17th edition.

Water Resources Division, Indian and Northern Affairs Canada (1990). "Generic Quality Assurance (QA) Plan Guidelines for Use by the Licensees in Meeting SNP Requirements for Submission of a QA Plan"; INAC.

Appendix C –
Testing and Certification

MOSHER ENGINEERING LTD.

Document Transmittal 186-74
Electronic Copy

Trow Associates Inc.
154 Colonnade Road South
Ottawa, ON
K2E7J5
Attention: Stephen Douglas
Ph: (613) 225-9940
Fax:(613) 225-7337

Contractor:
Mosher Engineering Ltd.
1869 Upper Water Street
Suite AH202,
Halifax, NS
B3J 1S9
Tel: (902) 429-0272
Fax: (902) 429-7762
Contact: Marc Losier

Date Submitted :
January 12, 2011

Project Title :
Sanikiluaq New Water Truck Fill Station

DESCRIPTION	Section or Drawing	# of Sheets
Fire Alarm Certificate of Verification	28 31 00 3.4	15

Comments:

Chubb EDWARDS

A UTC Fire & Security Company

17336

Certificate of Verification

THIS CERTIFIES that the Fire Alarm equipment

installed by KRT Electrical LTD

in accordance with the specifications prepared by

for WATER TRUCK FILL STATION

located at Sanikiluaq, Nunavut

was checked and inspected by a trained technician

Issued: DECEMBER 14TH 2010

in accordance with the conditions on the reverse. **See Notes**

All fire alarm systems must be properly maintained and subjected to periodic test and inspections under the applicable Fire Codes within your jurisdiction.

Branch Service Manager/Supervisor

Chubb Edwards, a UTC
Fire & Security Company

General Manager – Canada

Chubb EDWARDS
A UTC Fire & Security Company

FIRE ALARM SYSTEM VERIFICATION REPORT

BUILDING NAME AND ADDRESS :**WATER TRUCK FILL STATION, SANIKILUAQ, NUNAVUT**		
DATE : 14 DECEMBER 2010	SINGLE STAGE ☒	TWO STAGE ☐
SYSTEM MANUFACTURER :	MODEL NUMBER QS45	
BUILDING NUMBER :	PROPOSITION NUMBER. : 27-210-4005	

1. THIS IS TO CERTIFY THAT THE FIRE ALARM SYSTEM HAS BEEN VERIFIED IN ACCORDANCE WITH THE STANDARD FOR THE VERIFICATION OF FIRE ALARM SYSTEMS, CAN/ULC-S537M, AND THESE RECORDS DOCUMENT THE RESULTS OF TESTING AND INSPECTION PERFORMED. YES ☒ NO ☐

2. THE FIRE ALARM SYSTEM NOW CONFORMS TO THE DOCUMENTED DESCRIPTION OF THE SYSTEM. N/A ☐ YES ☒ NO ☐

3. THE FIRE ALARM SYSTEM IS NOW FULLY FUNCTIONAL. YES ☒ NO ☐

4. THE FIRE ALARM SYSTEM IS CORRECTLY LABELLED AS BEING 'VERIFIED IN ACCORDANCE WITH CAN/ULC-S537M'. YES ☒ NO ☐

5. VERIFICATION LABEL SERIAL NUMBER 27-210-4005

6. A COPY OF THIS REPORT HAS BEEN GIVEN TO WHO IS THE OWNER, OR OWNER'S REPRESENTATIVE FOR THIS BUILDING. YES ☐ NO ☐

THIS RECORD IS TO BE MAINTAINED BY THE BUILDING OWNER

Printed name and signature of primary or Technician conducting test	Company	Telephone
GILLES ANDRÉ GRENIER	Chubb EDWARDS	**(514) 321-9961**
Printed name and signature of technician Conducting test	Company	Telephone
Printed name and signature Of designer	Company	Telephone

Unless there is a specific contract for extra work, testing of ancillary devices other than operation of the fire alarm system relays are excluded from this verification.

Chubb EDWARDS
A UTC Fire & Security Company

FIRE ALARM SYSTEM VERIFICATION REPORT

1 Do you have a city tie? If so, take the necessary steps to alert the central station, fire department, etc... Do not use the fire department emergency telephone number. YES☒ NO☐

Date	Time out	Time in	Person contacted at the central station or fire department

2 Do you have auxiliary functions that can impair building functions, such as elevator capture, fan shutdown, door holders, etc? YES☒ NO☐

3 Can these be disabled and tested by groups? YES☒ NO☐

4 Have building occupants been made aware of fire alarm testing? YES☒ NO☐

5 Has a pre-determined time been established for testing signaling devices? YES☒ NO☐

6 Have provisions been made for acquiring access to the secured areas of the building? YES☒ NO☐

7 Has an alternative plan been established to alert building occupants and the local fire department should an actual fire condition occur during testing? YES☒ NO☐

Chubb EDWARDS
A UTC Fire & Security Company

FIRE ALARM SYSTEM VERIFICATION REPORT

Every line must have the appropriate marking in the space provided

1 Documentation

1.1	Documentation for the fire alarm system is on site and is located: IN F.A.P	YES

Fire alarm system documentation includes:

1.2	Instruction for resetting the system and silencing the alarm signals.	YES
1.3	Instruction for silencing the trouble signal, and action to be taken when the trouble signal sounds.	YES
1.4	Description of the function of each operating control and indicator on the fire alarm control unit.	YES
1.5	Description of the area of fire zone protected by each alarm detection circuit. (This may be in form of a list or plan drawings for the building).	YES
1.6	Description of alarm signal operation.	YES
1.7	Description of ancillary equipment controlled by the fire alarm system.	YES

2 Data communications Link Test

2.1	System abnormal conditions occur as detailed in table 1 of CAN/ULC-S537-M97.	N/A
2.2	Alarm and trouble conditions are received at control unit under a single ground on each conductor independently.	N/A
2.3	An alarm signal is received by the control unit from both sides of a single open fault condition.	N/A
2.4	A mire-to-wire short on a DCL in each floor area, does not inhibit the receipt of trouble and alarm signals from another floor area on the same loop.	N/A

3 Circuits Utilizing Power From System-Test and Inspection

3.1	The field device at the furthest point from the power source (in every circuit) receives rated power according to manufacturers specifications.	YES
3.2	Replacement over current protection devices are of correct rating as per manufacturers specification.	YES

4 Wiring Inspection

4.1	Wire type and gauge are in accordance with the equipment manufacturer's installation specifications at all termination points.	YES

5 Field Device and Test Related Circuits – Test and Inspection

5.1	Installed in accordance with the design and CAN/ULC-S524, Standard for the Installation of Fire Alarm Systems.	YES
5.2	Correct device operation confirmed. (alarm, trouble, supervisory & annunciation)	YES
5.3	Zone, circuit number or address recorded.	YES
5.4	Conventional field device locations recorded.	YES
5.5	Active and supporting field devices: correct DCL, address and location recorded	YES

5.6	Supervision of field wiring confirmed for all field devices.	YES
5.7	Correct field termination and wiring size confirmed.	YES
5.8	Correct circuit polarities confirmed.	YES
5.9	An open circuit fault on a conventional device circuit causes a trouble signal.	YES
5.10	Removal of any active or supporting field device causes a trouble signal.	YES
5.11	For class A circuits, the removal of the return wire from the control unit has been tested at the electrically furthest point in the circuit.	N/A
5.12	Ground fault indications occur when tested at the electrically furthest field device, and do not result in a normal to off-normal device status indicating change.	YES
5.13	One contact device and one non-contact device have been tested for operation and annunciation at the control unit when using a field verifying device.	YES
5.14	Longest time delay between 10% (or 6) manual pull station is: N.A seconds	
5.15	Control unit visual indications are acceptably colored.	YES

6 Remote Trouble Unit Test and Inspection

6.1	Input wiring from control unit is supervised	N/A
6.2	Visual trouble signal.	N/A
6.3	Audible trouble signal.	N/A
6.4	Audible trouble signal silence.	N/A

7 Control Unit Test

7.1	Power 'ON' visual indicator.		YES
7.2	Common visual trouble signal.		YES
7.3	Common audible trouble signal		YES
7.4	Trouble signal silence switch.		YES
7.5	Main power supply failure trouble signal.		YES
7.6	Ground fault trouble indication (tested on positive & negative).		YES
7.7	Alert signal operation (first stage).	Rate :	N/A
7.8	Alarm signal operation.	Rate : 3-3-3 (Generated by the panel)	YES
7.9	Automatic transfer from alert to alarm signal. Min.	minutes	N/A
7.10	Automatic Evacuation Cancel switch operation confirmed.		N/A
7.11	Alarm signal silence inhibit.	60 seconds	YES
7.12	Alarm signal silence operation.		YES

7.13	Alarm signal silence visual indication.		YES
7.14	Alarm signals, when silenced, automatically reinitiate upon subsequent alarms.		YES
7.15	Automatic signal silence timer.	_____ minutes	N/A
7.16	Audible and visual alarms signals operate per design and specification.		YES
7.17	Alarm and supervisory circuit operation, including annunciation.		YES
7.18	Input circuit trouble operation.		YES
7.19	Output circuit alarm operation.		YES
7.20	Output circuit trouble operation.		YES
7.21	Visual indicator test. (lamp test)		YES
7.22	Coded signal sequences operate not less than the required number of times and the correct alarm signal operates thereafter.		N/A
7.23	Coded signal sequences are not interrupted by subsequent alarms.		N/A
7.24	Ancillary devices are programmed and operated as per design and specification		N/A
7.25	Input circuit to output circuit correlations are programmed as per design and specification.		YES
7.26	Reset operation confirmed.		YES
7.27	Main power supply to emergency power transfer.		YES
7.28	Control unit bonded to ground.		YES
7.29	Transponder serves the same area for both input and output circuits.		N/A
7.30	Transponder operates in stand-alone mode as per design and specification.		N/A
7.31	Status change confirmation feature (smoke detectors only) verified.		YES
7.32	Control unit interconnection to monitoring station confirmed.		N/A

8 Control Unit Inspection

8.1	Input circuit designations correctly identified in relation to connected field wiring.		YES
8.2	Output wiring designations correctly identified in relation to connected field wiring.		YES
8.3	Designations for common control functions and indications.		YES
8.4	Cabinet plug-in components and modules securely in place.		YES
8.5	Plug-in cables securely in place.		YES
8.6	Record date, revision and revision of firmware and software.	Version : N/A Revision: N/A Date : N/A	
8.7	Cleanliness.		YES
8.8	Fuses in accordance with manufacturers specifications.		YES

8.9	Control unit lock functional.	YES
8.10	Wiring from field devices securely connected at terminal points.	YES
8.11	Control unit power disconnects in accordance with The Canadian Electrical Code.	YES
8.12	Main power supply feed wiring in accordance with manufacturers specifications.	YES

9 Voice Communications Test

9.1	Power 'ON' indicator.	N/A
9.2	Common visual trouble signal.	N/A
9.3	Common audible trouble signal.	N/A
9.4	Trouble signal silence switch.	N/A
9.5	All-call voice paging, including visual indicator.	N/A
9.6	Output circuits for selective voice paging, including visual indication.	N/A
9.7	Voice paging output circuit trouble indication, including visual indication.	N/A
9.8	Microphone, including press to talk switch.	N/A
9.9	Operation of voice paging does not interfere with the initial inhibit time of alert signal and alarm signal.	N/A
9.10	All-call voice paging system operates on emergency power back-up supply.	N/A
9.11	Upon failure of one amplifier the system automatically transfers to back-up amplifier(s).	N/A
9.12	Circuits for emergency telephone call-in operation, including audible and visual indication.	N/A
9.13	Circuits for emergency telephone call-in operation, including two way voice communication.	N/A
9.14	Circuits for emergency telephone call-in trouble operation, including visual indication.	N/A
9.15	Emergency telephone operable and is-use tomes functioning at handsets	N/A

10 Power Supply Inspection

10.1	Conforms to the requirements of CAN/ULC-S524 and The Canadian Electrical Code section 32.	YES
10.2	Fused in accordance with the manufacturers marked rating for the system.	YES
10.3	Equipped with identified disconnect means.	YES
10.4	Adequate to meet requirements of the system.	YES
10.5	Power for ancillary devices is taken from a source separate from the fire alarm power supply.	YES
10.6	Power for ancillary devices is taken from the control unit and is designed to supply such power.	YES
10.7	Ancillary devices powered from the control unit are recorded.	YES

11 Emergency Power Supply Test and Inspection

11.1 Location : F.A.P.

11.2 Type : 2 X 12 Volts _____ A/h

11.3	Correct battery type as recommended by manufacturer.	YES
11.4	Correct battery rating as determined by battery calculations based on full system load.	YES
11.5	Battery voltage – main power supply ON:	26.98 Volts dc
11.6	Battery charging current:	79 mA
11.7	Battery voltage and current with main system power OFF an panel in supervisory condition:	25.95 Volts dc
		NA mA
11.8	Battery voltage and current with main system power OFF and panel in full load condition:	25.7 Volts dc
		NA mA
11.9	Batteries inspected for physical damage.	YES
11.10	Terminals cleaned and lubricated.	YES
11.11	Terminals terminated correctly and clamped tighly.	YES
11.12	Correct electrolyte levels.	N/A
11.13	Specific gravity of the electrolyte is within manufactures specifications,	N/A
11.14	Batteries adequately ventilated.	YES
11.15	Within manufacturers rated life date code.	YES
11.16	Disconnecting causes trouble signal.	YES
11.17	Provides required power for its entire duration under full load.	YES

12 Printer Test

12.1	Operates as intended.	N/A
12.2	Zone description for each alarm initiating device is correctly printed	N/A
12.3	Rated printer voltage is present.	N/A

13 Printers in a Proprietary System – Test and Inspection

13.1	Events and acknowledgements are automatically printed complete with time and date.	N/A
13.2	Each event is recorded as they occur, irrespective of the order of event acknowledgement.	N/A
13.3	System records status changes without the loss of any data.	N/A
13.4	Paper advances automatically such that printed record is visible	N/A.
13.5	Printer operates under loss of main power supply.	N/A

13.6	Printer is monitored for low paper, and paper out conditions.	N/A

14 Sequential Display and Inspection

14.1	Individual alarm, supervisory and trouble inputs are clearly indicated and separately designated.	YES
14.2	Individual alarm and supervisory input designation labels are properly identified.	YES
14.3	Alarm input overrides supervisory and trouble inputs.	YES
14.4	Supervisory input overrides trouble inputs.	YES
14.5	Display can be manually advanced.	YES
14.6	First alarm is continuously displayed until manually advanced.	YES
14.7	First alarm is clearly identified each time it is displayed.	YES
14.8	Alarm and supervisory inputs can be retrieved until system is reset.	YES
14.9	Data communications link is properly installed.	YES
14.10	Operates on emergency power for required duration.	YES
14.11	Means to manually advance alarm, supervisory and trouble events independently, one event at a time.	YES
14.12	Means to advance display is openly accessible at all times.	YES
14.13	Display advance means does not interfere with operation of control unit.	YES
14.14	Alarm events manually advance in order of occurrence.	YES
14.15	Display advance means clearly identified.	YES
14.16	Visual indication that multiple alarm and/or supervisory conditions exist simultaneously.	YES
14.17	Alarm and supervisory inputs are not interleaved and/or displayed simultaneously unless the inputs utilize the following display colors: Alarm input — Red Supervisory input — YELLOW Trouble input — YELLOW Power input — GREEN	
14.18	Display of status of all inputs capable of being manually controlled as required.	YES
14.19	Short circuit fault, open fault or ground fault on extended circuit serving display means (not part of required display for control unit – e.g. CCA, CGP) does not affect operation of control unit.	YES

15 Annunciator Test and Inspection

15.1	Power ON indicator.	N/A
15.2	Individual alarm and supervisory zone indication.	N/A
15.3	Individual alarm and supervisory zone labels are properly identified.	N/A
15.4	Common trouble signal.	N/A
15.5	Visual indicator test (lamp test).	N/A

15.6	Input wiring from control unit is supervised	N/A
15.7	Alarm signal silence visual indicator.	N/A
15.8	Switches for ancillary functions operate as per design and specifications.	N/A
15.9	Other ancillary functions visual indicators.	N/A
15.10	Manual activation of alarm signal indication.	N/A
15.11	Displays are visible in installed location.	N/A

Chubb EDWARDS
A UTC Fire & Security Company

FIRE ALARM SYSTEM VERIFICATION REPORT

Devices	Description	Quantity	Model number
M	Manual pull station	2	270 SPO
RHT	Heat detector – Rate-of-rise		
HT	Heat detector – Fixed	3	281 BPL
S	Smoke detector		
RI	Remote indicating unit		
DS	Duct smoke detector		
	Other type of detector		
SFD	Supporting field device		
FS	Sprinkler flow switch		
SS	Sprinkler supervisory		
EM	Fault isolation module		
B	Bell		
H	Horn	3	757-8A-T-GIR-HDVM
V	Visual signal appliance		
SP	Cone type speaker		
HSP	Horn style speaker		
AD	Ancillary device		
ET	Emergency telephone	8	ZR8

Comments :

NOTE # 1: DRAWING USED: # E1, FEB 2010, PROJECT: # 08-2019

NOTE # 2: THE PULL STATION WAS RELOCATED AND ISNT AS PRES DRAWING # E1

NOTE # 3: RELAY # 5 (010205) IS ISSUED TO ACTIVATE A 120 RELAY COIL FOR THE AHU SHUT DOWN

NOTE # 4: THE DIALER IS INSTALLED BUT THE TELEPHONE LINE ISNT THERE.

DECEMBER 16 2010: WEVE TESTED THE TRANSMISSION OF THE SIGNAL FROM F.A.P TO PHONE LINE (867)-266-8387

Chubb EDWARDS
A UTC Fire & Security Company

✓ Verification
____ PMA

McMURRAY
CANADIAN FIRE ALARM ASSOCIATION

BUILDING : WATERFILL STATION

PROPOSITION NO. : 27-210-4005

Location		Device	Address	Circuit Number	Sprinkler flow delay	Smoke Detector sensitivity	Correctly Installed	Missing	Requires Service or Repairs	Alarm Operation Confirmed	Annunciation Indication Confirmed	Supervision/Ground Fault Confirmed		
GENERATOR ROOM		QS-4					✓			✓	✓	✓		NOTE 1
ZONE # 1			01 01 01				✓			✓	✓	✓		
GENERATOR ROOM		281B-PL	01 01 01				✓			✓	✓	✓		
GENERATOR ROOM		270 SPO	01 01 01				✓			✓	✓	✓		NOTE 2
GENERATOR ROOM		EOL	01 01 01				✓			✓	✓	✓		
ZONE # 2														
PUMP ROOM		281B-PL	01 01 02				✓			✓	✓	✓		
PUMP ROOM		281B-PL	01 01 02				✓			✓	✓	✓		
PUMP ROOM		270 SPO	01 01 02				✓			✓	✓	✓		
PUMP ROOM		EOL	01 01 02				✓			✓	✓	✓		
ZONE # 3														
ALARM ZONE, SPARE		EOL	01 01 03				✓			✓	✓	✓		
ZONE # 4														
ALARM ZONE, SPARE		EOL	01 01 04				✓			✓	✓	✓		
ZONE # 5														
ALARM ZONE, SPARE		EOL	01 01 05				✓			✓	✓	✓		
ZONE # 6														
ALARM ZONE, SPARE		EOL	01 01 06				✓			✓	✓	✓		
ZONE # 7														
ALARM ZONE, SPARE		EOL	01 01 07				✓			✓	✓	✓		

Inspection : 100 Technician : GILLES ANDRÉ GRENIER Date : 2010/12/14

Chubb EDWARDS
A UTC Fire & Security Company

✓ Verification
____ PMA

MEMBER CANADIAN FIRE ALARM ASSOCIATION

BUILDING : WATERFILL STATION

PROPOSITION NO. : 27-210-4005

Page 2 OF 4

Location		Device	Address	Circuit Number	Sprinkler flow delay	Smoke Detector sensitivity	Correctly Installed	Missing	Requires Service or Repairs	Alarm Operation Confirmed	Annunciation Indication Confirmed	Supervision/Ground Fault Confirmed	
ZONE # 8													
ALARM ZONE, SPARE		EOL	01 01 08				✓			✓	✓	✓	
ZONE # 9													
ALARM ZONE, SPARE		EOL	01 01 09				✓			✓	✓	✓	
ZONE # 10													
SUPV. ZONE, SPARE		EOL	01 01 10				✓			✓	✓	✓	
ZONE # 11													
SUPV. ZONE, SPARE		EOL	01 01 11				✓			✓	✓	✓	
ZONE # 12													
SUPV. ZONE, SPARE		EOL	01 01 12				✓			✓	✓	✓	
SIGNAL CCT # 1													
HORN AND STROBE													
EXTERIOR FRONT WALL		757-8A-T	01 01 13				✓			✓	✓	✓	
GENERATOR ROOM		GIR-HDVM	01 01 13				✓			✓	✓	✓	
PUMP ROOM		GIR-HDVM	01 01 13				✓			✓	✓	✓	
PUMP ROOM		EOL	01 01 13				✓			✓	✓	✓	
SIGNAL CCT # 2													
SPARE		EOL	01 01 14				✓			✓	✓	✓	
SIGNAL CCT # 3													
SPARE		EOL	01 01 15				✓			✓	✓	✓	
SIGNAL # 4													
SPARE		EOL	01 01 16				✓			✓	✓	✓	

Inspection : 100 Technician : GILLES ANDRÉ GRENIER Date : 2010/12/14

Chubb EDWARDS
A UTC Fire & Security Company

✓ Verification
____ PMA

MEMBER CANADIAN FIRE ALARM ASSOCIATION

BUILDING : WATERFILL STATION

PROPOSITION NO. : 27-210-4005

Location	Device	Address	Circuit Number	Sprinkler flow delay	Smoke Detector sensitivity	Correctly Installed	Missing	Requires Service or Repairs	Alarm Operation Confirmed	Annunciation Indication Confirmed	Supervision/Ground Fault Confirmed	
AUX RELAY	ZR8	01 02				✓		✓	✓	✓		
AUX RELAY 1 SPARE	DRY CONTACT N.O	01 02 01				✓		✓	✓	✓		
RELAY # 2 SPARE	N.O	01 02 02				✓		✓	✓	✓		
RELAY # 3 SPARE	N.O	01 02 03				✓		✓	✓	✓		
RELAY # 4 SPARE	N.O	01 02 04				✓		✓	✓	✓		
RELAY # 5: AHV	SHUT DOWN					✓		✓	✓	✓		COIL 120 VAC (NOTE
AHU SHUT DOWN	N.C. CONT.	01 02 05				✓		✓	✓	✓		
RELAY # 6 SPARE	N.C	01 02 06				✓		✓	✓	✓		
RELAY # 7 SPARE	N.C	01 02 07				✓		✓	✓	✓		
RELAY # 8 SPARE	N.C	01 02 08				✓		✓	✓	✓		
COMMON RELAY												
ALARM RELAY	DIALER											
SIGNAL FOR DIALER	N.O. CONT.					✓		✓	✓	✓		NOTE 4
SUPV. RELAY	SPARE					✓		✓	✓	✓		
TROUBLE RELAY	SPARE					✓		✓	✓	✓		
PROG RELAY	SPARE					✓		✓	✓	✓		

Inspection : 100 Technician : GILLES ANDRÉ GRENIER Date : 2010/12/14

Chubb EDWARDS
A UTC Fire & Security Company

✓ Verification
____ PMA

MEMBER
CANADIAN FIRE ALARM ASSOCIATION

BUILDING : WATERFILL STATION

PROPOSITION NO. : 27-210-4005

Location	Device		Address	Circuit Number	Sprinkler flow delay	Smoke Detector sensitivity	Correctly Installed	Missing	Requires Service or Repairs	Alarm Operation Confirmed	Annunciation Indication Confirmed	Supervision/Ground Fault Confirmed	

Inspection : 100 Technician : GILLES ANDRÉ GRENIER Date : 2010/12/14

MOSHER ENGINEERING LTD.

Document Transmittal 186-75
Electronic Copy

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154 Colonnade Road South
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K2E7J5
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Ph: (613) 225-9940
Fax:(613) 225-7337

Contractor:
Mosher Engineering Ltd.
1869 Upper Water Street
Suite AH202,
Halifax, NS
B3J 1S9
Tel: (902) 429-0272
Fax: (902) 429-7762
Contact: Marc Losier

Date Submitted :
January 24, 2011

Project Title :
Sanikiluaq New Water Truck Fill Station

DESCRIPTION	Section or Drawing	# of Sheets
Chlorine System Commissioning Report		15

Comments:

START-UP REPORT

PROJECT	**: SANIKILUAQ NUNAVIT TRUCK FILL STATION**
METCON JOB NO.	**: 10-S005414**
CONTRACTORS NAME	**: MOSHER ENGINEERING**
START-UP DATE	**: DECEMBER 6-10, 2010**
SERVICE REP.	**: JEREMY STEVENS**
SUBJECT	**: CHEMICAL FEED AND MEASUREMENT EQUIPMENT**

OPERATOR TRAINING

Paul and Mark were present and trained on the operation and maintenance of the equipment.

PRE CHLORINE ANALYZER

Model	: D1CAW1C11014G020E
Serial No.	: 201001002
Probe Type	: CLE @ 5ppm, S/N 02385
Cl Cal. Slope	: 2.36mA/ppm (0.90ppm smpl)
pH probe type	: Unformer s/n # 3010042011
pH slope	: 56.04mv/ph @ 11.8mV
Analog Output 1	: 4-20mAmps @ 5ppm to PLC
Analog Output 2	: 4-20mAmps control out 0-100%
Xp	: 8%
Ti	: 30secs

POST CHLORINE ANALYZER

Model	: D1CAW1C11014G020E
Serial No.	: 201000988
Probe Type	: CLE @ 5ppm, S/N 2384
Cl Cal. Slope	: 2.40mA/ppm (0.80ppm smpl)
pH probe type	: Unformer s/n # 3010042031
pH slope	: 56.67mv/ph @ 10.6mV
Analog Output	: 4-20mAmps @ 5ppm to PLC
Analog Output 2	: 4-20mAmps control out 0-100%
Xp	: 7%
Ti	: 30secs

FIRE CHLORINE ANALYZER

Model	: D1CAW1C11014G020E
Serial No.	: 201000994
Probe Type	: CLE @ 5ppm, S/N 02382
Cl Cal. Slope	: 2.20mA/ppm (0.75ppm smpl)
pH probe type	: Unformer s/n # 3010041988
pH slope	: 56.80mv/ph @ 4.0mV
Analog Output 1	: 4-20mAmps @ 5ppm to PLC
Analog Output 2	: 4-20mAmps control out 0-100%
Xp	: 8%
Ti	: 30secs

HARMSCO FILTERS

Model	: HUR3X170FL
S/n #'s	: 20 micron (00086), 5 micron (0089), 1 micron (0088), 1 micron (0087)

1555 St. James Street, Suite 113 • Winnipeg, Manitoba, Canada R3H 1B5
P 204.774.5552 • **F** 905.738.5520 • **E** metcon@metconeng.com • **W** www.metconeng.com

PRE NaOCl PUMP SYSTEM

Equipment	: Two (2) Prominent Metering Pumps
Model No.	: DLTA0730PVT2000UDG130EN0
Serial No.	: 2710010742 (CMP 02) & 2710010750 (CMP-03)
Backpressure Valve Setting (1pc)	: 30 psi
Pressure Relief Valve Setting (2pcs)	: 50 psi
Maximum Pump Capacity	: 29.20 litres/hour
SurefeedPump Control	: analog 4-20mAmps from chlorine analyzer

POST NaOCl PUMP SYSTEM

Equipment	: Two (2) Prominent Metering Pumps
Model No.	: DLTA0730PVT2000UDG130EN0
Serial No.	: 2710010744 (CMP 04) & 2710010752 (CMP-05)
Backpressure Valve Setting (1pc)	: 30 psi
Pressure Relief Valve Setting (2pcs)	: 50 psi
Maximum Pump Capacity	: 29.20 litres/hour
SurefeedPump Control	: analog 4-20mAmps from chlorine analyzer

FIRE NaOCl PUMP SYSTEM

Equipment	: One (1) Prominent Metering Pump
Model No.	: DLTA0730PVT2000UDG130EN0
Serial No.	: 2710010753 (CMP 01)
Backpressure Valve Setting (1pc)	: 30 psi
Pressure Relief Valve Setting (1pc)	: 50 psi
Maximum Pump Capacity	: 29.20 litres/hour
SurefeedPump Control	: analog 4-20mAmps from chlorine analyzer

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PRE SODIUM HYPOCHLORITE PANEL

STROKE FREQ %	STROKE LENGTH %	MODEL # DLTA0730PVT2000UDG130EN0	CAPACITY IN L/HR	CAPACITY IN L/HR
		SERIAL #	2710010742	2710010750
100	100		29.30	29.65
75	100		21.98	22.24
50	100		14.65	14.83
25	100		7.33	7.41
100	75		21.97	22.24
75	75		16.48	16.68
50	75		10.99	11.12
25	75		5.49	5.56
100	50		14.94	15.12
75	50		11.21	11.34
50	50		7.47	7.56
25	50		3.74	3.78
100	25		7.61	7.91
75	25		5.71	5.93
50	25		3.81	3.96
25	25		1.90	1.98

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PUMP START UP RECORD

SITE:	SANIKILUAQ NUNAVIT TRUCK FILL
DATE:	DECEMBER 6-10, 2010
CUSTOMER NAME:	MOSHER ENGINEERING
MODEL # :	DLTA0730PVT2000UDG130EN0
SERIAL NUMBER:	2710010742
CHEMICAL USED:	SODIUM HYPOCHLORITE
MAX CAPACITY:	29.20 L/H
@ MAX BACK PRESSURE:	102 PSI
PRESSURE RELIEF VALVE SETTING:	50 PSI
BACK PRESSURE VALVE SETTING:	30 PSI
SIZE OF CALIBRATION COLUMN:	500ML
TECHNICIAN NAME:	JEREMY STEVENS
SIGNATURE:	

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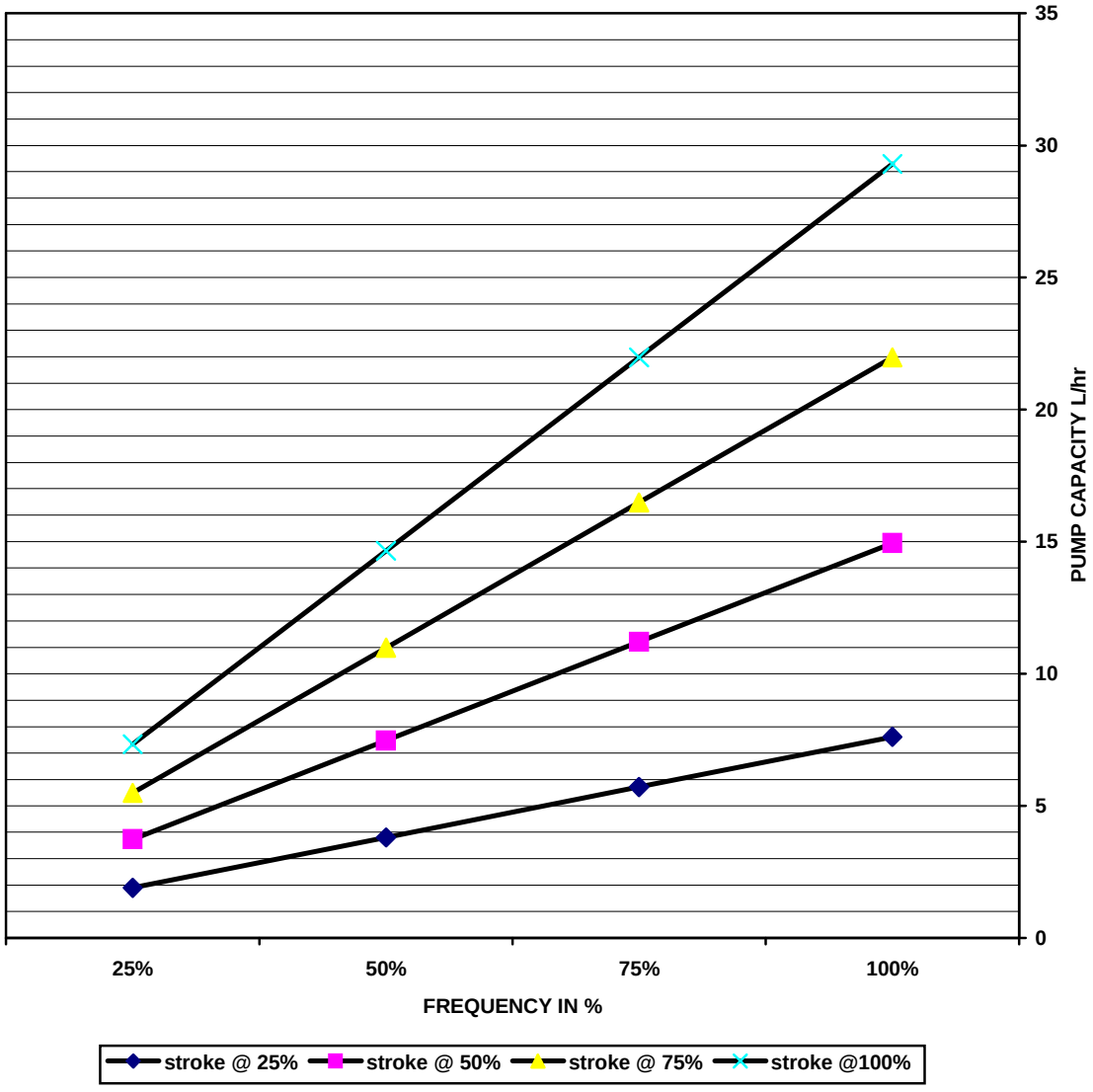
SANIKILUAQ NUNAVIT PRE SODIUM HYPOCHLORITE
SYSTEM
10-S005414
DLTA0730PVT
2710010742



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SALES & ENGINEERING LTD.

PUMP START UP RECORD

SITE:	SANIKILUAQ NUNAVIT TRUCK FILL
DATE:	DECEMBER 6-10, 2010
CUSTOMER NAME:	MOSHER ENGINEERING
MODEL # :	DLTA0730PVT2000UDG130EN0
SERIAL NUMBER:	2710010750
CHEMICAL USED:	SODIUM HYPOCHLORITE
MAX CAPACITY:	29.20 L/H
@ MAX BACK PRESSURE:	102 PSI
PRESSURE RELIEF VALVE SETTING:	50 PSI
BACK PRESSURE VALVE SETTING:	30 PSI
SIZE OF CALIBRATION COLUMN:	500ML
TECHNICIAN NAME:	JEREMY STEVENS
SIGNATURE:	

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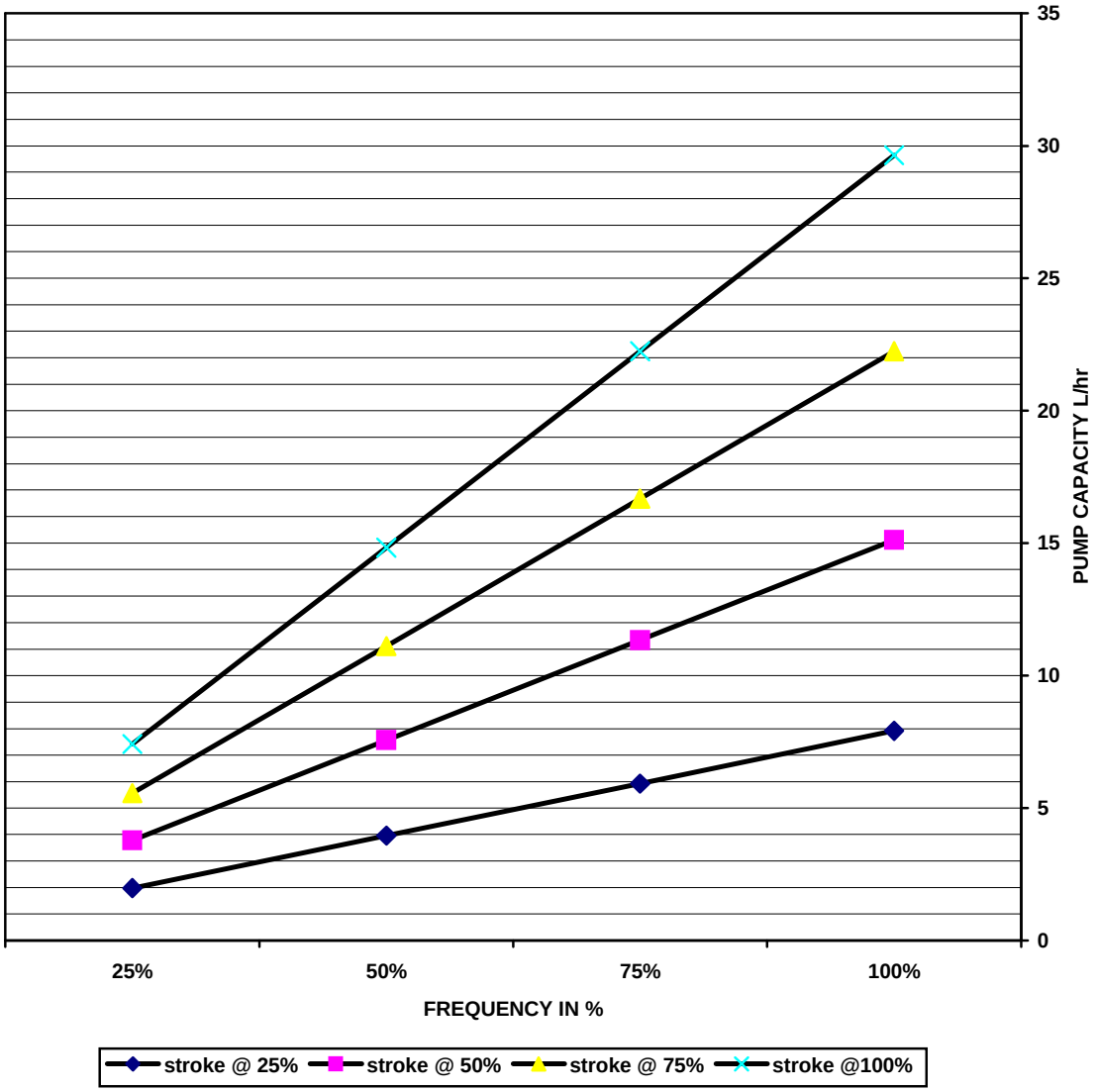
SANIKILUAQ NUNAVIT PRE SODIUM HYPOCHLORITE SYSTEM
10-S005414
DLTA0730PVT
2710010750



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POST SODIUM HYPOCHLORITE PANEL

STROKE FREQ %	STROKE LENGTH %	MODEL # DLTA0730PVT2000UDG130EN0	CAPACITY IN L/HR	CAPACITY IN L/HR
		SERIAL #	2710010744	2710010752
100	100		30.00	29.01
75	100		22.50	21.76
50	100		15.00	14.51
25	100		7.50	7.25
100	75		22.50	21.46
75	75		16.88	16.10
50	75		11.25	10.73
25	75		5.63	5.37
100	50		15.29	14.50
75	50		11.47	10.88
50	50		7.65	7.25
25	50		3.82	3.63
100	25		7.79	7.25
75	25		5.84	5.44
50	25		3.90	3.63
25	25		1.95	1.81

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PUMP START UP RECORD

SITE:	SANIKILUAQ NUNAVIT TRUCK FILL
DATE:	DECEMBER 6-10, 2010
CUSTOMER NAME:	MOSHER ENGINEERING
MODEL # :	DLTA0730PVT2000UDG130EN0
SERIAL NUMBER:	2710010744
CHEMICAL USED:	SODIUM HYPOCHLORITE
MAX CAPACITY:	29.20 L/H
@ MAX BACK PRESSURE:	102 PSI
PRESSURE RELIEF VALVE SETTING:	50 PSI
BACK PRESSURE VALVE SETTING:	30 PSI
SIZE OF CALIBRATION COLUMN:	500ML
TECHNICIAN NAME:	JEREMY STEVENS
SIGNATURE:	

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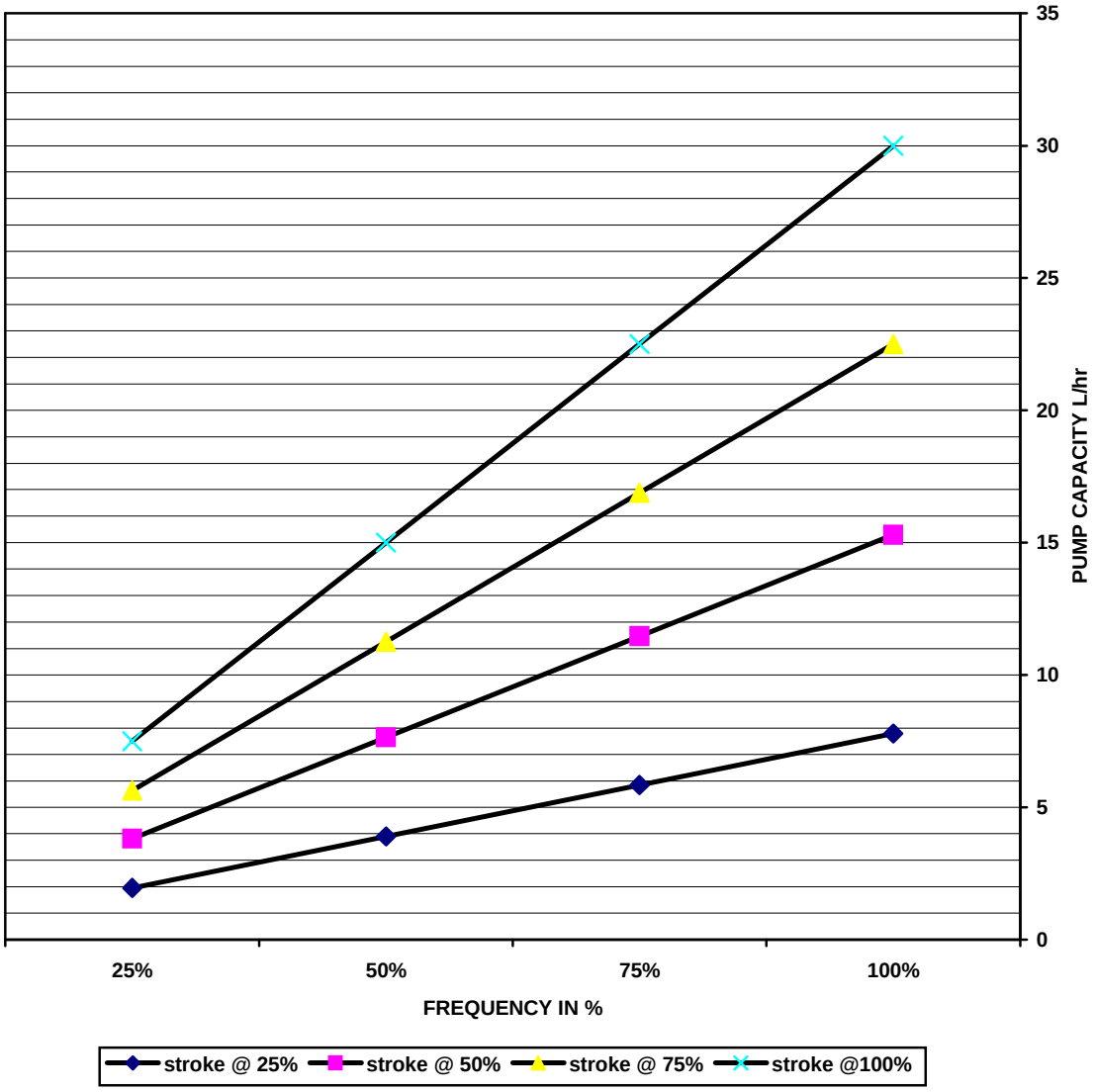
SANIKILUAQ NUNAVIT POST SODIUM HYPOCHLORITE SYSTEM
10-S005414
DLTA0730PVT
2710010744



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PUMP START UP RECORD

SITE:	SANIKILUAQ NUNAVIT TRUCK FILL
DATE:	DECEMBER 6-10, 2010
CUSTOMER NAME:	MOSHER ENGINEERING
MODEL # :	DLTA0730PVT2000UDG130EN0
SERIAL NUMBER:	2710010752
CHEMICAL USED:	SODIUM HYPOCHLORITE
MAX CAPACITY:	29.20 L/H
@ MAX BACK PRESSURE:	102 PSI
PRESSURE RELIEF VALVE SETTING:	50 PSI
BACK PRESSURE VALVE SETTING:	30 PSI
SIZE OF CALIBRATION COLUMN:	500ML
TECHNICIAN NAME:	JEREMY STEVENS
SIGNATURE:	

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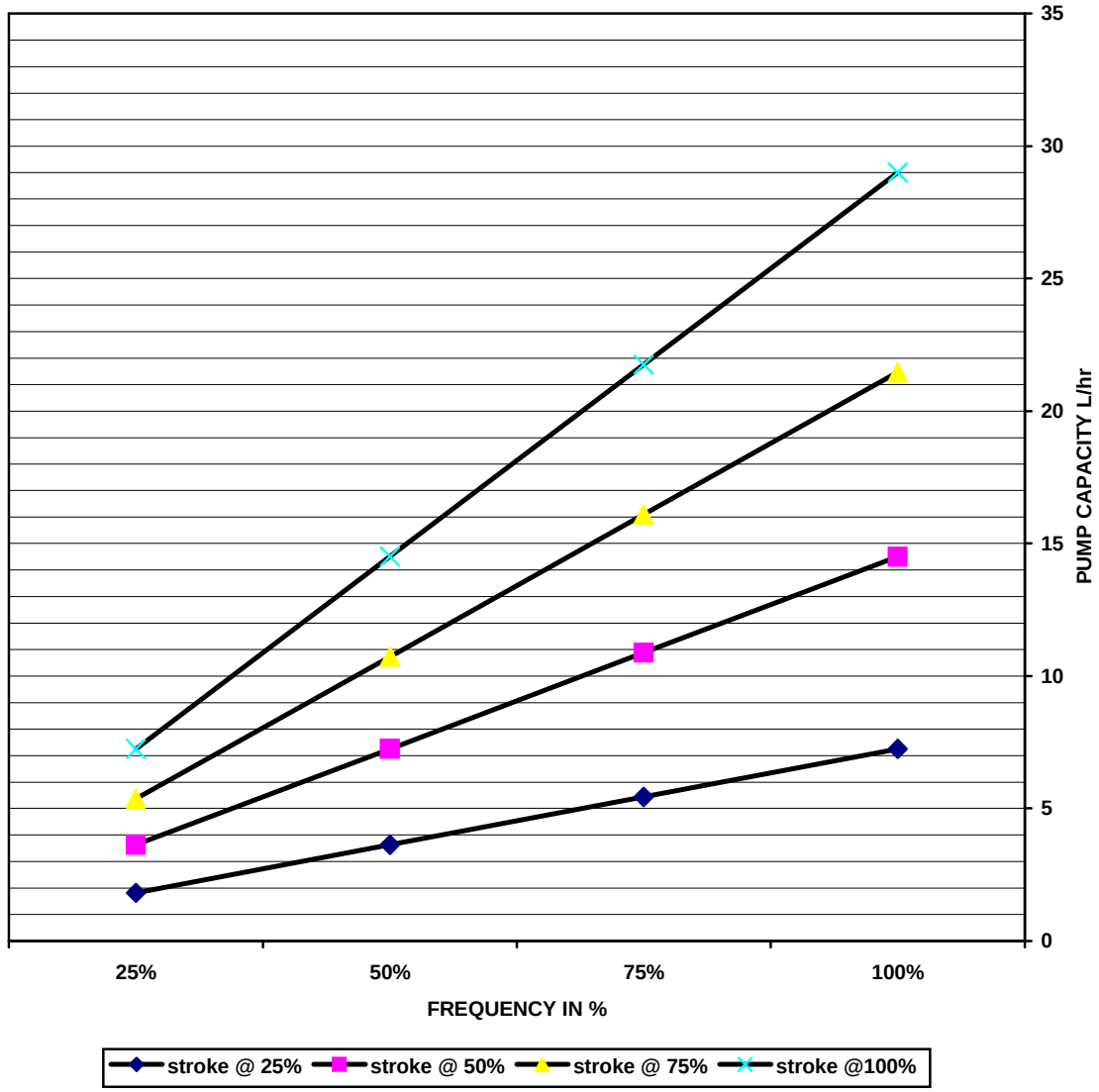
SANIKILUAQ NUNAVIT POST SODIUM HYPOCHLORITE SYSTEM
10-S005414
DLTA0730PVT
2710010752



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FIRE SODIUM HYPOCHLORITE PANEL

STROKE FREQ %	STROKE LENGTH %	MODEL # DLTA0730PVT2000UDG130EN0	CAPACITY IN L/HR
		SERIAL #	2710010753
100	100		29.62
75	100		22.22
50	100		14.81
25	100		7.41
100	75		22.22
75	75		16.67
50	75		11.11
25	75		5.56
100	50		15.11
75	50		11.33
50	50		7.56
25	50		3.78
100	25		7.40
75	25		5.55
50	25		3.70
25	25		1.85

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PUMP START UP RECORD

SITE:	SANIKILUAQ NUNAVIT TRUCK FILL
DATE:	DECEMBER 6-10, 2010
CUSTOMER NAME:	MOSHER ENGINEERING
MODEL # :	DLTA0730PVT2000UDG130EN0
SERIAL NUMBER:	2710010753
CHEMICAL USED:	SODIUM HYPOCHLORITE
MAX CAPACITY:	29.20 L/H
@ MAX BACK PRESSURE:	102 PSI
PRESSURE RELIEF VALVE SETTING:	50 PSI
BACK PRESSURE VALVE SETTING:	30 PSI
SIZE OF CALIBRATION COLUMN:	500ML
TECHNICIAN NAME:	JEREMY STEVENS
SIGNATURE:	

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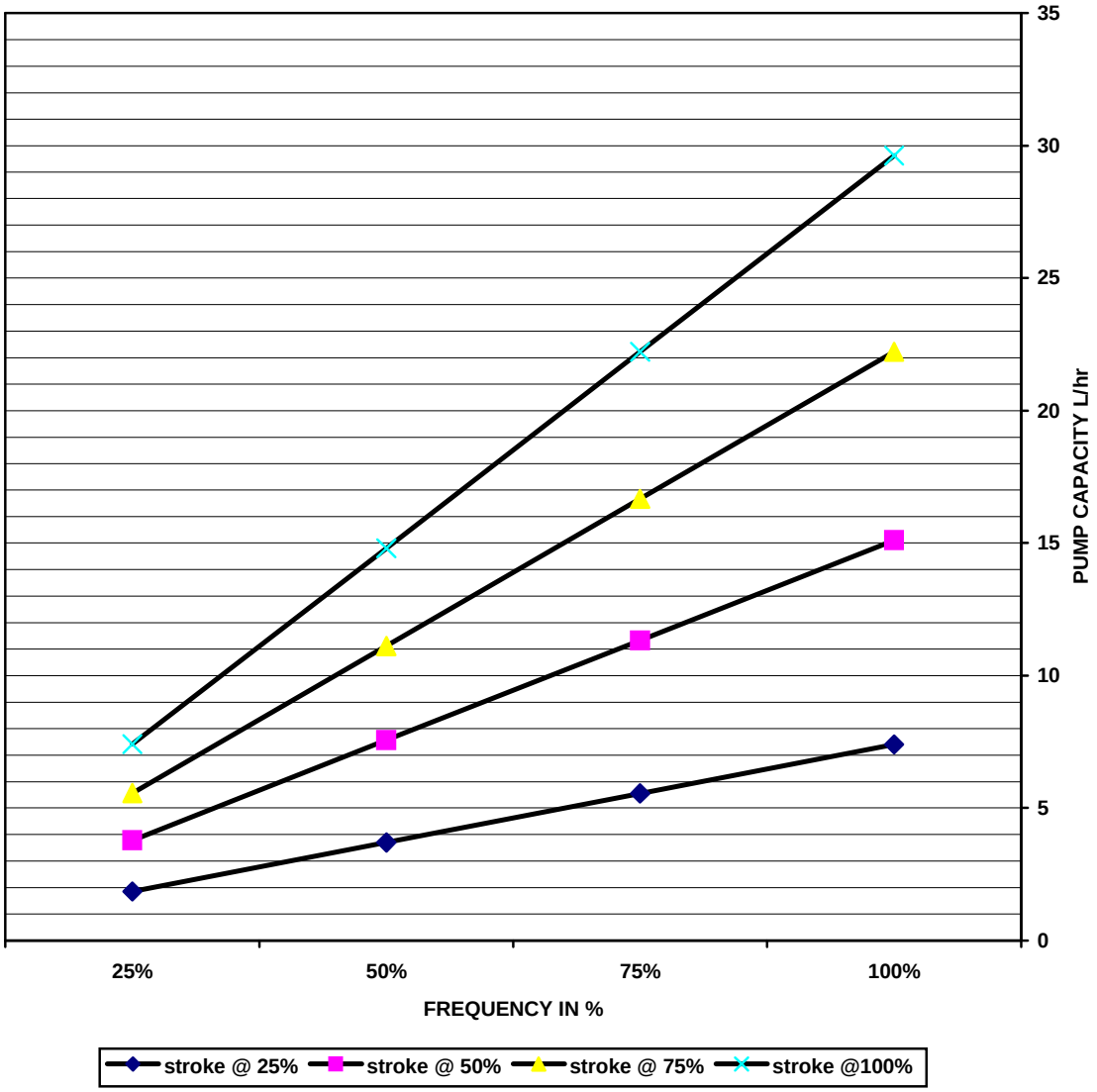
SANIKILUAQ NUNAVIT FIRE SODIUM HYPOCHLORITE SYSTEM
10-S005414
DLTA0730PVT
2710010753



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MOSHER ENGINEERING LTD.

Document Transmittal 186-68
Electronic Copy

Trow Associates Inc.
154 Colonnade Road South
Ottawa, ON
K2E7J5
Attention: Stephen Douglas
Ph: (613) 225-9940
Fax:(613) 225-7337

Contractor:
Mosher Engineering Ltd.
1869 Upper Water Street
Suite AH202,
Halifax, NS
B3J 1S9
Tel: (902) 429-0272
Fax: (902) 429-7762
Contact: Marc Losier

Date Submitted :
December 15, 2010

Project Title :
Sanikiluaq New Water Truck Fill Station

DESCRIPTION	Section or Drawing	# of Sheets
Generator Commissioning Report		17

Comments:

CATERPILLAR®

Engine Delivery Service Record

REGISTRO DE ENTREGA DEL MOTOR
RAPPORT DE LIVRAISON MOTEUR
MOTOR-AUSLIEFERUNGSBERICHT

☐ Check if information has been entered into the CAT Product Information System.
Indique si se incluyó la información en el Sistema de Información de los Productos Cat.
Indiquer si ces renseignements soint rentrés dans le Système d' Information des Produits Caterpillar
Angaben sind im CAT Produkt-Information-System aufgeführt.

DLR. CODE *Código del Distribuidor* *Code du conc.* *Händler-Kode*	MODEL *Modelo* *Modèle* *Modell*	ENGINE SERIAL NO. *No. de serie del motor* *No. de série du moteur* *Motor-Seriennr.*	HR/MI/KM *Horas/Millas/KM* *Heures/Milles/KM* *Betriebsstunden/Meilen/KM*	DELIVERY DATE *Fecha de entrega* *Date de livraison* *Lieferdatum*
NO20	D25 - 6S	N3C00529	6 HR	DEC 10 2010

OEM MANUFACTURER'S EQUIPMENT IDENT. *Identificación del equipo del dist.* *Identification de l'équipement OEM* *Fremdhersteller-Gerätebezeichnung*	NAME *Nombre* *Nom* *Name*	TYPE MACHINE *Tipo de máquina* *Type de machine* *Maschinentyp*	SERIAL NO. *No. de serie* *No. de série* *Seriennr.*	MODEL *Modelo* *Modèle* *Modell*	ARRANGEMENT NO. *No. de conjunto* *No. de version* *Ausführungsnr.*

DELIVERED BY
Entregado por / Livré par / Geliefert durch

1. ☒ CATERPILLAR DEALER — *Distribuidor Caterpillar, Concessionnaire CAT, Caterpillar-Händler*
2. ☐ OEM DEALER — *Conc., Conc. OEM., Fremdhersteller-Händler*

ENGINE APPLICATION (Complete only one box below)
USO DEL MOTOR (Marque debajo un espacio solamente)
APPLICATION DU MOTEUR (A compléter seulement la partie ci-dessous)
MOTOREINSATZ (nur einen ankreuzen)

MARINE Marinas, Marine, Schiffsmotoren
- ☐ A. MARINE & SELF PROPELLED DREDGE — Marina y dragas autopropulsadas / Marine ou dragues automotrice / Schiffs- und selbstfahrende Bagger
- ☐ B. DREDGE — Dragas / Drague / Bagger

INDUSTRIAL Aplicaciones Industriales, Industrie, Industriemotoren
- ☐ C. POWERING AGRICULTURAL VEHICLE — Para propulsión de vehículos agrícolas / Propulsion de véhicules de chantier / Antrieb für Landwirtschafts-Fahrzeug
- ☐ D. AGRICULTURAL - OTHER — Agricultura - otras / Autres applications agricoles / Anderes landwirtschaftliches Gerät
- ☐ F. PETROLEUM DRILL RIG — Petróleo - perforación / Industrie pétrolière - forage / Erdölbohrturm
- ☐ G. PETROLEUM - OTHER — Petróleo - otras / Industrie pétrolière - autres / Erdölindustrie - sonstiges
- ☐ H. LOCOMOTIVE — Locomotoras / Locomotive / Lokomotive

ON/OFF HIGHWAY VEHICLE Aplicaciones para toda clase de vehículos, Vehicule, Strassen und Geländefahrzeug
- ☐ E. POWERING ON-HIGHWAY VEHICLE — Para propulsión de vehículos de carretera / Propulsion de véhicules routiers / Antrieb für Strassenfahrzeug
- ☐ J. POWER OFF-HIGHWAY TRUCK — Para propulsión de vehículos de toda clase de terreno / Propulsion de véhicules de chantier / Antrieb für Gelände/fahrzeug

GENERATOR SET Grupos electrogenos, Groupe électrogène, Stromaggregat
- ☐ L. PRIME — Principal / Service permanent / Hauptstromversorgung
- ☒ M. STAND-BY — Auxiliar / Service auxiliaire / Notstromversorgung

OTHER (DRILL, COMPRESSOR, ROAD MCHY, CRANE, ETC)
Otras aplicaciones (compresor de barrenas, maquinaria vial y grúas) / Autres applications / Andere Einsätze (Bohrgeräte, Kompressor, Strassenbaufahrzeuge, Krane, usw.)
- ☐ K. (specify) (Especifique) (Préciser) (Bezeichnung) _____

SERVICE AT DELIVERY
Durante la entrega / A la livraison: / Kundendienst bei Auslieferung

☒ 1. Check if proper literature included.
Se verificó que el material impreso correspondiente venía incluido.
La littérature technique appropriée a-t-elle été fournie?
Zugehörige Anleitungen sind enthalten.

☒ 2. Check fluid levels in all compartments.
Se verificó el nivel de fluidos en todos los compartimientos.
Vérifier les niveaux de liquide de tous les circuits.
Flüssigkeitsstand in allen Gehäusen prüfen.

☒ 3. Review safe start, stop and operating procedures with user.
Se verificaron con el usuario los procedimientos de arranque, parada y funcionamiento.
Revoir avec le client les instructions exactes pour le démarrage, l'arrêt et le fonctionnement.
Sichere Start-, Abstell- und Bedienungsmethoden mit dem Kunden besprechen.

☒ 4. Review maintenance service and ajustments with user.
Se verificó con el usuario el servicio de conservación y ajustes.
Revoir avec le client les réglages et l'entretien.
Wartungsdienst und Einstellungen mit dem Kunden besprechen.

This engine inspected and started. Este motor se inspeccionó y se hizo arrancar. Ce moteur a été vérifié et mis en marche.
Dieser Motor wurde überprüft und angelassen.

CUSTOMER OR USER
Usuario o prop. / Client ou utilisateur / Kunde

NAME *Nombre, Nom, Name*: GOV'T OF NUNAVUT
HAMLET OF SANIKILUAQ

MAILING ADDRESS *Dirección comercial, Adresse postale, Adresse*: P.O. BOX 379

CITY *Ciudad, Ville, Stadt*: POND INLET

STATE *Estado o Provincia, Département*: NUNAVUT

USER'S SIGNATURE
Nombre del dist., / Kundenunterschrift / Signature du client,

COUNTRY *País, Pays, Land*: CANADA.

POSTAL CODE *Código Postal, No. Postal, Postleitzahl*: X0A 0S0

DELIVERING DEALER
Entregado por / Livré par / Geliefert durch (Händler)

DEALER'S NAME
Nombre del dist., / Nom du conc., / Händlername: TOROMONT CAT

CITY *Ciudad, Ville, Stadt*: WINNIPEG

STATE *Estado o Provincia, Dépt.*: MANITOBA

DEALER REP. SIGNATURE *Firma del representante del dist.,*
Signature du représentant du conc., / Unterschrift des Handlervertreters: Doug King

COUNTRY *País, Pays, Land*: CANADA

POSTAL CODE *Código Postal, No. Postal, Postleitzahl*:

ENGINE LOCATION
Lieu de travail du moteur, / Motor-Standort, / Lugar de trabajo del motor,: SANIKILUAQ NU.

OEM DEALER *Conc. OEM, Conc. OEM, Fremdhersteller-Händler*:

Do not send Factory Copy if entered into the CAT Product Information System.
No envíe copia de fábrica se la información está en el Sistema de Información de los Productos CAT.
Ne pas envoyer Copie Usine si les renseignements sont rentrés dans le Système d' Information des Produits Caterpillar.
Werkskopie nicht einsenden, falls im CAT Produkt-Information-System aufgeführt.

01-083995-09 [3505]

TOROMONT Power Systems CAT

Toromont CAT - 140 Inksbrook Drive, Winnipeg Manitoba, R2R 2W3 - Ph. 204-453-4343

Project: SANIKILUAQ WATER FILL STATION

Acknowledgement of training for on-site personnel

Toromont service w/o #: 1004186 Toromont Representative: DOUG HAY

Training location: SANIKILUAQ WATER FILL STATION

Personnel trained and employer:

Name:	Company:	Signature:
Paul Aqiatusuk	C & G S	
MARK TOOKTOO	C & G S	

Dated: DEC 19 2010 Toromont representative: Doug Hay

Toromont CAT - 140 Inksbrook Drive, Winnipeg Manitoba, R2R 2W3 - Ph. 204-453-4343

Project: SANIKILUAQ WATER FILL STATION

Project Completion and Acceptance of Toromont Start up and Commissioning

Note:

1. If there are customer concerns or deficiencies please attach the completed form (s) to the Acceptance form.
2. Attach a list of on-site personnel trained on the operation of the package.
3. Attach a signed copy of appropriate manufactures commissioning form, which will initiate the warranty.

Toromont service w/o #: 1Q04186 Toromont representative: DOUG HAY

Accepting Personnel: NO PERSONNEL AVAILABLE FROM END USER

Name (s):	Company:	Signature:

Dated: DEC 10 2010 Toromont representative: Doug Hay

CATERPILLAR® 2009 ELECTRIC POWER START-UP CHECKLIST

The following is a recommended start-up checklist intended for use during generator set commissioning process. This general checklist is intended to help facilitate a standardized self-assessment approach to commissioning. These checks are a representative sample, but not all-inclusive of typical checks to be performed during generator set commissioning. The appropriate Application and Installation guides, as well as the applicable Operation and Maintenance Manuals (OMM's) should be the prevailing reference during the generator set commissioning process. See LEBW4950 (Engine Application & Installation Guide Table of Contents) for a list of resources.

Although Caterpillar Inc. warrants the performance of the generator set pursuant to the applicable warranty statements, the responsibility for proper generator set application and installation in accordance with Caterpillar's required and recommended installation procedures rests with the installing dealer(s). Caterpillar Inc. assumes no responsibility for deficiencies in the installation. Proper installation is critical for quality generator set performance and compliance. Caterpillar Inc. does not guarantee or approve the validity or correctness of any installation, and Caterpillar's sole obligation with respect to any product is as set forth in the applicable Caterpillar warranty statement

Once completed, this checklist should be maintained exclusively by the installing dealer(s) as a history of the product's commissioning processs. For example, future reference of this checklist could prove beneficial in resolving any Caterpillar product support issues, or any other issues associated with the generator set commissioning process.

DEALERSHIP AND CUSTOMER ACKNOWLEDGEMENTS

INSPECTING DEALERSHIP ACKNOWLEDGEMENT: I hereby certify that the start up checklist as specified in this form has been completed and the generator set is commissioned. As an authorized Caterpillar dealer, I understand my responsibilities to properly commission the Caterpillar generator set in accordance with Caterpillar's Application and Installation guides.

I also acknowledge the following:
1) All operating controls function per manufacturer's specifications.
2) All safety devices function per manufacturer's specifications.
3) Comments made on this form best describe the condition of the equipment at commissioning.

Name of lead technician in charge of commissioning: DOUG HAY

Dealership Service Manager Name (clearly printed): SEAN HRBOTICKY

Dealership Service Manager Signature: _____ Date: _____

CUSTOMER ACKNOWLEDGEMENT: I acknowledge that the dealership has explained this start up check list to me.

Customer Signature: _____ Date: _____

LEXE0095-00
September 30, 2009

CATERPILLAR®

2009 ELECTRIC POWER START-UP CHECKLIST

COMMISSIONING DEALER

Caterpillar Dealer: TOROMONT CAT Dealer Code: N020 Commissioning Date: DEC 10 2010

CUSTOMER INFORMATION

Customer Name: HAMLET OF SANIKILUAQ Contact Name: _____

Address: _____ City: SANIKILUAQ

State / Province: NUNAVUT Postal Code: _____ Country: CANADA

GENERATOR SET INFORMATION

Package Serial Number: N3C00529 Type of Installation: Standby Fuel Type: Diesel

Generator Serial Number: F1A01137 Engine Model Group: 3034, C3.3

Engine Serial Number: E3H00271 Generator Arrangement Number: 287-8061CY

Note: The following engine/generator data should reside in SIMSi and/or TMI: personality module, performance spec., TMI specifications, engine rating (bhp, bkW), voltage, rating, frequency, amperes, emissions requirements, application (e.g. prime, standby). To avoid duplications, manual recording is not required here. Record any deviations from factory settings in comments section.

Comments:

MAINTENANCE AND COVERAGE

Action Required	Completed	Comments
Reviewed start-up procedure & safety information	☒ YES	
Reviewed OMM, warranty, SOS & service needs	☒ YES	
CSA was offered to the customer	☐ YES ☐ NO	
CSA was accepted by the customer	☐ YES ☐ NO	
ESC was offered to the customer	☐ YES ☐ NO	
ESC was accepted by the customer	☐ YES ☐ NO	
Copy of ESC form saved in dealer records	☐ YES ☐ NO	

SITE SPECIFICATIONS

Special Requirements and Testing ☐YES ☐NO ☒N/A _____

Additional Parts Purchased or Ordered ☐YES ☐NO ☒N/A _____

Job Delays and Problems ☐YES ☐NO ☒N/A _____

Ambient temperature (specify units): Max: _____ Min: _____

Relative humidity (specify units): Max: _____ Min: _____

Atmospheric conditions (e.g. clean, dusty, sandy, wet, salty, chemical, etc): _____

Elevation (specify units): _____

Comments:

SAFETY AND SERVICEABILITY

- [x] YES [ ] NO [ ] N/A Personal protection equipment worn
- [x] YES [ ] NO [ ] N/A Floors are clean no hazards
- [x] YES [ ] NO [ ] N/A Floor openings are covered
- [x] YES [ ] NO [ ] N/A Access routes unobstructed
- [ ] YES [ ] NO [x] N/A Overhead obstructions are clearly marked
- [x] YES [ ] NO [ ] N/A Overhead & side clearance is acceptable
- [x] YES [ ] NO [ ] N/A Genset is free of damage
- [x] YES [ ] NO [ ] N/A Genset is level with all holding bolts secure
- [x] YES [ ] NO [ ] N/A Warning decals & plates are installed
- [ ] YES [x] NO [ ] N/A All guards and heat shields are in place
- [x] YES [ ] NO [ ] N/A All safety shutdowns & warnings operational
- [x] YES [ ] NO [ ] N/A Fire extinguisher present & charged
- [ ] YES [ ] NO [x] N/A Fire suppression unlocked & operational
- [ ] YES [x] NO [ ] N/A Pipework & services are color coded/labeled
- [ ] YES [ ] NO [x] N/A Hot pipes are wrapped
- [x] YES [ ] NO [ ] N/A All hoses, piping & wiring is secure
- [x] YES [ ] NO [ ] N/A Remote start/stop checked & operational
- [x] YES [ ] NO [ ] N/A Emergency stop functional
- [x] YES [ ] NO [ ] N/A Adequate access to fluid fill areas to prevent spills
- [x] YES [ ] NO [ ] N/A Air / Oil / Fuel filters are accessible
- [x] YES [ ] NO [ ] N/A Level indicators are accessible
- [x] YES [ ] NO [ ] N/A Spillage containment acceptable
- [ ] YES [ ] NO [x] N/A Sight glasses are visible
- [x] YES [ ] NO [ ] N/A Key components are labeled
- [x] YES [ ] NO [ ] N/A Gauges are funtional (oil, fuel, air, other...)
- [x] YES [ ] NO [ ] N/A Proper grounding (refer to REHS4634)
- [x] YES [ ] NO [ ] N/A Engine room noise level policy satisfied
- [x] YES [ ] NO [ ] N/A No unauthorized access
- [x] YES [ ] NO [ ] N/A Air intake free of airborne debris

Comments:

UPPER EXHAUST PIPING TO BE WRAPPED AFTER TESTING

FUEL SYSTEM AND FUEL STORAGE

- [x] YES [ ] NO [ ] N/A Fuel system schematic created / saved
- [x] YES [ ] NO [ ] N/A Fuel pressure matches TMI specification
- [x] YES [ ] NO [ ] N/A Check for fuel leaks
- [x] YES [ ] NO [ ] N/A Check fuel lines for leaks
- [x] YES [ ] NO [ ] N/A Check fuel tanks for leaks
- [ ] YES [ ] NO [x] N/A Gas leak detection operating properly
- [ ] YES [ ] NO [x] N/A Gas lines unobstructed, properly mounted
- [x] YES [ ] NO [ ] N/A Fuel line is isolated
- [x] YES [ ] NO [ ] N/A Properly sized fuel lines
- [x] YES [ ] NO [ ] N/A Flexible connections on engine
- [x] YES [ ] NO [ ] N/A Check flex fuel line for vibration isolation
- [ ] YES [ ] NO [x] N/A Off package fuel filter vibration isolated
- [ ] YES [ ] NO [x] N/A Insulation / heating of fuel lines completed
- [x] YES [ ] NO [ ] N/A Fuel transfer pump properly installed
- [x] YES [ ] NO [ ] N/A Fuel filters tightened to specification
- [ ] YES [ ] NO [x] N/A Fuel monitoring system operational
- [ ] YES [ ] NO [x] N/A Critical fuel level shutdown
- [ ] YES [ ] NO [x] N/A Content alarm fitted & wired
- [x] YES [ ] NO [ ] N/A Tank fuel level is verified
- [ ] YES [x] NO [ ] N/A Fuel tank mounting is level
- [ ] YES [ ] NO [x] N/A Proper operation of fuel tank alarms
- [ ] YES [x] NO [ ] N/A Properly connected fuel return/overflow lines
- [x] YES [ ] NO [ ] N/A Fuel filter primed
- [x] YES [ ] NO [ ] N/A Fuel filter not damaged
- [x] YES [ ] NO [ ] N/A Properly vented fuel tanks
- [x] YES [ ] NO [ ] N/A Fuel tank plugs properly installed
- [ ] YES [ ] NO [x] N/A High fuel level gauge stops pump
- [x] YES [ ] NO [ ] N/A Fuel cooler installed (external)
- [ ] YES [ ] NO [x] N/A No unusual fuel tank noises / vibrations
- [x] YES [ ] NO [ ] N/A Off package fuel lines are proper material (ref A&I)
- [x] YES [ ] NO [ ] N/A Day tank properly installed in relation to engine

Note: The following engine/generator data should reside in SIMSi and/or TMI: personality module, performance spec., TMI specifications, engine rating (bhp,bkW), voltage, rating, frequency, amperes, emissions requirements, application (e.g. prime, standby) . To avoid duplications, manual recording is not required here. Record any deviations from factory settings in comments section.

Comments:

FUEL RETURN LINE PIPED BACK TO MAIN TANK AND NOT DAY TANK. POSSIBILITY OF FUEL SPILLAGE DUE TO OVER FILLING MAIN TANK. MAY ALSO CAUSE CONDENSATION AND WATER IN FUEL IN MAIN TANK LOCATED OUTSIDE.

FUEL SYSTEM AND FUEL STORAGE - VALVES

- [x] YES [ ] NO [ ] N/A Shufoff valves are operating properly
- [ ] YES [ ] NO [x] N/A Foot valve installed & operational
- [x] YES [ ] NO [ ] N/A Correct valve installed in the return line
- [ ] YES [ ] NO [x] N/A Solenoid valve operating properly
- [x] YES [ ] NO [ ] N/A Fire valves and contacts are correct
- [x] YES [ ] NO [ ] N/A Drain water from water seperators
- [x] YES [ ] NO [ ] N/A Proper direction of check valves
- [x] YES [ ] NO [ ] N/A Isolation valves are correctly positioned

Comments:

LUBRICATION SYSTEM

Note: The following data can be stored using the datalogger function in ET: oil pressure (full/no load), and oil filter delta P. Low oil pressure shut-down can be recorded via ECM download. To avoid duplications, manual recording is not required.

Oil Type: 15W40

- [x] YES [ ] NO [ ] N/A Oil level is correct
- [x] YES [ ] NO [ ] N/A Check for leaks
- [x] YES [ ] NO [ ] N/A Check for oil contamination
- [ ] YES [ ] NO [x] N/A Oil make-up system installed
- [x] YES [ ] NO [ ] N/A Check seals
- [x] YES [ ] NO [ ] N/A Oil pressures within specifications
- [ ] YES [ ] NO [x] N/A Pre-lubrication system installed
- [ ] YES [ ] NO [x] N/A Jacket oil heater operational
- [ ] YES [ ] NO [x] N/A Oil sample taken (SOS)
- [ ] YES [ ] NO [x] N/A Install crankcase breather hose if necessary
- [ ] YES [ ] NO [x] N/A Pipes routed through front end of base
- [x] YES [ ] NO [ ] N/A Remove crankcase covers, plugs & tape
- [ ] YES [ ] NO [x] N/A Check pre-lube pump voltage supply
- [ ] YES [ ] NO [x] N/A Check for proper pre-lube pump rotation
- [ ] YES [ ] NO [x] N/A Check for unusual noises & vibration
- [ ] YES [ ] NO [x] N/A Check pre-lube pump valves
- [ ] YES [ ] NO [x] N/A Verify proper lubrication of pre-lube pumps

Comments:

ALARM VERIFICATION

- [x] YES [ ] NO [ ] N/A Low water level
- [x] YES [ ] NO [ ] N/A High water temperature
- [x] YES [ ] NO [ ] N/A Low water temperature
- [x] YES [ ] NO [ ] N/A Low oil pressure
- [ ] YES [ ] NO [x] N/A Low oil level
- [ ] YES [ ] NO [x] N/A Low fuel level
- [ ] YES [ ] NO [x] N/A High fuel level
- [x] YES [ ] NO [ ] N/A Over speed
- [x] YES [ ] NO [ ] N/A E-Stop
- [x] YES [ ] NO [ ] N/A Crank termination system
- [x] YES [ ] NO [ ] N/A Low DC Voltage
- [x] YES [ ] NO [ ] N/A Over crank
- [x] YES [ ] NO [ ] N/A Battery charger
- [ ] YES [ ] NO [x] N/A Fire alarm
- [ ] YES [ ] NO [x] N/A Shutdown device
- [ ] YES [ ] NO [x] N/A High air inlet manifold temperature
- [ ] YES [ ] NO [x] N/A High / low battery voltage
- [ ] YES [ ] NO [x] N/A Jacket water pressure
- [ ] YES [ ] NO [x] N/A Rupture basin
- [ ] YES [ ] NO [x] N/A Temperature detectors connected

Comments:

GOVERNOR SETTINGS

Save a copy of the ECM replacement file or record other governor settings.

Comments:

N/A

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COMBUSTION AIR

YES	NO	N/A	Item
X			Check for damage
X			Check for leaks
X			Check for duct isolation
X			Check intake air system
X			Remove air filter bags / covers
X			Air filter gasket serviceable
X			Air filter housing free of damage
X			Check exhaust cowl & rain cap
		X	Check exhaust water drain pipework & valves
X			Check all exhaust flanges, joints & welds
		X	Create / Save air supply / exhaust layout
		X	Condensate drain provided
X			Check sealing surfaces
X			Air filter housing seal present & serviceable
X			Check for manifold damage
X			Check for missing or loose hardware
		X	Pre-lube turbo charger
		X	Emissions control unit installed & operational
X			Exhaust installation allows for expansion
		X	Drain valves fitted relative to exhaust system
X			Exhaust pipe isolation
X			Exhaust pipe properly supported
X			Flexible exhaust fitting to isolate vibrations
X			Exhaust directed away from building / personnel
X			Acceptable size of supply air

Record boost (inlet manifold) pressure: N/A

Record temperature after cooler: 20 *C

Exhaust temperature (pre turbo) at full load: N/A

Record air filter differential pressure: N/A

Record exhaust temperature stack: 296*C

Record inlet air temperature: 19*C

Exhaust port temperatures at full load (if other load factor used please specify)

	Temp		Temp
Right Hand Cylinder. # ___		Left Hand Cylinder. # ___	
Right Hand Cylinder. # ___		Left Hand Cylinder. # ___	
Right Hand Cylinder. # ___		Left Hand Cylinder. # ___	
Right Hand Cylinder. # ___		Left Hand Cylinder. # ___	
Right Hand Cylinder. # ___		Left Hand Cylinder. # ___	
Right Hand Cylinder. # ___		Left Hand Cylinder. # ___	
Right Hand Cylinder. # ___		Left Hand Cylinder. # ___	
Right Hand Cylinder. # ___		Left Hand Cylinder. # ___	
Right Hand Cylinder. # ___		Left Hand Cylinder. # ___	
Right Hand Cylinder. # ___		Left Hand Cylinder. # ___	

Comments:

JACKET WATER HEATER AND SPACE HEATER

YES	NO	N/A	Item
X			Jacket water heater wired correctly
X			Correct jacket water heater supply voltage
		X	Jacket water heater bleed off air required
X			Jacket water heater power on
X			Verify JWH valve position is open during usage
		X	Space heater functioning properly
		X	Space heater is off while engine is running
		X	Space heater operated 48 hours before start-up
		X	Space heater thermostat is installed

Adjust thermostat record setting: N/A

Record block temperature: 50*C

Space heater voltage: N/A

Comments:

NON ADJUSTABLE THERMOSTAT

STARTER AND BATTERY

Starter Type Electric

- [x] YES [ ] NO [ ] N/A Confirm auto start
- [x] YES [ ] NO [ ] N/A Inspect starter wiring
- [x] YES [ ] NO [ ] N/A Starter operational check
- [x] YES [ ] NO [ ] N/A Cycle crank timer
- [ ] YES [ ] NO [x] N/A Check oil lubrication
- [ ] YES [ ] NO [x] N/A Air / hydraulic compressor operational
- [ ] YES [ ] NO [x] N/A Isolation valves correctly positioned
- [ ] YES [ ] NO [x] N/A Condensate drain provided
- [ ] YES [ ] NO [x] N/A Check high & low air / hydraulic pressure
- [ ] YES [ ] NO [x] N/A Check battery boost / float controls

Charge Rate (need data value): 1.9 AMPS

- [x] YES [ ] NO [ ] N/A Battery charging alternator wired correctly
- [x] YES [ ] NO [ ] N/A Battery charging alternator operational check
- [x] YES [ ] NO [ ] N/A Charging alternator guards in place & secure
- [x] YES [ ] NO [ ] N/A Charging alternator belts properly adjusted
- [x] YES [ ] NO [ ] N/A Batteries connected properly
- [x] YES [ ] NO [ ] N/A Batteries isolated from floor
- [x] YES [ ] NO [ ] N/A Batteries charged (deep cycle) before use
- [x] YES [ ] NO [ ] N/A Battery cables & racks properly installed
- [x] YES [ ] NO [ ] N/A Proper electrolyte level & proper specific gravity
- [x] YES [ ] NO [ ] N/A Proper system voltage
- [x] YES [ ] NO [ ] N/A Trickle charger

Where a 10 second Start-Up is Required, Record Time from Voltage at the Starter Relay to Initial Engine Ignition (90% of Rated Speed and Voltage)

Comments:

COOLING SYSTEM

Note: The following data can be stored using the datalogger function in ET: water temp., and full load temp. Cool down set time can be recorded via ECM download. To avoid duplications, manual recording is not required here.

- [x] YES [ ] NO [ ] N/A Check for leaks (pressure test - record PSI)
- [x] YES [ ] NO [ ] N/A Check coolant level
- [x] YES [ ] NO [ ] N/A Check for damage & unusual noise
- [x] YES [ ] NO [ ] N/A High water temperature shutdown
- [x] YES [ ] NO [ ] N/A Hot air recirculation prevented
- [x] YES [ ] NO [ ] N/A Expansion tank highest level
- [ ] YES [ ] NO [x] N/A Check secondary coolant system
- [ ] YES [ ] NO [x] N/A Secondary cooling pump commissioned
- [x] YES [ ] NO [ ] N/A Filler cap & seal installed properly
- [ ] YES [ ] NO [x] N/A Lubricate pully/drive bearings if applicable

Coolant mixing ratios 50/50

Jacket water heater supply (Volts / Amps) 120 V

- [x] YES [ ] NO [ ] N/A Check antifreeze (refer to A&I Guide)
- [ ] YES [ ] NO [x] N/A Isolation valves & drain valves installed
- [ ] YES [ ] NO [x] N/A Drain valves routed correctly
- [ ] YES [ ] NO [x] N/A Piping complete & tight
- [x] YES [ ] NO [ ] N/A All guards & shrouds in place
- [ ] YES [ ] NO [x] N/A Correct alignment of fan belts / pulleys
- [x] YES [ ] NO [ ] N/A Discharge air unobstructed
- [ ] YES [ ] NO [x] N/A Auxiliary supply voltage to fans correct
- [x] YES [ ] NO [ ] N/A Proper clearance between fans, shrouds & guards
- [x] YES [ ] NO [ ] N/A Check fan / drive / pulley belt tension
- [x] YES [ ] NO [ ] N/A Verify sufficient cooling provisions

Differential Temperature Radiator (ref. to A&I Guide N/A

Comments:

MECHANICAL

- [x] YES [ ] NO [ ] N/A Inspect belts, hoses & connections
- [x] YES [ ] NO [ ] N/A Inspect supports & vibration isolators
- [x] YES [ ] NO [ ] N/A Inspect fan drive
- [ ] YES [ ] NO [x] N/A Air shut-off is operational
- [x] YES [ ] NO [ ] N/A Overspeed shut-down is correct
- [x] YES [ ] NO [ ] N/A Over-crank shut-down is correct
- [x] YES [ ] NO [ ] N/A Motorized dampers are operational
- [ ] YES [ ] NO [x] N/A Verify attachments

Comments:

WAITING ON PARTS FOR DAMPERS TO MODULATE, DAMPERS ARE CURRENTLY FUNCTIONAL

GENERATOR SYSTEM

Electrical

Check Stator Lead Cables (Ensure that the stator output leads are routed out of the generator (stator) in a manner that prevents the leads from rubbing against metal objects. Visually inspect the following areas for cracking and physical damage: stator output leads, protective sleeving, insulation).

- [x] YES [ ] NO [ ] N/A Unit is properly grounded (REHS4632)
- [x] YES [ ] NO [ ] N/A Check AC & DC Electrical
- [x] YES [ ] NO [ ] N/A Check for loose wiring & secure
- [x] YES [ ] NO [ ] N/A Verity phase sequence of wiring
- [ ] YES [ ] NO [x] N/A Confirm stator RTD's are functional
- [x] YES [ ] NO [ ] N/A Annunciators installed & wiring is complete
- [x] YES [ ] NO [ ] N/A Electrical bonding of services is complete
- [x] YES [ ] NO [ ] N/A Interconnects complete & ready for load test
- [x] YES [ ] NO [ ] N/A Connections completed to transfer switch
- [x] YES [ ] NO [ ] N/A Fuse & fuse ratings are verified
- [x] YES [ ] NO [ ] N/A Over voltage protection
- [x] YES [ ] NO [ ] N/A Over current protection
- [x] YES [ ] NO [ ] N/A Adjust voltage
- [ ] YES [ ] NO [x] N/A Check diodes
- [x] YES [ ] NO [ ] N/A All covers are in position
- [ ] YES [ ] NO [x] N/A Adjust frequency
- [ ] YES [ ] NO [x] N/A Complete generator alignment process

Comments:

Mechanical

Complete Generator Alignment Process (reference SEHS7654, SEHS7259, SEHS7073 in SIS)

- [x] YES [ ] NO [ ] N/A Check for loose or missing hardware
- [x] YES [ ] NO [ ] N/A Check for tight connections
- [x] YES [ ] NO [ ] N/A Clean all debris from the area
- [ ] YES [ ] NO [x] N/A Confirm all bearing RTD's are functional
- [x] YES [ ] NO [ ] N/A Acceptable size of supply air opening
- [ ] YES [ ] NO [x] N/A Check crankshaft deflection / end play
- [ ] YES [ ] NO [x] N/A Confirm bearing grease fitting is accessible (greasing not required at start-up)

Air gap measurement on main stator - top _____
Air gap measurement on main stator - bottom _____
Air gap measurement on main stator - sides _____
Air gap measurement on excitor stator - top _____
Air gap measurement on excitor stator - bottom _____
Air gap measurement on excitor stator - sides _____
Air gap measurement on PMG - top _____
Air gap measurement on PMG - bottom _____
Air gap measurement on PMG - sides _____

Note: The following generator data should already reside in TMI: number of bearings and type. The following generator data may be stored via the EMCP3 data log: bearing temperature at full load (front/rear), stator temperature at full load (A,B,C). To avoid duplications, manual recording is not required here if stored electronically.

Comments:
SEE LOAD LOAD TEST REPORTS

Circuit Breaker

- [ ] YES [ ] NO [x] N/A Test any alarms / shunt trip
- [ ] YES [ ] NO [x] N/A Check for tight connections
- [ ] YES [ ] NO [x] N/A Verify against generator Volts / Amps
- [ ] YES [ ] NO [x] N/A Set circuit breaker trip unit for site conditions

Record circuit breaker settings: _____

Comments:

GENERATOR SYSTEM

Control Panel (EMCP)

- [x] YES [ ] NO [ ] N/A Verify settings (correct as needed)
- [x] YES [ ] NO [ ] N/A Secure all wires
- [x] YES [ ] NO [ ] N/A Check all wire terminations for tightness
- [x] YES [ ] NO [ ] N/A Energize set & system controls
- [ ] YES [ ] NO [x] N/A Verify operation of annunciator
- [x] YES [ ] NO [ ] N/A Check software & upload latest version
- [ ] YES [ ] NO [x] N/A Load shedding control required
- [x] YES [ ] NO [ ] N/A Check auto / manual stop operation
- [x] YES [ ] NO [ ] N/A Check generator local controls
- [x] YES [ ] NO [ ] N/A Verify all alarms
- [x] YES [ ] NO [ ] N/A Check generator remote controls
- [x] YES [ ] NO [ ] N/A Check condition / operation of meters
- [x] YES [ ] NO [ ] N/A Remote emergency stop wired / functional
- [x] YES [ ] NO [ ] N/A Calibrations are checked
- [x] YES [ ] NO [ ] N/A Verify engine / generator shutdown
- [x] YES [ ] NO [ ] N/A Verify interconnect wiring
- [x] YES [ ] NO [ ] N/A Check generator system controls
- [x] YES [ ] NO [ ] N/A Select set parameters on system (ECM download)

Note: The following general data should reside in SIMSi and/or TMI: Control type / serial number, system control type.

Comments:

Voltage Regulator

Manufacturer	CAT
Model number	R250
Serial number	
Hardware version	
Software version	

- [ ] YES [ ] NO [x] N/A CDVR/ECM replacement file saved
- [ ] YES [ ] NO [x] N/A All settings verified
- [ ] YES [ ] NO [x] N/A Check cross current compensation
- [ ] YES [ ] NO [x] N/A Check voltage power factor regulation
- [ ] YES [ ] NO [x] N/A Install latest software version

*Note: The following data may be stored using the datalogger function in ET (CDVR/ECM File): sensing voltage, response characteristic, corner frequency, max. voltage dip, max. speed dip, max.recovery time, max. voltage rise, max. speed rise, max. recovery time, load gain adjustment. To avoid duplications, manual recording is not required if electronically stored.

Voltage Regulator Measured Data

				Comments: Note differences between measured values & name plate/TMI
No Load	Exciter field (F1,F2)	N/A	Volts DC	
	Exciter field (F1,F2)	N/A	Amps DC	
	Sensing line (T1,T2)	N/A	Volts AC	
	Sensing line (T1,T3)	N/A	Volts AC	
	Sensing line (T2,T3)	N/A	Volts AC	
	PMG output (1 to 2)	N/A	Volts AC	
	PMG output (1 to 3)	N/A	Volts AC	
	PMG output (2 to 3)	N/A	Volts AC	
Full Load	Exciter field (F1,F2	N/A	Volts DC	
	Exciter field (F1,F2	N/A	Amps DC	
	Sensing line (T1,T2)	N/A	Volts AC	
	Sensing line (T1,T3)	N/A	Volts AC	
	Sensing line (T2,T3)	N/A	Volts AC	
	PMG output (1 to 2)	N/A	Volts AC	
	PMG output (1 to 3)	N/A	Volts AC	
	PMG output (2 to 3)	N/A	Volts AC	

Reference Doc. (Service Information System): SENR5833 (CDVR), RENR2480 (VR6), REHS4638 (R448), KENR9008 (R250), KENR9009 (R438). Click on Media Search, Enter Media Number in Media Number Field

Comments:

Q.E.C. SUPPLIED AVR - EXISTING IN CUSTOMER SWITCHGEAR

INSTALLATION & LOAD INFORMATION

☐YES ☐NO ☒N/A Load diagram created & saved
☐YES ☐NO ☒N/A Full load data created & saved
☐YES ☐NO ☒N/A Neutral grounding system
☐YES ☐NO ☒N/A Enclosure weather tight
☐YES ☐NO ☒N/A Proper ventilation

Motor SKVA _____
Motor total HP _____
UPS manufacturer _____
UPS model number / size _____
UPS serial number _____

*Note: Full load data (voltage, amps, kW, Power Factor, kVARS) can be stored using the datalogger function in ET. To avoid duplications, manual recording is not required here.

If no diagram is available, record load types (e.g. lighting, computers, welding, non-linear, other) in comment field.

Comments:

N/A

SWITCHGEAR / PARALLEL OPERATION

*Note: Save all information possible (e.g. configuration/settings/protective relay settings, system schematic)

☐YES ☐NO ☒N/A Switchgear information saved
☐YES ☐NO ☒N/A Auxiliary supplies (check funtionality)
☐YES ☐NO ☒N/A Configure load share device
☐YES ☐NO ☒N/A Redundancy requirement
☐YES ☐NO ☒N/A Confirm control wires properly installed
☐YES ☐NO ☒N/A Means of disconnect provided
☐YES ☐NO ☒N/A Check interface with switch gear
☐YES ☐NO ☒N/A Commission auxiliary & utility supplies

Manufacturer _____
Model number _____
Serial number _____
Circuit breaker type _____
List Gen Set serial numbers in parallel _____
Detail method of neutral connection in parallel system (save schematic) _____

Describe surge protection for high voltage _____
Auxiliary & utility supply settings _____
Identify generator control device & record settings _____
Identify protective relay device & confirm setting _____

	Setting 1	Setting 2	Setting 3	Manufacturer	Part Number	Serial Number
Circuit breaker type						
Overload settings						
Reverse power relay						
VAR/PF controller						
Load share						
Droop/cross current compensation						

Comments:

N/A

AUTOMATIC TRANSFER SWITCH

Manufacturer GE
Model number _____
Serial number _____

☒YES ☐NO ☐N/A All wires secure & check wire terminations
☒YES ☐NO ☐N/A Test for proper operation
☐YES ☐NO ☒N/A Verify voltage / amperage
☐YES ☐NO ☒N/A Verify phase rotation
☒YES ☐NO ☐N/A Set all timers & exerciser
☒YES ☐NO ☐N/A Check for damage
☒YES ☐NO ☐N/A Check for loose or missing hardware

Comments:

N/A

VIBRATION LEVELS - 1

Vibration isolator manufacturer N/A
Vibration isolator model N/A
Vibration isolator serial number N/A

Vibration test equipment description (model, serial # & calibration date): N/A
Order = (Vibration Frequency / Engine RPM)

Vibration Levels - Use for All Packages Excluding In-line 6 (eg. C9, C15, C18, 3406, 3456C...) Built After 1/1/04
Reference Doc. (Engine Electronic Media Center): Media Number: LEKQ4023, Select Media Type: Document, Status: Both

Test Location	Overall	1/2	1	1 1/2	2	2 1/2	3
Engine Front Vertical (EFV)							
Engine Front Horizontal (EFH)							
Engine Rear Vertical (ERV)							
Engine Read Horizontal (ERH)							
Generator Rear Vertical (GRV)							
Generator Rear Horizontal (GRH)							
Engine Rear Roll (ERR)							
Generator Rear Axle (GRA)							
Other							
Other							

Record load factor and PF when measurements are taken (full load is recommended): _____
Note: Please attach any electronic vibration measurement results.

VIBRATION LEVELS - 2

Vibration Levels - Use for All In-line 6 (eg. C9, C15, C18, 3406, 3456C...) Built After 1/1/04
Reference ISO 8528-9
The dealer can obtain ISO standards from ISO or an authorized reseller such as ANSI, IHS, and Techstreet.

Power kW N/A
Engine Speed N/A

rms overall values (2 Hz to 300 Hz)*
*either measured or calculated direction of measurement

Measuring Point Number:	Axial (x)			Transverse (y)			Vertical (z)		
	s (mm)	v (mm/s)	a (m/s2)	s (mm)	v (mm/s)	a (m/s2)	s (mm)	v (mm/s)	a (m/s2)
1									
2									
3									
4									
5									
6									
7									
8									
-									
-									

Record load factor and PF when measurements are taken (full load is recommended): N/A
Note: Save any electronic vibration measurement results.

PARTICULARS OF MEASUREMENT EQUIPMENT

Component	Manufacturer	Type	Remarks
Sensor	N/A		
Measuring Indicator Set			
Recording Instruments			
Calibration Apparatus			

Note: Terms are according to ISO 2954

Mechanical Connection

Measured Value

Recorded Value

Calibration Date

Measuring Range (Amplitude / Frequency)

Frequency Analyzer / Filter (Linear Range / Pass-Band)

Recorded Value

Calibration Date

Data for evaluation of measuring records (e.g. amplification, rate of feed)

Comments:

STORAGE INFORMATION

Location: N/A

Complete Insulation Test below: ☐YES ☐NO ☒N/A

Generator dried for 48 hours before start-up (see SEHS9124): ☐YES ☐NO ☒N/A

Drying Method: N/A

INSULATION TEST

Reference Doc. (Service Information System): SEHS9124

Click on Media Search, enter SEHS9124 in Media Number Field

Insulation Test	30 Second Reading	60 Second Reading	30 Second Corrected	60 Second Corrected	Winding Temp.	Comments
Beginning of storage - Main Stator						N/A
Beginning of storage - Main Rotor						
Beginning of storage - Exciter Stator						
Beginning of storage - Exciter Rotor						
Beginning of storage - PMG Stator						
Start-Up - Main Stator	> 5 GIG	> 5 GIG	> 5 GIG	> 5 GIG	19*C	@ 266V
Start-Up - Main Rotor	NO	ACCESS				
Start-Up - Exciter Stator	> 5 GIG	> 5 GIG	> 5 GIG	> 5 GIG	37 *F	@ 266V
Start-Up - Exciter Rotor	NO	ACCESS				
Start-Up - PMG Stator	N/A					

InsulationTest Equipment Description:

TOROMONT Power Systems

EMERGENCY GENERATOR LOAD TEST SHEET

Customer/Address: Gov't of Nunavut
Unit #: water pumping station
Date: 09-Dec-10

Package Make: Caterpillar Model: D25-6S Serial #: N3C00529 Workorder #: IQ04186

Engine Make: Caterpillar Model: 3.3 Serial #: E3H00271 Hours: 2

Generator Make: Caterpillar Model: LCB1014Q Serial #: F1A01137

Generator Rating: Volts: 120/240 kW: 25 25 kVA: 791 Amps @ 1.0 PF: 104 Amps @ Unity: 104 Hz: 60

HOUR INTERVALS	0	0.25	.50	0.75	1.0	1.25	1.5	1.75	2.0	2.25	2.5	2.75	3.0	3.25	3.5	3.75	4.0	Cool Down
Time	8:45	9:00	9:15	9:30	9:45	10:00	10:15	10:30	10:45	11:00	11:15	11:30	11:45	12:00	12:15	12:30	12:45	
Ambient Temperature ☑ °C ☐ °F	17	17	17	18	20	22	22	20	19	19	19	19	19	18	19	20	19	
Service Meter Hours	2	2.2	2.5	2.8	3.1	3.3	3.5	3.8	4	4.3	4.5	4.7	5	5.2	5.5	5.7	6	
Voltage: Phase L - L	241	243	241	241	241	240	240	240	241	242	242	240	241	239	241	240	241	
Voltage: Phase L1 - N	120	121	121	120	120	120	120	120	121	121	121	120	121	118	120	119	120	
Voltage: Phase L2 - N	121	121	120	121	121	120	120	120	120	121	121	120	120	121	121	121	121	
Amperage: Phase L1	96	96	95	104	104	86	86	98	98	99	98	100	99	106	100	104	99	
Amperage: Phase L2	97	95	94	103	103	86	85	89	90	87	90	90	88	87	87	97	87	
% Load	95	95	95	100	100	83	83	90	90	92	90	90	90	93	90	93	90	
Frequency (Hz)	59.7	59.6	59.7	59.5	59.5	59.9	59.9	59.6	59.6	59.5	59.6	59.5	59.6	59.5	59.6	59.5	59.6	
Power Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Power - kW	24	24	23	25	25	21	21	21	22	23	22	23	22	23	22	23	22	
Oil Pressure ☐ psi ☑ kpa	471	419	401	401	393	394	393	394	393	394	393	393	393	394	393	392	393	
Oil Temperature ☑ °C ☐ °F	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Coolant Temp ☑ °C ☐ °F	65	77	78	78	80	78	79	78	78	78	79	79	78	78	78	78	78	
☐ °C ☐ °F																		
Exhaust Temp ☑ °C ☐ °F	308	339	361	415	412	314	336	368	357	371	389	388	368	377	368	372	558	
☑ °C ☐ °F																		
Fuel Pressure ☐ psi ☐ kpa																		
Battery Voltage	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	
☐ °C ☐ °F																		
☐ psi ☐ kpa																		

Comments: LOADS VARIABLE DUE TO OPERATING WATER FILL STATION AND TRUCKS LOADING

AMBIENT TEMP IS GENERATOR ROOM TEMP.

Technician: Doug Hay

140 Inksbrook Drive, Winnipeg, MB R2R 2W3 Phone: (204) 478-6596 Fax: (204) 478-3355

CATERPILLAR

Service Report

Report Header Information					
Work Order	IQ04186	Dealer Code		Manufacturer	Caterpillar Inc.
Employee ID	0830	Service Date	14/12/2010	Model	D25-6S
Customer	KRT ELECTRICAL	Customer Equipment Number	WATERFILL STATION	Serial Number	N3C00529
SMU	6 Hours	Equipment Location	SANIKILUAQ WATER FILL STATION		
IN Date		Promise Date		OUT Date	
Instructions					

Truck Information			
Truck Make		Truck Model	
VIN		Cab Type	
Vehicle Config		Delivery Date	

SIMS / Part Causing Failure										
Segment No	Part Number	Part Name	Qty	SMCS	Primary	Secondary	Group Number Containing Part	Group Name	Product Inoperable?	CAT Item

Repair Background

Segment No: 01	
Customer Complaint	TRAVEL TO AND FROM SANIKILUAQ NU. TRAVEL DELAYED DUE TO WEATHER - FLIGHT FROM WINNIPEG TO SANIKILUAQ CANCELLED. TRAVEL TIME FROM SANIKILUAQ TO OTTAWA EXTENDED DUE TO WEATHER, LATE ARRIVING FLIGHTS AND MISSED CONNECTIONS
Cause of Failure	N/A
Resultant Damage	N/A
Repair Process Comments	INCURRED EXTRA HOTEL CHARGE FOR EXTRA NIGHT IN WINNIPEG AND NIGHT IN MONTREAL DUE TO MISSED CONNECTING FLIGHT. FULL DAY WEDNESDAY CHARGED TO TRAVEL AT REDUCED RATE. TRAVEL TO SANIKILUAQ THURSDAY, TRAVEL TO MONTREAL FRIDAY. DELAYED AND TRAVEL TO OTTAWA ON SATURDAY MORNING.

Segment No: 02	
Customer Complaint	START UP AND COMMISSION OF D25-6S GENSET
Cause of Failure	N/A
Resultant Damage	N/A
Repair Process Comments	PERFORM START UP AND COMMISSION OF GENSET VISUALLY INSPECTED UNIT, CHECKED LEVELS - OK PACKAGE SUPPLIED FUEL TANK NOT USED, DISABLED ALARMS AND SWITCHES ASSOCIATED WITH TANK. (SEPARATE DAY TANK BEING USED) CHECKED EMCP 3 PARAMETERS AND CONFIGURED AS REQUIRED. DOWN LOAD PARAMETERS (ECM REPLACEMENT FILE) CONNECTED WIRING FOR REMOTE ALARMS AND AUTO START TO GENSET PANEL. CONFIGURED "GE" TRANSFER SWITCH FOR APPLICATION TESTED SHUTDOWNS AND ALARMS ON GENSET - OK TESTED ALL TRANSFER SWITCH FUNCTIONS - OK PERFORMED SIMULATED POWER FAILURE TEST - OK ALL FUNCTIONS PERFORMED AS EXPECTED. PERFORMED 4 HR LOAD TEST. DUE TO WATER FILL STATION BEING OPERATIONAL AND LOAD FLUCTUATIONS DUE TO DAILY OPERATIONS, TRIED TO MAINTAIN LOAD AROUND 90%. RECORDED RESULTS MANUALLY OVERRIDE VENTILATION LOUVERS TO PERFORM LOAD TEST. ELECTRICAL CONTRACTOR WAITING FOR PARTS TO ENABLE AUTOMATIC MODULATION OF LOUVERS. DAY TANK WAS MANUALLY FILLED CONTRACTOR ALSO WAITING FOR PARTS TO ENABLE AUTOMATIC OPERATION. GAVE ON SITE TRAINING OF PACKAGE AND CONTROLS TO LOCAL OPERATORS. FILLED OUT COMMISSIONING PAPERWORK.

Customer Signature	Technician Signature

File Attachments				
Name	Size	Modified	Title	Description

Digital Images