RYFAN NUNAVUT INC.

Qikiqtarjuaq Heat Trace Sewage Lagoon Project Qikiqtarjuaq, NU

ELECTRICAL OPERATION & MAINTENANCE MANUAL

August, 2009

RYFAN NUNAVUT INC.

Qikiqtarjuaq Heat Trace Project

Electrical Contractor Contact Information

Ryfan Nunavut Inc.

(Branch Office)

P.O. Box 4204

Spruce Grove, AB T7X-3B4

Ph: (780) 960-3601

Fx: (780) 962-3266

Contact: Darren Fraser

General Contractor Contact Information

Kudlik Construction Ltd.

P.O. Box 727

Iqaluit, NU X0A-0H0

Ph: (867) 979-1166

Fx: (867) 979-1169

Contact: Francois Bourassa

RYFAN NUNAVUT INC.

LIST OF SUPPLIERS

For

Qikiqtarjuaq Heat Trace project

Heat Trace Material
Du Alaska Inc.
6706 Greenwood street # 1
Anchorage, Alaska
99518
Contact: Caroline Sullivan
Ph. (907) 522-3004
Fax (907) 349-1023

General Electrical Material
Wesco Distribution
#14760 – 116th Avenue
Edmonton, AB
T5M 3G1
Contact: Jeff Shemely
Ph. (780)-452-7920
Fax (780)-451-2195

RYFAN NUNAVUT INC.

LETTER OF WARRANTY
For
Qikiqtarjuaq heat trace lagoon project, Qikiqtarjuaq, NU

The electrical installation has been thoroughly tested and found to be in proper operating condition at time of turn over and is guaranteed to be free from any defect in workmanship and material that may develop within a one year period from date of acceptance.

Any part or parts of the electrical installation, as defined in the Electrical Specifications, that prove defective within a one year period shall be replaced without charge, when subjected to examination by one of our representatives, providing that such defect, in our opinion, is due to faulty material or workmanship and not caused by tampering, abuse, or misapplication.

This warranty is limited to division 16 materials and associated equipment and in no event shall Ryfan Nunavut Inc. have any liability for consequential damages, or expenses, or lost revenues directly or indirectly arising from an electrical system failure. Any alterations to the system without the written expressed approval from a Ryfan Nunavut Inc. representative will render this warranty null and void.

August 21, 2009

Darren Fraser
Ryfan Nunavut Inc.

Heat Trace System

Overview

The heat trace system requires power from a portable generator. There is a 20a, 120v cord end located inside the man hole. When this is connected to the portable generator, power is supplied to the heat trace control box. There is a 20a, ground fault breaker located inside the box. This can be turned on by pushing the handle of the breaker upwards all the way until you hear an audible "click". Power is then available to the thermostat located inside the same control box. The remote sensor for the thermostat is tied to the pipe. If the temperature on the pipe drops below the set point of the thermostat, the switches located on the cover of the control panel will control the individual heat trace runs. Simply turn the switch on to the applicable heat trace cable that needs to be energized. Once the thaw is completed, switch off the switches on the exterior of the box, turn off the ground fault breaker and disconnect the cord end from the generator.

Maintenance

Generally, the breaker, switches and heat trace equipment is maintenance free. However, annual interior cleaning of all equipment is recommended. This should be performed by a qualified electrician. The only problem that might be experienced is in the event a circuit becomes overloaded it will open or "trip". Should this happen, remove the load from the circuit, push the breaker handle all the way to the off position. This resets the breaker and you should be able to feel and hear an audible click. After resetting the breaker push it all the way to the on position. Power should now be restored to the circuit. If the breaker will not reset, confirm that everything connected to the circuit has been disconnected. If it still will not reset, call a qualified electrician to correct the problem.

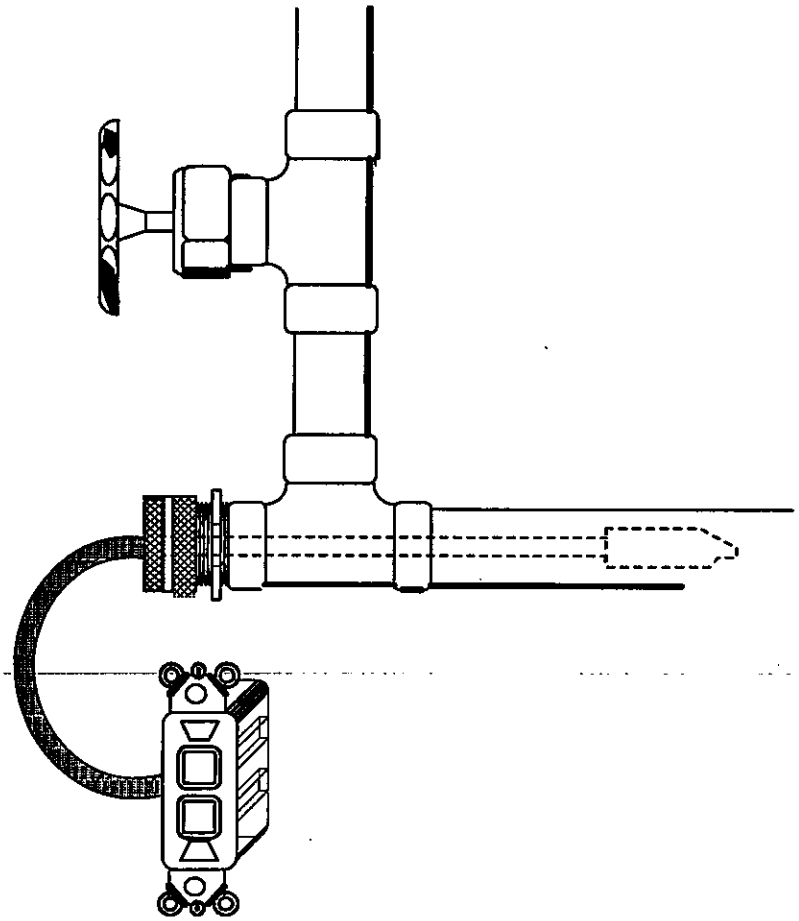
WARNING: When resetting a breaker, make sure that you stand back and to the side and shield your eyes before turning the breaker back on to prevent injury in case of catastrophic failure of the breaker.

Wiring devices

All wiring devices used in this facility are high quality "specification grade". Replacement devices should be of the same quality and manufacturer as those being replaced.

ARCTIC TRACE®

Installation Information



Submersible Heat Trace Freeze Protection System

Alaska Incorporated

Product Information Introduction

As plastic began to emerge as a suitable material to carry water and wastewater, it was discovered that the freeze protection of pipes and vessels could not be done easily using traditional heat cable placed on the pipe or vessel surface. du Alaska decided that if the heat cable itself could be placed inside the pipe in contact with the liquid there would be many advantages.

du Alaska began to introduce heat cables to be used inside pipes or vessels for freeze protection. These cables incorporated a Tefzel jackets, which is a suitable waterproof food grade material. The product was further enhanced with the introduction of parallel resistance heaters, made from power limiting resistance wire. The heat cable was now able to limit its temperature and was suitable for inside the pipe application. Testing confirmed that this new combination of materials offered superior product performance in the area of heat transfer with small or non-existent heat cable in-rush during cold starting. The new materials also extended cable life outlasting other cables 3 to 1 and added greater abrasion resistant quality for all commercial and industrial applications.

The Arctic Trace heat cable system was additionally improved with the introduction of our exclusive heat fused waterproof end cap and butt splice which stopped water infiltration into the cable allowing the heat trace to be placed in pressurized waterlines. The Arctic Trace product in its present form has been used for over 20 years successfully for waterline freeze protection, deep well heat tracing, harbors, agriculture, watering points, roof drains, snow melting systems, sewer outfall lines, food product, and pharmaceutical.

Additional cost savings of Arctic Pipe fabrication is also realized, because no special channel or modified insulation area needs to be added when Arctic Trace heat trace is placed directly inside the pipe in contact with the system water. Retrofit or the replacement of failed heat trace in buried insulated lines now becomes simple and tremendous cost savings are achieved when excavation is not required for replacement of existing heating cables.

Our design also offers cut-to-length cable and completely waterproof field components used in deep well tracing, water tanks, or other applications.

CAUTION

This product must only be installed by qualified personnel, who fully understands electrical equipment placement, and must never under any circumstance be placed in service without the use of an adequate ground fault circuit interrupter to protect personnel from shock or injury.

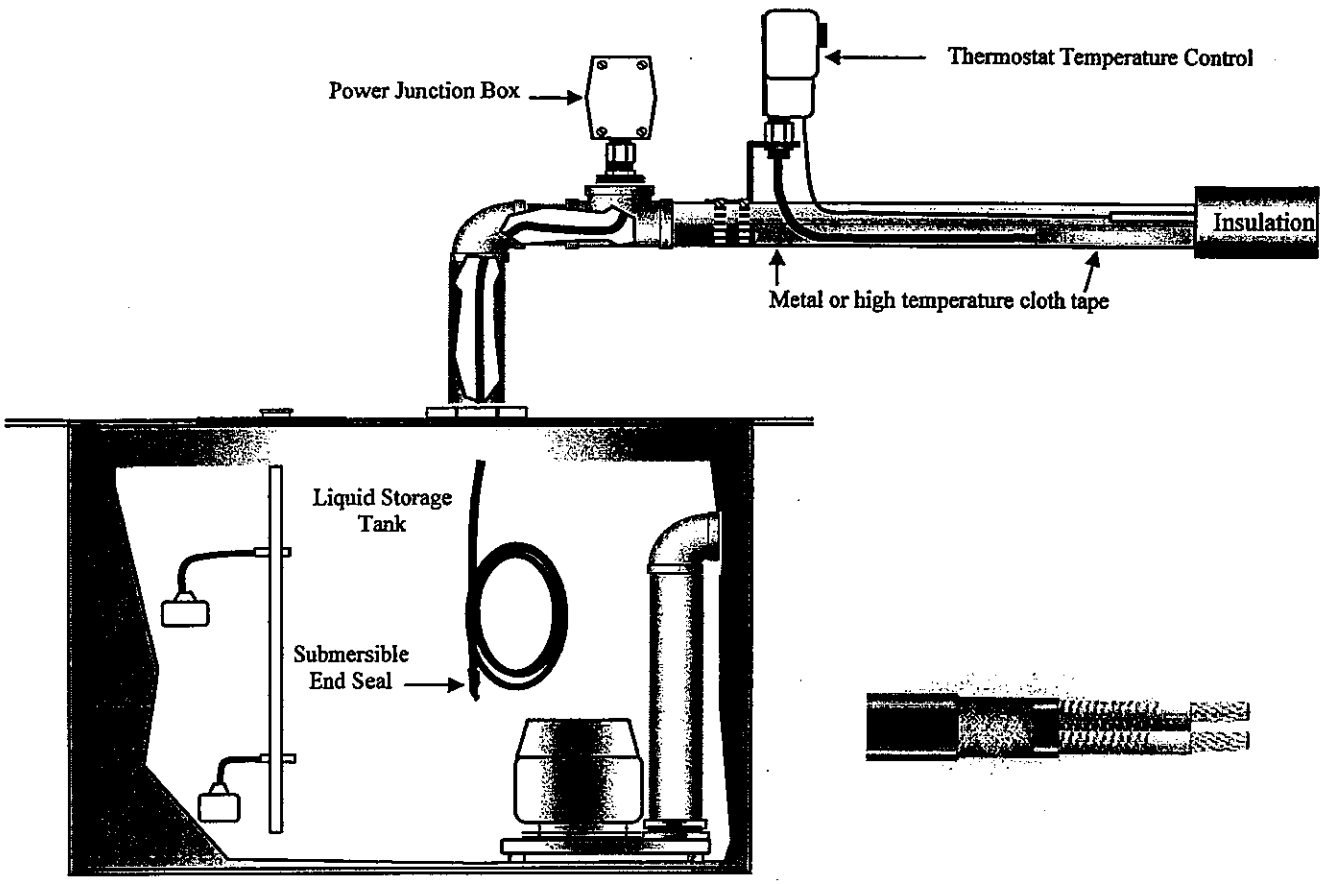
After this equipment has been placed in service, it must be tested to ensure all wiring and safety devices are working.

All National, State, and Local Electrical Codes must be followed.

If this product is not installed properly, fire, death, or injury may result.

ARCTIC TRACE ®

Typical Equipment Layout
for Industrial Heating Cable in Ordinary Location



A. Heat trace applications for long or short runs of buried or insulated liquid filled plastic or metal pipe, drains, watering points, or sewer and water outfall with minimum valve closure, we would suggest the use of TL Tefzel coated submersible cable inside the pipe.

B. Runs of piping with numerous valve connection pumping equipment of less then 700' create a challenge for the heat trace installation, for those applications we suggest the use of type TL Temperature Limiting applied to the equipment or pipe surface.

C. High temperature steam cleaning, sanitary, special O.E.M., or factory assembled heaters as specified with fitting and accessories we may suggest the use of TL or CW depending on the application. Consult Factory.

INSTALLATION INFORMATION

This information will provide a general overview of the procedures involved in the installation of The Arctic Trace heat cable systems.

- **Inspection**

Check all material received to insure that the proper voltage, AMP output, and the cable jacket are suitable for your application.

DO NOT install heat cable that shows any type of damage.

CAUTION:

DO NOT connect power to the heating cable while it is on a reel or in the shipping carton.