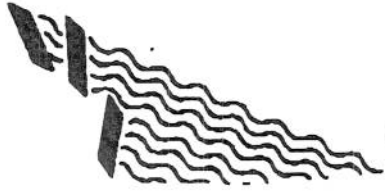

APPENDIX C

COST ESTIMATE DATA



Midnight Sun Energy
the remote power experts
5 Ellesmere Drive
Yellowknife, NT
873-8760 Fax 873-8768

FACSIMILE TRANSMISSION SHEET

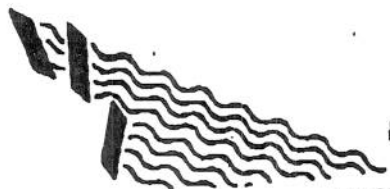
TO: Gary Strong
FAX NO: 873-3328
FROM: Alex Hampson
DATE: Oct. 28/96
NUMBER OF PAGES INCLUDING COVER: 3

MESSAGE:

Hi Gary,
Here is the information you
requested.
Cheers,
Alex.



Midnight Sun Energy
the remote power experts



Midnight Sun Energy
the remote power experts
5 Ellesmere Drive
Yellowknife, NT
873-8760 Fax 873-8768

~system design, sales and installation
~solar panels ~wind generators ~inverters ~batteries ~water pumps
~hot water systems ~energy-efficient lighting ~other alternative energy products
~diesel generators ~gas generators ~heaters ~camp supplies ~floating dock systems

Gary Strong
Dillon Engineering
Yellowknife, NT

October 28, 1996

Gary:

Thanks for your call. Here are the specs on the Trace 4000W pure sine wave inverters. I have included some pricing based on the battery bank you specified.

QUANTITY	DESCRIPTION	UNIT PRICE	AMOUNT
2	Trace 4000W inverters	3995.00	7990.00
24	2V cells -1560Ahrs (2 sets of 12=3120Ahrs) Other configurations are also available		11,900.00

If you need further information on sizing , pricing or design, please give us a call any time.

Regards,

Alex. Hampson
Alex. Hampson

Model SW4024

POWER CONVERSION CENTER

A Revolution in Power Technology

The result of new ideas and technologies, the Trace Model SW4024 delivers sine wave power without compromise. Now sine wave output with high efficiency, high surge and low idle current is available. It is more than just the finest inverter, with three microprocessors and bi-directional power topology, it has features and capabilities that were previously either non-existent or available only as separate products.

Inverter

- Multiple step, low distortion, 4000 watt continuous sine wave output, 94% maximum efficiency.
- Units may be operated in series to provide 8000 watts at 240 vac, three wire, with optional series interface cable.
- Adjustable search mode circuit can reduce idle power to 1 watt.
- Current compensated, adjustable low battery cutout voltage. Adjustable low battery cut-in, high battery cutout and high battery cut-in voltages.
- Protection circuitry guards against over-current, short circuit, over temperature, low battery and high battery conditions.

Battery Charger

- Continuous 120 amp rated. High efficiency, low current distortion design allows the use of smaller generators.
- Three stage, temperature compensated charging algorithm ensures maximum battery life. Remote battery temperature probe is standard.
- Adjustable temperature compensation, charge rate, LCD meter indicates, BULK VOLTS, FLOAT VOLTS and BULK DONE AMPS.

When connected to grid or generator, the SW4024 synchronizes its waveform to that of the AC source, locks to it and operates in parallel. This ability, coupled with the bi-directional power topology and microprocessor control, makes it possible for the unit to offer multiple operating modes.

Generator Support Mode: When charging from a generator, the generator's output voltage and current are monitored. If either falls below user adjustable limits, the unit sheds itself as a load and then reverses the power flow if necessary. This delivers energy from the batteries to the loads assisting the generator. When operating two units in series at 240 VAC, one 120 VAC leg can be charging while the other is supporting.

Standby Power Mode: Two AC inputs are provided - one for generator and one for utility grid. When AC falls, transfer to Inverter power is no longer than 34 milliseconds. If the grid and generator are connected, the unit can be set to start the generator if the grid falls. After grid returns, the generator is automatically stopped. The inverter output is synchronized to the grid and the grid is reconnected to the loads.

Battery Voltage Transfer Mode: If the batteries are low, a current compensated low battery set point triggers connection to the grid. The charger operation may be enabled or disabled during grid connection.

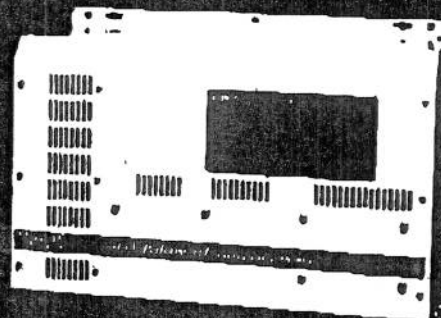
Generator Start Mode: Extensive automatic generator start features are standard and user programmable. Gen start can be triggered by battery voltage, load size in amps or time of day. QUIET TIME can be set during which the generator is not allowed to start unless a MUST START override voltage is reached. WARMUP SECONDS, MAX CRANKING SECONDS and MAX STARTING ATTEMPTS are some of the user adjustable parameters.

"I don't have enough house loads to find out what the limits of this baby are."
John C. Wiles, Research Engineer, Southwest Technology Development Institute

From
Trace Engineering,
maker of the world's
most reliable
inverters

An advanced original
and revolutionary
design

Sine wave power
without
compromise



THE POWER COMPANY
Trace
ENGINEERING

Model SW4024

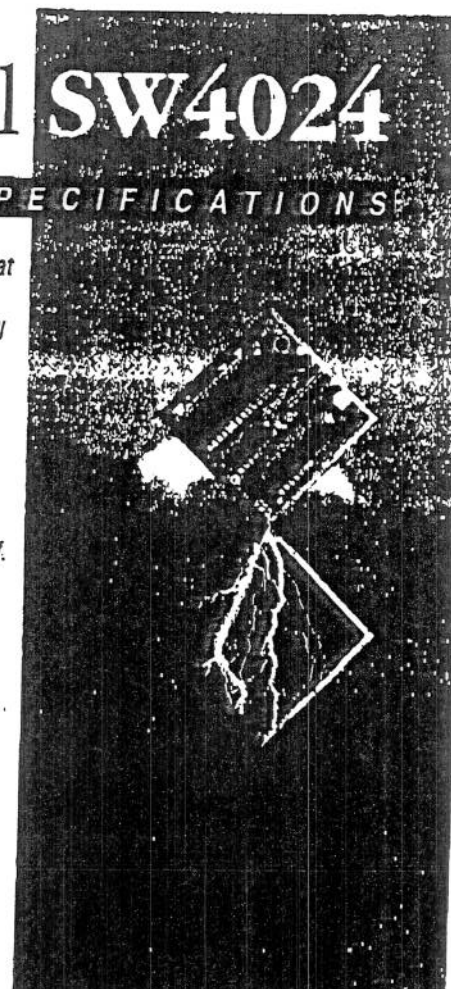
SPECIFICATIONS

Utility Interactive Mode: Operating as a bi-directional battery charger, power from any source that tries to raise the batteries above their programmed float voltage is delivered to the grid. A GRID USAGE TIMER can be set to allow selling of electricity to the utility only during prescribed hours. Sell back current is adjustable. **Caution:** Utility intertie must have approval of local utility company.

Peak Load Shaving Modes - (1) The SW4024 may be programmed to operate from batteries only during a specified period of the day. Batteries may be charged during lower rate periods. (2) During a programmable time of the day, power is delivered to the grid from the batteries. An alternative (lower) adjustable float voltage is employed to allow variable battery discharge depths.

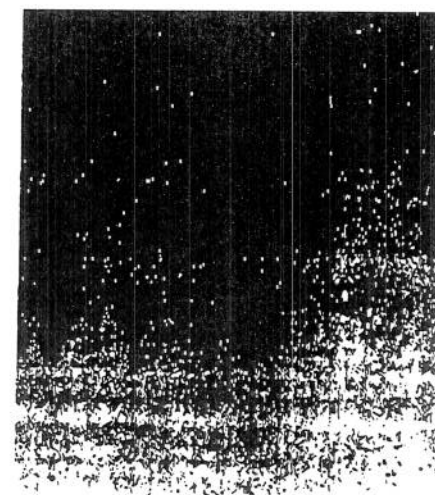
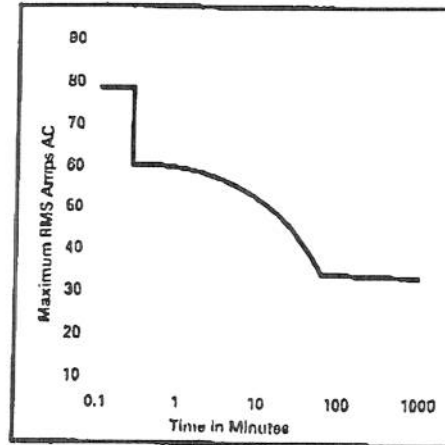
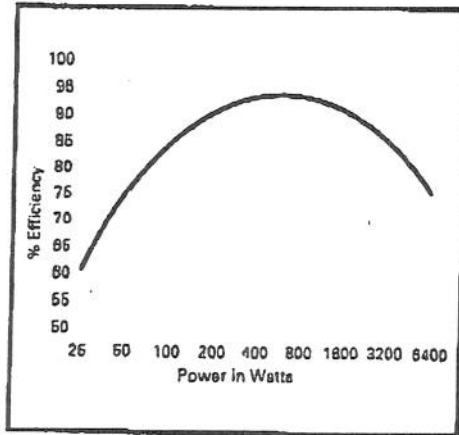
Three user adjustable voltage-controlled relays are provided to turn charging sources and loads on and off.

Selecting modes, enabling features and adjusting parameters are easily accomplished by moving thru a menu tree that is displayed on the control panel's LCD read-out. Doubling as a meter, the LCD will display INVERTER AMPS, INPUT AMPS, LOAD AMPS, BATTERY VOLTS DC and INVERTER VOLTS AC. Additionally, control panel LED's report the status of eight battery charger and AC input conditions.



Specifications	Model SW4024	Model SW4048
Input Voltage	24 VDC	48VDC
Output Power	4000 watts	4000 watts
Surge Power	10,000 watts	10,000 watts
Output Voltage	120 VAC	120 VAC
Efficiency	94% maximum	94% maximum
Voltage Regulation	±2%	±2%

Output Voltage	120 VAC	120 VAC
Efficiency	94% maximum	94% maximum
Voltage Regulation	±2%	±2%
Frequency Regulation	±.04%	±.04%
Input Requirements		
Min Search Power	1 watt	1 watt
Full Voltage	.66 amps	.33 amps
Rated Power	227 amps	113 amps
Distortion	3 to 5%	3 to 5%
Power Factor Allowed	1 to -1	1 to -1
Max. Charge Rate	120 amps	60 amps
Automatic Transfer Relay	60 amps	60 amps
Weight	105 lb	105 lb
Size	8" deep, 21" wide, 15.1" high	



THE POWER COMPANY
TRACE
 ENGINEERING

Available From:

*specifications may change without notice

Options: Remote control panel (SWRC), stacking interface cable (SWSI), conduit box for code approved DC input battery cables (SWCB).

Certified by ETL to meet Underwriters Laboratories specification UL1741 (residential use).

Approved by Warnock Hersey to Canadian specification CSA-C222 No. 107.1.



Printed on recycled paper

OCT 28 '96 17:07

4038738768

PAGE. 02

Call to: Bill Slater From: Gary Strong
Organization: Adco Date: 29 Oct / 96
Phone No. 403-465-3265 File No. 96-3817
Project: Arctic Bay + Clyde
Regarding: Costs

Adco completed the Lake Harbour TF
plus others

- cost saving to build in south
\$200 / man day (Accom)
\$60 / man day wages
\$260

Total of 60 site man days can be saved
plus 10 flights

- Total savings $\Rightarrow$ \$45k to \$50k.

- If Bulky cladding can be put on
after = avoids shipping hassles -

- Bill willing to help is costly various
building types

Signed: _____



Telephone Discussion Record

Call to: Midnight Sun From: Gary Strong
Organization: _____ Date: Oct 28/96
Phone No. _____ File No. 96-3817
Project: _____
Regarding: UPS.

- 4000 watt inverter can be stacked
- \$4,200 each
- Use 2 volt industrial batteries
 - 24 volt system
 - 12 batteries per set
- At 3000 amp hours needs 2 sets of batteries.

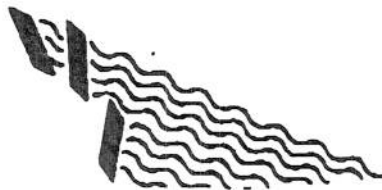
± \$ 20,000

Signed: _____



APPENDIX C

COST ESTIMATE DATA



Midnight Sun Energy
the remote power experts
5 Ellesmere Drive
Yellowknife, NT
873-8760 Fax 873-8768

FACSIMILE TRANSMISSION SHEET

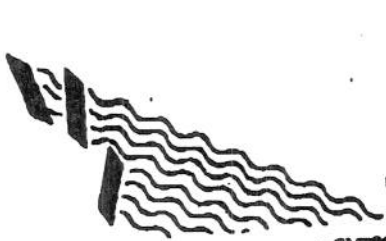
TO: Gary Strong
FAX NO: 873-3328
FROM: Alex Hampson
DATE: Oct. 28/96
NUMBER OF PAGES INCLUDING COVER: 3

MESSAGE:

Hi Gary,
Here is the information you
requested.
Cheers,
Alex.



Midnight Sun Energy
the remote power experts



Midnight Sun Energy
the remote power experts
5 Ellesmere Drive
Yellowknife, NT
873-8760 Fax 873-8768

-system design, sales and installation
-solar panels -wind generators -inverters -batteries -water pumps
-hot water systems -energy-efficient lighting -other alternative energy products
-diesel generators -gas generators -heaters -camp supplies -floating dock systems

Gary Strong
Dillon Engineering
Yellowknife, NT

October 28, 1996

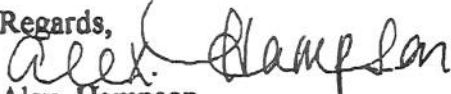
Gary:

Thanks for your call. Here are the specs on the Trace 4000W pure sine wave inverters. I have included some pricing based on the battery bank you specified.

QUANTITY	DESCRIPTION	UNIT PRICE	AMOUNT
2	Trace 4000W inverters	3995.00	7990.00
24	2V cells -1560Ahrs (2 sets of 12=3120Ahrs)		11,900.00

Other configurations are also available

If you need further information on sizing , pricing or design, please give us a call any time.

Regards,

Alex. Hampson

Model SW4024

POWER CONVERSION CENTER

A Revolution in Power Technology

The result of new ideas and technologies, the Trace Model SW4024 delivers sine wave power without compromise. Now sine wave output with high efficiency, high surge and low idle current is available. It is more than just the finest inverter, with three microprocessors and bi-directional power topology, it has features and capabilities that were previously either non-existent or available only as separate products.

Inverter

- Multiple step, low distortion, 4000 watt continuous sine wave output, 94% maximum efficiency.
- Units may be operated in series to provide 8000 watts at 240 vac, three wire, with optional series interface cable.
- Adjustable search mode circuit can reduce idle power to 1 watt.
- Current compensated, adjustable low battery cutout voltage. Adjustable low battery cut-in, high battery cutout and high battery cut-in voltages.
- Protection circuitry guards against over-current, short circuit, over temperature, low battery and high battery conditions.

Battery Charger

- Continuous 120 amp rated. High efficiency, low current distortion design allows the use of smaller generators.
- Three stage, temperature compensated charging algorithm ensures maximum battery life. Remote battery temperature probe is standard.
- Adjustable temperature compensation, charge rate, LCD meter indicates, BULK VOLTS, FLOAT VOLTS and BULK DONE AMPS.

When connected to grid or generator, the SW4024 synchronizes its waveform to that of the AC source, locks to it and operates in parallel. This ability, coupled with the bi-directional power topology and microprocessor control, makes it possible for the unit to offer multiple operating modes.

Generator Support Mode: When charging from a generator, the generator's output voltage and current are monitored. If either falls below user adjustable limits, the unit sheds itself as a load and then reverses the power flow if necessary. This delivers energy from the batteries to the loads assisting the generator. When operating two units in series at 240 VAC, one 120 VAC leg can be charging while the other is supporting.

Standby Power Mode: Two AC inputs are provided - one for generator and one for utility grid. When AC falls, transfer to inverter power is no longer than 34 milliseconds. If the grid and generator are connected, the unit can be set to start the generator if the grid falls. After grid returns, the generator is automatically stopped. The inverter output is synchronized to the grid and the grid is reconnected to the loads.

Battery Voltage Transfer Mode: If the batteries are low, a current compensated low battery set point triggers connection to the grid. The charger operation may be enabled or disabled during grid connection.

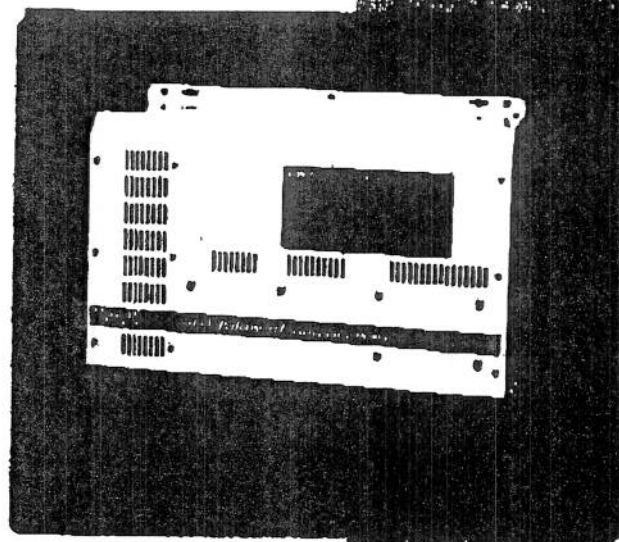
Generator Start Mode: Extensive automatic generator start features are standard and user programmable. Gen start can be triggered by battery voltage, load size in amps or time of day. QUIET TIME can be set during which the generator is not allowed to start unless a MUST START override voltage is reached. WARMUP SECONDS, MAX CRANKING SECONDS and MAX STARTING ATTEMPTS are some of the user adjustable parameters.

"I don't have enough house loads to find out what the limits of this baby are."
John C. Wiles, Research Engineer, Southwest Technology Development Institute

From
Trace Engineering,
maker of the world's
most reliable
inverters

An advanced original
and revolutionary
design

Sine wave power
without
compromise



THE POWER COMPANY
Trace
ENGINEERING

Model SW4024

SPECIFICATIONS

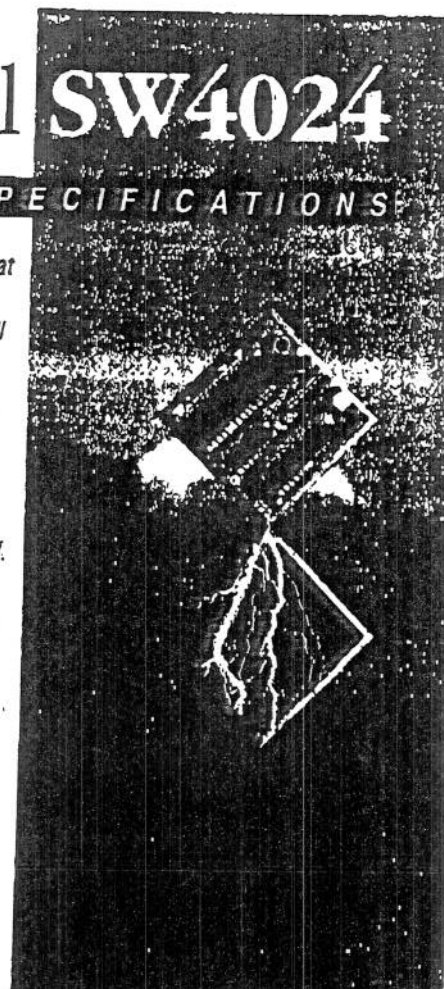
Utility Interactive Mode: Operating as a bi-directional battery charger, power from any source that tries to raise the batteries above their programmed float voltage is delivered to the grid. A GRID USAGE TIMER can be set to allow selling of electricity to the utility only during prescribed hours. Sell back current is adjustable. **Caution:** Utility intertie must have approval of local utility company.

Peak Load Shaving Modes - (1) The SW4024 may be programmed to operate from batteries only during a specified period of the day. Batteries may be charged during lower rate periods. (2) During a programmable time of the day, power is delivered to the grid from the batteries. An alternative (lower) adjustable float voltage is employed to allow variable battery discharge depths.

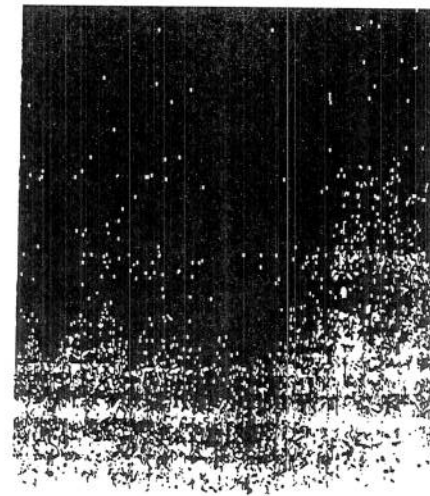
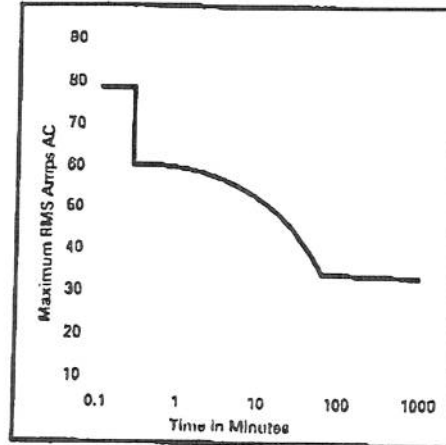
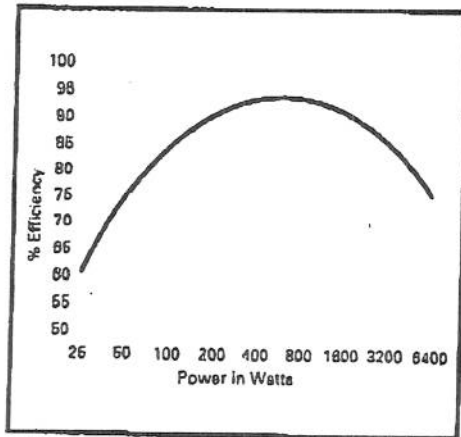
Three user adjustable voltage-controlled relays are provided to turn charging sources and loads on and off.

Selecting modes, enabling features and adjusting parameters are easily accomplished by moving thru a menu tree that is displayed on the control panel's LCD read-out. Doubling as a meter, the LCD will display INVERTER AMPS, INPUT AMPS, LOAD AMPS, BATTERY VOLTS DC and INVERTER VOLTS AC. Additionally, control panel LED's report the status of eight battery charger and AC input conditions.

Specifications	Model SW4024	Model SW4048
Input Voltage	24 VDC	48VDC
Output Power	4000 watts	4000 watts
Surge Power	10,000 watts	10,000 watts
Output Voltage	120 VAC	120 VAC
Efficiency	94% maximum	94% maximum
Voltage Regulation	±2%	±2%



Output Voltage	120 VAC	120 VAC
Efficiency	94% maximum	94% maximum
Voltage Regulation	±2%	±2%
Frequency Regulation	±.04%	±.04%
Input Requirements		
Min Search Power	1 watt	1 watt
Full Voltage	.66 amps	.33 amps
Rated Power	227 amps	113 amps
Distortion	3 to 5%	3 to 5%
Power Factor Allowed	1 to -1	1 to -1
Max. Charge Rate	120 amps	60 amps
Automatic Transfer Relay	60 amps	60 amps
Weight	105 lb	105 lb
Size	8"deep, 21"wide, 15.1"high	



THE POWER COMPANY
Trace
ENGINEERING

Available From:

*specifications may change without notice

Options: Remote control panel (SWRC), stacking interface cable (SWSI), conduit box for code approved DC input battery cables (SWCB).

Certified by ETL to meet Underwriters Laboratories specification UL1741 (residential use).

Approved by Warnock Hersey to Canadian specification CSA-C222 No. 107.1.



Printed on recycled paper

OCT 28 '96 17:07

4038738768

PAGE.02

Call to: Bill Slater From: Gary Strang
Organization: Adco Date: 29 Oct / 96
Phone No. 403-465-3265 File No. 96-3817
Project: Arctic Bay + Clyde
Regarding: Costs

Adco completed the Lake Harbour TF
plus others

- cost saving to build in south
\$200 / man day (Accom)
\$60 / man day wages
\$260

Total of 60 site man days can be saved
plus 10 flights

- Total savings $\Rightarrow$ \$45k to \$50k.
- If Bulky cladding can be put on
after = avoids shipping hassles -
- Bill willing to help is costly various
building types

Signed: 

Call to: Midnight Sun From: Gary Strong
Organization: _____ Date: Oct 28/96
Phone No. _____ File No. 96-3817
Project: _____
Regarding: UPS.

- 4000 watt inverter can be stacked
- \$4,200 each
- use 2 volt industrial batteries
 - 24 volt system
 - 12 batteries per set
- At 3000 amp hours needs 2 sets of batteries.
- ± \$ 20,000

Signed: 

Telephone Discussion Record

Call to: Graham Medwork From: Gary Strong
Organization: ~~First~~ A Delwa Canada Date: 23 Oct 1996
Phone No. 403-250-2650 File No. 96-3817
Project: Arctic Bay & Clyde River
Regarding: _____

- \$50 to \$60 per tank for Calcium
- Pump stays the same
- total Sodium is $\pm \$200$ to delete the tank from the system.
- The use of sodium is common, and doesn't present a problem to the system.

Signed: 

FACSIMILE COVER SHEET

M. M. Dillon Limited

#201, 5102 - 51 St.
Yellowknife, NWT, X1A 1S7
(403) 920 - 4555
(403) 873 - 3328

Phone:
Fax:

TO
COMPANY

Transport Narvik

FAX NO. 1-514-523-7875

ATTENTION

John

DATE Oct 23

FROM

Gary Strong

TIME

DILLON PROJECT NO.

96-3817

TOTAL PAGES SENT 1
(including this page)

MESSAGE

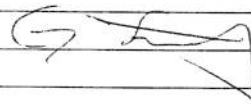
Re Shipping Rates:

I'm looking for "budget \$", last
years will be fine to ship
material to Arctic Bay and
Clyde River.

Fairly large kg and volume

Call or fax information to my
attention E F 903 873-3328
call 920-4555

Thanking you in advance



Telephone Discussion Record

Call to: John Lepine From: Gary Strong
Organization: Transport Date: Oct 25/96
Phone No. 514-597-0186 File No. 96-3817
Project: Arctic and Clyde River Truck fill stations
Regarding: Sea lift costs

The rate for bulk material to the communities is as follows.

Clyde River \$ 379 /tonne or \$ 379 / 2.5m³

Arctic Bay \$ 384 /tonne or \$ 384 / 2.5m³

If a large quantity is being shipped the rate would be closer to \$ 350 /tonne or 2.5m³

Signed: 

Bradley Air Services Ltd
 carrying on business under the
 firm name and style of FIRST AIR

DOMESTIC SCHEDULED TARIFF
 12th Revised Page 87
 Cancels
 11th Revised Page 87

FROM

YELLOWKNIFE - YZF

TO

FOR PICK-UP & DELIVERY SERVICES SEE PAGES 89 - 92

BROUGHTON ISLAND YVM				CAMBRIDGE BAY YCB				CAPE DORSET YTE				CLYDE RIVER YCY				CORAL HARBOUR YZS				FORT RESOLUTION YFR			
RTG 7F YFB 7F				RTG 7F DIRECT				RTG 7F YFB 7F				RTG 7F YSR 7F YIO 7F				RTG 7F YFB 7F				RTG 7F DIRECT			
DELIVERY				DELIVERY				DELIVERY				DELIVERY				DELIVERY				DELIVERY			
RATE	KG	\$/KG	PIVOT	RATE	KG	\$/KG	PIVOT	RATE	KG	\$/KG	PIVOT	RATE	KG	\$/KG	PIVOT	RATE	KG	\$/KG	PIVOT	RATE	KG	\$/KG	PIVOT
GEN MIN 31.00	4			GEN MIN 25.00	9			GEN MIN 31.00	4			GEN MIN 31.00	3			GEN MIN 31.00	3			GEN MIN 25.00	21		
GEN 1 7.33	41			GEN 1 2.52	43			GEN 1 6.87	41			GEN 1 8.16	42			GEN 1 8.16	41			GEN 1 1.15	189		
GEN 45 6.71	196			GEN 45 2.46	198			GEN 45 6.26	195			GEN 45 7.79	198			GEN 45 7.44	194						
GEN 200 6.59	459			GEN 200 2.44	497			GEN 200 6.13	457			GEN 200 7.72	495			GEN 200 7.23	436			GEN 200 1.09			
GEN 500 6.06				GEN 500 2.43				GEN 500 5.61				GEN 500 7.65				GEN 500 6.31							
PRI MIN 48.00	4			PRI MIN 39.00	11			PRI MIN 48.00	5			PRI MIN 48.00	4			PRI MIN 48.00	4			PRI MIN 32.00	20		
PRI 1 9.90	41			PRI 1 3.40	43			PRI 1 9.27	41			PRI 1 11.02	42			PRI 1 11.02	41			PRI 1 1.55	189		
PRI 45 9.06	196			PRI 45 3.32	198			PRI 45 8.45	195			PRI 45 10.52	198			PRI 45 10.04	194						
PRI 200 8.90	459			PRI 200 3.29	497			PRI 200 8.28	457			PRI 200 10.42	495			PRI 200 9.76	436			PRI 200 1.47			
PRI 500 8.18				PRI 500 3.28				PRI 500 7.57				PRI 500 10.33				PRI 500 8.52							
ENV MIN 25.00				ENV MIN 12.50				ENV MIN 25.00				ENV MIN 25.00				ENV MIN 25.00				ENV MIN 20.00			
SCR MIN 25.00				SCR MIN 25.00																			
#16 1 1.89	13																						

FORT SIMPSON YFS				GJOA HAVEN YHK				HALL BEACH YUX				HAY RIVER YHY				HOLMAN YHI				IGLOOLIK YGT			
RTG 7F DIRECT				RTG 7F DIRECT				RTG 7F YSR 7F				RTG 7F DIRECT				RTG 7F DIRECT				RTG 7F DIRECT			
DELIVERY				DELIVERY				DELIVERY				DELIVERY				DELIVERY				DELIVERY			
RATE	KG	\$/KG	PIVOT	RATE	KG	\$/KG	PIVOT	RATE	KG	\$/KG	PIVOT	RATE	KG	\$/KG	PIVOT	RATE	KG	\$/KG	PIVOT	RATE	KG	\$/KG	PIVOT
GEN MIN 25.00	16			GEN MIN 31.00	10			GEN MIN 31.00	4			GEN MIN 25.00	18			GEN MIN 31.00	7			GEN MIN 31.00	4		
GEN 1 1.52	180			GEN 1 3.02	42			GEN 1 6.35	43			GEN 1 1.35	182			GEN 1 3.94	40			GEN 1 6.35	43		
GEN 200 1.37				GEN 45 2.88	197			GEN 45 6.10	198			GEN 45 3.58	161			GEN 45 6.10	198			GEN 45 6.10	198		
				GEN 200 2.84	496			GEN 200 6.04	494			GEN 200 1.23				GEN 200 2.89	442			GEN 200 6.04	494		
				GEN 500 2.82				GEN 500 5.97								GEN 500 2.56				GEN 500 5.97			
PRI MIN 32.00	15			PRI MIN 48.00	11			PRI MIN 48.00	5			PRI MIN 32.00	17			PRI MIN 48.00	9			PRI MIN 48.00	5		
PRI 1 2.05	180			PRI 1 4.08	42			PRI 1 8.57	43			PRI 1 1.82	182			PRI 1 5.32	40			PRI 1 8.57	43		
PRI 200 1.85				PRI 45 3.89	107			PRI 45 8.24	198			PRI 200 1.66				PRI 45 4.83	161			PRI 45 8.24	198		
				PRI 200 3.83	496			PRI 200 8.15	494							PRI 200 3.90	412			PRI 200 8.15	494		
				PRI 500 3.81				PRI 500 8.06								PRI 500 3.46				PRI 500 8.06			
ENV MIN 20.00				ENV MIN 20.00				ENV MIN 25.00				ENV MIN 20.00				ENV MIN 20.00				ENV MIN 25.00			
SCR MIN 31.00				SCR MIN 31.00												SCR MIN 31.00							
#16 1 2.27	13															#16 1 2.96	10						

IQALUIT YFB				KIMMIRUT YLC				KUGLUKTUK YCO				KULIJUAQ YVP				LUTSEL KE YSR				MONTREAL YMQ			
RTG 7F DIRECT				RTG 7F YFB 7F				RTG 7F DIRECT				RTG 7F YFB 7F				RTG 7F DIRECT				RTG 7F YFB 7F			
DELIVERY				DELIVERY				DELIVERY				DELIVERY				DELIVERY				DELIVERY			
RATE	KG	\$/KG	PIVOT	RATE	KG	\$/KG	PIVOT	RATE	KG	\$/KG	PIVOT	RATE	KG	\$/KG	PIVOT	RATE	KG	\$/KG	PIVOT	RATE	KG	\$/KG	PIVOT
GEN MIN 25.00	6			GEN MIN 31.00	5			GEN MIN 25.00	13			GEN MIN 26.00	4			GEN MIN 25.00	18			GEN MIN 26.00	4		
GEN 1 4.01	39			GEN 1 5.41	40			GEN 1 1.91	39			GEN 1 5.36	40			GEN 1 1.33	180			GEN 1 6.32	40		
GEN 45 3.54	194			GEN 45 4.85	195			GEN 45 1.57	197			GEN 45 4.79	194			GEN 45 5.70	177			GEN 45 5.70	177		
GEN 200 3.44	427			GEN 200 4.74	446			GEN 200 1.65	493			GEN 200 4.67	443			GEN 200 1.20				GEN 200 5.06	489		
GEN 500 2.94				GEN 500 4.23				GEN 500 1.63				GEN 500 4.14								GEN 500 4.95			
PRI MIN 39.00	7			PRI MIN 48.00	6			PRI MIN 39.00	15			PRI MIN 48.00	6			PRI MIN 32.00	17			PRI MIN 48.00	5		
PRI 1 5.41	39			PRI 1 7.30	40			PRI 1 2.58	39			PRI 1 7.24	40			PRI 1 1.80	180			PRI 1 8.53	40		
PRI 45 4.78	194			PRI 45 6.55	105			PRI 45 2.25	197			PRI 45 6.47	194							PRI 45 7.10	177		
PRI 200 4.64	427			PRI 200 6.40	446			PRI 200 2.23	493			PRI 200 6.30	443			PRI 200 1.62				PRI 200 6.83	489		
PRI 500 3.97				PRI 500 5.71				PRI 500 2.20				PRI 500 5.59								PRI 500 6.68			
ENV MIN 17.50				ENV MIN 25.00				ENV MIN 12.50				ENV MIN 12.50				ENV MIN 20.00				ENV MIN 12.50			
SCR MIN 25.00								SCR MIN 25.00															
#16 1 3.01	8							#16 1 1.62	15														

ISSUED
 1996 June 15

ISSUED BY: G R PLEXMAN
 DIRECTOR MARKETING SUPPORT SERVICES
 CARP, ONTARIO K0A 1L0

EFFECTIVE
 1996 July 01

Bradley Air Services Ltd
 carrying on business under the
 firm name and style of FIRST AIR

DOMESTIC SCHEDULED TARIFF

8th Revised Page 38

Cancel

7th Revised Page 38

FROM

YELLOWKNIFE - YZF

TO

FOR PICK-UP & DELIVERY SERVICES SEE PAGES 89 - 92

NANISIVIK				YSR OTTAWA				YOW PANGNIERTUNG				YXP PELLY BAY				YBB POND INLET				YIO			
RTG 7F DIRECT				RTG 7F DIRECT				RTG 7F YFB 7F				RTG 7F DIRECT				RTG 7F YSR 7F				RTG 7F DIRECT			
DELIVERY				DELIVERY				DELIVERY				DELIVERY				DELIVERY				DELIVERY			
RATE	KG	\$/KG	PIVOT	RATE	KG	\$/KG	PIVOT	RATE	KG	\$/KG	PIVOT	RATE	KG	\$/KG	PIVOT	RATE	KG	\$/KG	PIVOT	RATE	KG	\$/KG	PIVOT
GEN	MIN	26.00	4	GEN	MIN	25.00	4	GEN	MIN	31.00	4	GEN	MIN	31.00	4	GEN	MIN	31.00	5	GEN	MIN	31.00	5
GEN	1	3.83	42	GEN	1	6.32	40	GEN	1	6.34	40	GEN	1	3.77	42	GEN	1	5.30	43	GEN	1	5.30	43
GEN	45	3.63	198	GEN	45	5.70	177	GEN	45	5.77	195	GEN	45	3.59	198	GEN	45	5.07	198	GEN	45	5.07	198
GEN	200	3.61	497	GEN	200	5.06	489	GEN	200	5.63	454	GEN	200	3.56	492	GEN	200	5.03	495	GEN	200	5.03	495
GEN	500	3.59		GEN	500	4.95		GEN	500	5.12		GEN	500	3.51		GEN	500	4.98		GEN	500	4.98	
PRI	MIN	48.00	9	PRI	MIN	48.00	5	PRI	MIN	48.00	5	PRI	MIN	48.00	9	PRI	MIN	48.00	6	PRI	MIN	48.00	6
PRI	1	5.17	42	PRI	1	8.53	40	PRI	1	8.56	40	PRI	1	5.09	42	PRI	1	7.16	43	PRI	1	7.16	43
PRI	45	4.90	198	PRI	45	7.70	177	PRI	45	7.79	195	PRI	45	4.85	198	PRI	45	6.84	198	PRI	45	6.84	198
PRI	200	4.87	497	PRI	200	6.83	489	PRI	200	7.60	454	PRI	200	4.81	492	PRI	200	6.79	495	PRI	200	6.79	495
PRI	500	4.85		PRI	500	6.68		PRI	500	6.91		PRI	500	4.74		PRI	500	6.72		PRI	500	6.72	
ENV	MIN	12.50		ENV	MIN	12.50		ENV	MIN	25.00		ENV	MIN	20.00		ENV	MIN	25.00		ENV	MIN	25.00	
												SCR	MIN	31.00									
												#16	1	2.83	10								
RANKIN INLET				YRT RESOLUTE BAY				YRB TALOYOAK				YYH VAL D'OR				YVO WHA TI				YLE WHITEHORSE			
RTG 7F YFR 7F				RTG 7F DIRECT				RTG 7F DIRECT				RTG 7F YFB 7F				RTG 7F DIRECT				RTG 7F DIRECT			
DELIVERY				DELIVERY				DELIVERY				DELIVERY				DELIVERY				DELIVERY			
RATE	KG	\$/KG	PIVOT	RATE	KG	\$/KG	PIVOT	RATE	KG	\$/KG	PIVOT	RATE	KG	\$/KG	PIVOT	RATE	KG	\$/KG	PIVOT	RATE	KG	\$/KG	PIVOT
GEN	MIN	31.00	4	GEN	MIN	25.00	8	GEN	MIN	31.00	9	GEN	MIN	26.00	4	GEN	MIN	25.00	22	GEN	MIN	25.00	16
GEN	1	6.75	38	GEN	1	3.02	37	GEN	1	3.40	42	GEN	1	6.32	40	GEN	1	1.13	187	GEN	1	1.55	185
GEN	45	5.80	189	GEN	45	2.55	185	GEN	45	3.23	198	GEN	45	5.70	173	GEN	45	1.13	187	GEN	45	1.55	185
GEN	200	5.50	440	GEN	200	2.37	474	GEN	200	3.21	493	GEN	200	4.95	500	GEN	200	1.06		GEN	200	1.44	
GEN	500	4.84		GEN	500	2.25		GEN	500	3.17		GEN	500	4.95		GEN	500	1.06		GEN	500	1.44	
PRI	MIN	48.00	5	PRI	MIN	48.00	11	PRI	MIN	48.00	10	PRI	MIN	48.00	10	PRI	MIN	32.00	20	PRI	MIN	32.00	15
PRI	1	9.11	38	PRI	1	4.08	37	PRI	1	4.59	42	PRI	1	4.59	42	PRI	1	1.53	187	PRI	1	2.09	185
PRI	45	7.83	189	PRI	45	3.44	185	PRI	45	4.36	198	PRI	45	4.36	198	PRI	45	1.53	187	PRI	45	1.53	185
PRI	200	7.43	440	PRI	200	3.20	474	PRI	200	4.33	493	PRI	200	4.33	493	PRI	200	1.13		PRI	200	1.94	
PRI	500	6.53		PRI	500	3.04		PRI	500	4.28		PRI	500	4.28		PRI	500	1.13		PRI	500	1.94	
ENV	MIN	25.00		ENV	MIN	12.50		ENV	MIN	20.00		ENV	MIN	12.50		ENV	MIN	20.00		ENV	MIN	20.00	

DELIVERIES

KUUJJUAQ 8.00/ over 16kg 10.00

RANKIN INLET 8.00/over 61 .13 per kg

WHA TI 8.00

WHITEHORSE 8.00/ over 50kg 8.00+ 0.05 per kg

HAY RIVER 10.00 2.5kg -
 16.00 over 50kg
 8.00 ENV 40 2.5kg

ISSUED
 1996 June 15

ISSUED BY: G.R. PLEXMAN
 DIRECTOR, MARKETING SUPPORT SERVICES
 CARP, ONTARIO K0A 1L0

EFFECTIVE
 1996 July 01

Telephone Discussion Record

Call to: _____ From: Gary Strong
Organization: Dr. Claire Chenhor Date: Oct 23/96
Phone No. 403-452-6000 File No. 96-3817
Project: Arctic Bay and Clyde River Truckfill
Regarding: Disinfectant Prices

Looking for disinfectant prices

Sodium in 12% 22.7 liter non returnable
in flats of 24 $\rightarrow \$17.71^*$ each

- shelf life - end of 90 days strength
will decrease

- can not be frozen (can stand $\pm 70^{\circ}\text{C}$)

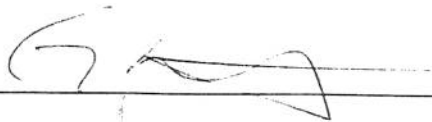
Normally fly calcium - 65% available

calcium - 2.5kg plastic Bottles

- cases of 9

- \$133²⁰ / case.

Signed: _____



Call to: Dan Rato From: Gary Strong
Organization: Best Tech Date: Oct 12/96
Phone No. 1-905-564-7655 File No. 96-3817
Project: Arctic Bay + Clyde River
Regarding: UPS Systems

Run time -

need 6 KW for 60 min

- will run for 48 mins

Put on EBP9 F - ⁷³~~23~~ mins @ 5 KW
12.5 KVA on say ²⁷ mins @ 6 KW

- @ ϕ .2 KW - 269 mins (4 or 5 hours)

- what is power requirements -

- \$ for Supply. Best \$12,448⁰⁰ FOB. Mississauga
Battery \$5,239⁰⁰

- Dimensions

Battery
Pack
included.

\$17,700⁰⁰

3' high x 19" wide, x 32" deep - 580 lbs

30" high x 15" wide x 32" deep - 1002 lbs

Signed: _____



CHLORINE SAMPLE CALCULATION

Parameters

1 ppm C1 residual is required.

Sodium Hypochlorite is 12% available C1

Calcium Hypochlorite is 65% available C1

Year 1 Arctic Bay 24,000 m³

This requires 24 L of C1

i.e. (24,000 x 1 x 10⁻⁶ x 1000)

24 L of C1 requires 200 L (or 200 Kg) of Calcium Hypochlorite

Year 2

Requires

325 L (or 325 Kg) of Sodium Hypochlorite

Using Calcium	Totals are:	Year 1 - 37 Kg
		Year 2 - 60 Kg

discount rat 0.08
Residual CI 5.0E-07

Calculation of Chlorine Costs on Annual basis

Design Year	Litres of Cl	Litres Required	Sodium Hypochloride Supply Cost Transport	Maintenanc	Operation	Total Annua Present value	Kilograms	Calcium Hypochloride Supply Cost Transport	Maintenanc	Operation	Total Annua Present val
0	11.8	98.3	76.7	398.4	500.0	1015.1	18.2	107.5	500.0	520.0	1134.4
1	12	100.0	78.0	405.2	500.0	1023.2	18.5	109.3	500.0	520.0	1136.4
2	12.3	102.5	80.0	415.3	500.0	1035.3	18.9	112.0	500.0	520.0	1139.3
3	12.6	105.0	81.9	425.5	500.0	1047.4	19.4	114.8	500.0	520.0	1142.2
4	12.95	107.9	84.2	437.3	500.0	1061.5	19.9	117.9	500.0	520.0	1145.6
5	13.3	110.8	86.5	449.1	500.0	1075.5	20.5	121.1	500.0	520.0	1149.0
6	13.65	113.8	88.7	460.9	500.0	1089.6	21.0	124.3	500.0	520.0	1152.4
7	14	116.7	91.0	472.7	500.0	1103.7	21.5	127.5	500.0	520.0	1155.8
8	14.4	120.0	93.6	486.2	500.0	1119.8	22.2	131.2	500.0	520.0	1159.7
9	14.75	122.9	95.9	498.1	500.0	1133.9	22.7	134.3	500.0	520.0	1163.1
10	15.1	125.8	98.2	509.9	500.0	1148.0	23.2	137.5	500.0	520.0	1166.4
11	15.5	129.2	100.8	523.4	500.0	1164.1	23.8	141.2	500.0	520.0	1170.3
12	15.9	132.5	103.4	536.9	500.0	1180.2	24.5	144.8	500.0	520.0	1174.2
13	16.3	135.8	106.0	550.4	500.0	1196.3	25.1	148.5	500.0	520.0	1178.1
14	16.75	139.6	108.9	565.6	500.0	1214.5	25.8	152.6	500.0	520.0	1182.4
15	17.15	142.9	111.5	579.1	500.0	1230.6	26.4	156.2	500.0	520.0	1186.3
16	17.6	146.7	114.4	594.3	500.0	1248.7	27.1	160.3	500.0	520.0	1190.7
17	18.05	150.4	117.3	609.5	500.0	1266.8	27.8	164.4	500.0	520.0	1195.1
18	18.6	155.0	120.9	628.1	500.0	1289.0	28.6	169.4	500.0	520.0	1200.4
19	19.05	158.8	123.8	643.3	500.0	1307.1	29.3	173.5	500.0	520.0	1204.8
20	19.55	162.9	127.1	660.1	500.0	1327.2	30.1	178.1	500.0	520.0	1209.6
						12054.8					16063.2

4.0 SCHEMATICS AND FUNCTIONAL DATA

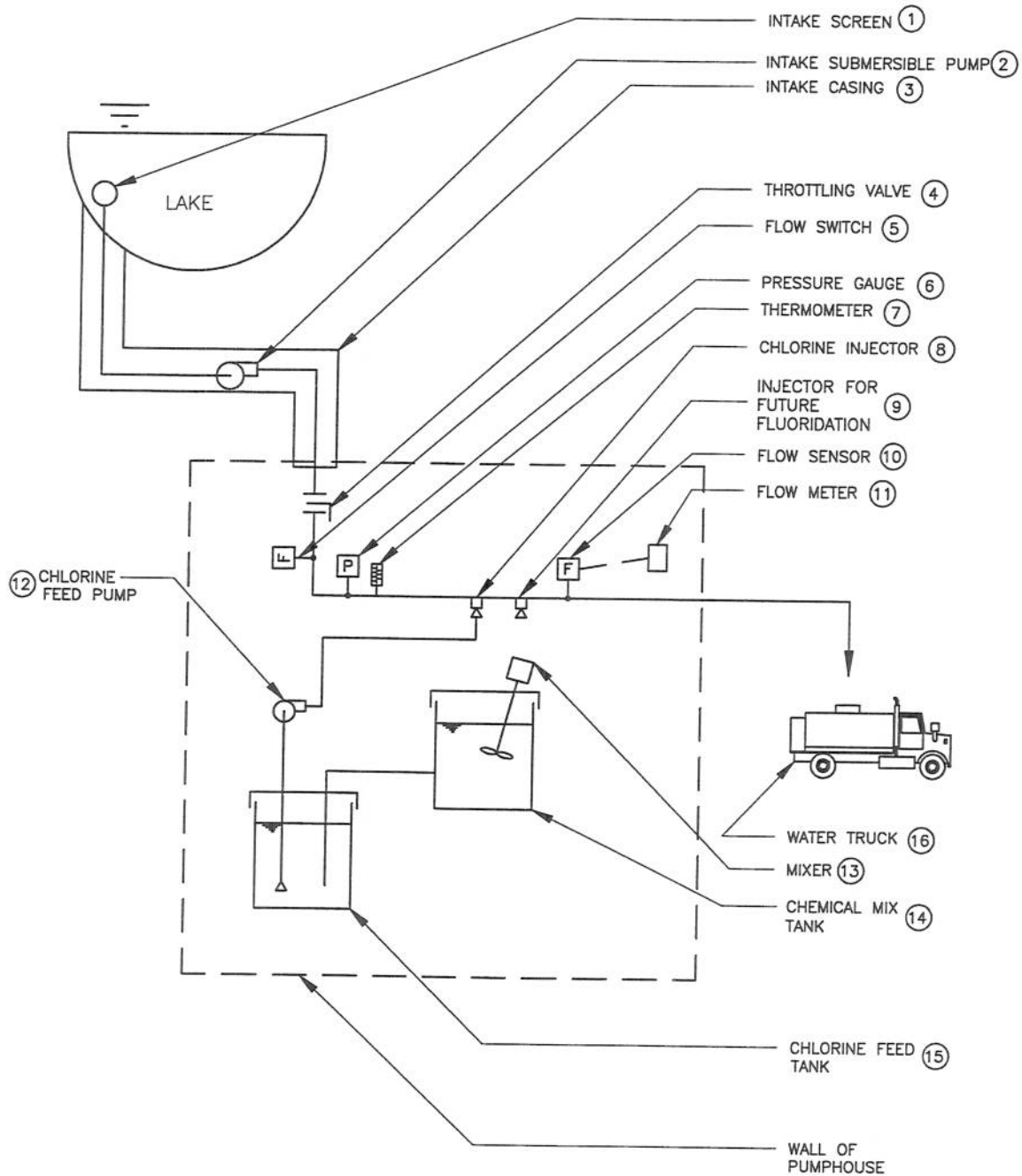
4.1 General

Chapter 4 contains tables and sketches that list components and a short description of their function.

For each system in the plant, there is a Table listing each component, it's function and cross references to the attached Figure and the Manufacturer's data in Chapter 9.

Five (5) systems are shown:

	Table	Figure
Water Treatment System	4.1	4.1
Power Distribution System	4.2	4.2
Controls and Alarms	4.3	4.3
Intake Casing, Pipe, and Cables	4.4	4.4
Heat Trace System	4.4	4.4, 4.5



PROCESS SCHEMATIC

NTS

EDIT DATE: 06/02/98 ACAD FILE: G:\963817\CLYDE_OM\OM_41.DWG
 BASE NAME: a.dwg LOG FILE: NA

DILLON
CONSULTING

PROJECT

CLYDE RIVER TRUCKFILL
CLYDE RIVER, NT

PROJECT NUMBER

96-3817

DATE

JUNE 98

TITLE

WATER TREATMENT SYSTEM

FIGURE NUMBER

4.1

**CLYDE RIVER TRUCKFILL
CLYDE RIVER, NT**

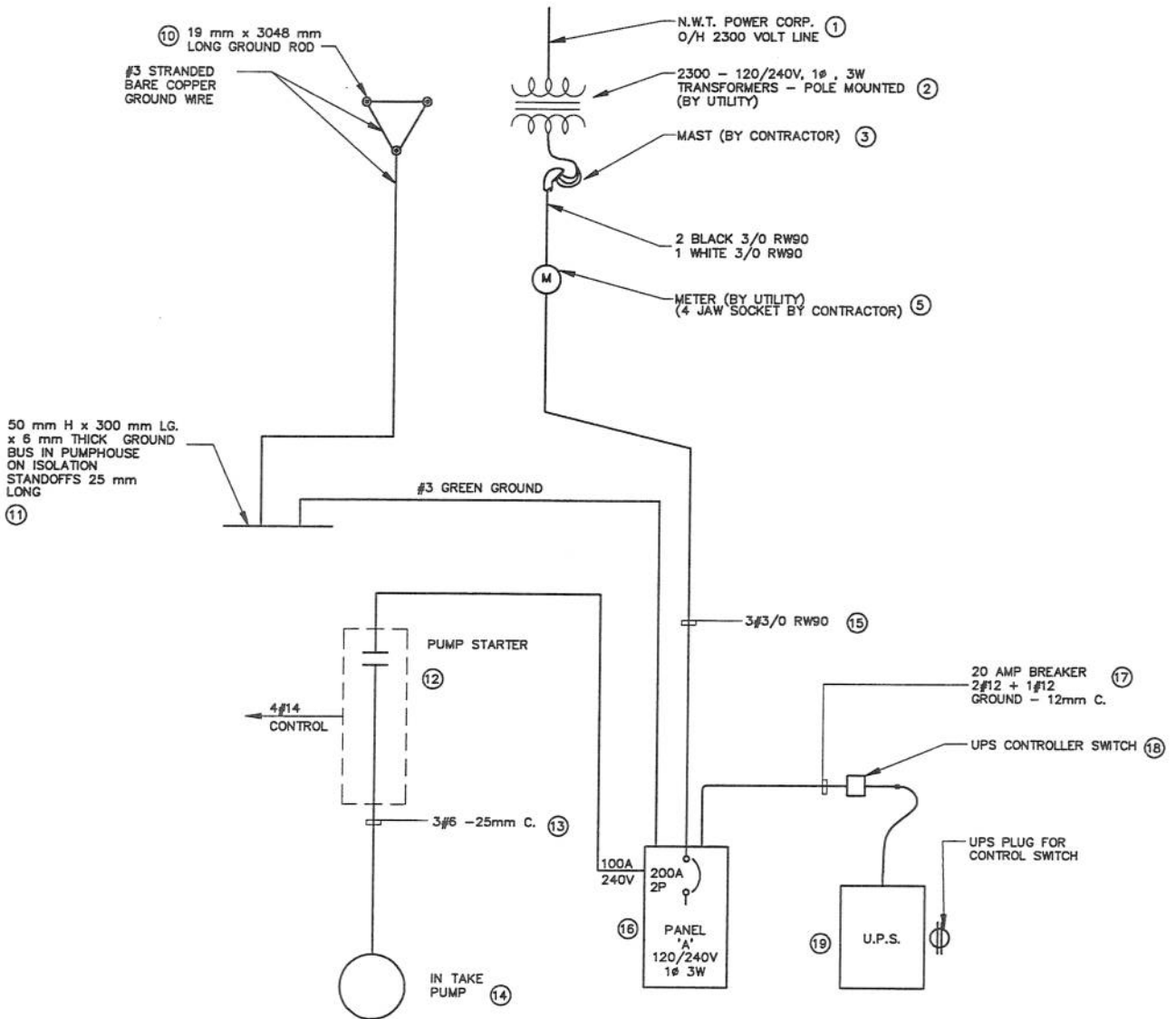
**WATER TREATMENT SYSTEM
TABLE 4.1**

Figure	No.	Section 9 Tab	Component	Function	Remarks
4.1	1	9.1	Intake Screen	Prevents larger solids from entering intake line and submersible pump	Stainless Steel Drum Screen
4.1	2	9.2	Submersible Pump	Pumps water from lake through intake pipe for treatment and distribution	Submersible 150 mm Diameter centrifugal pump, 7.5 HP, mounted on skid. Spare pump supplied.
4.1	3	9.1	Intake Casing	Screen flanged to casing. Casing houses and protects intake line and submersible pump.	Casing is insulated 300 mm Diameter DR17 HDPE pipe.
4.1	4	9.1	Throttling Valve	Control flow rate of water being pumped through system	Butterfly Valve
4.1	5	9.8	Flow Switch	Activates chlorine feed pump in a flow condition. Deactivates pump in no-flow condition	-
4.1	6	9.3	Pressure Gauge	Measures the water's gauge pressure in the system piping	-
4.1	7	9.3	Thermometer	Measures water's temperature	-
4.1	8	-	Chlorine Injector	Allows chlorine to be injected into raw water. Does not allow raw water into chlorine line.	-
4.1	9	-	Future Fluoridation Injector	For future fluoridation system	-
4.1	10	9.8	Flow Sensor	Paddle wheel that turns proportional to the flow rate. Connected to flow meter and accumulator.	-

**CLYDE RIVER TRUCKFILL
CLYDE RIVER, NT**

**WATER TREATMENT SYSTEM
TABLE 4.1**

Figure	No.	Section 9 Tab	Component	Function	Remarks
4.1	11	9.3	Flow Meter	Displays flow rate of system	Flow Meter/Accumulator housed in control panel.
4.1	12	9.4	Chlorine Feed Pump	Pumps chlorinated stock from feed tank to raw water in system piping.	Positive displacement pump with adjustable stroke and rate.
4.1	13	9.4	Mixer	Physically mixes calcium hypochlorite and water for treating raw water.	Neptune 120 V, 1/20 HP agitator.
4.1	14	9.4	Chemical Mix Tank	Vessel used to mix calcium hypochlorite and water for treating raw water.	Translucent plastic tank with lid.
4.1	15	9.4	Chemical Feed Tank	Stores mixed stock of calcium hypochlorite and water for injection into raw water.	Translucent plastic tank with lid.
4.1	16	-	Water Truck	Delivers treated water	-



POWER DISTRIBUTION SYSTEM

NTS

EDIT DATE: 06/02/98 ACAD FILE: G:\963817\CLYDE_OM\OM_41.DWG
BASE NAME: a.dwg LOG FILE: NA

DILLON
CONSULTING

PROJECT

CLYDE RIVER TRUCKFILL
CLYDE RIVER, NT

TITLE

POWER DISTRIBUTION SYTEM

PROJECT NUMBER

96-3817

DATE

JUNE 98

FIGURE NUMBER

4.2