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
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.

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

An advanced original and revolutionary design

Sine wave power without compromise

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

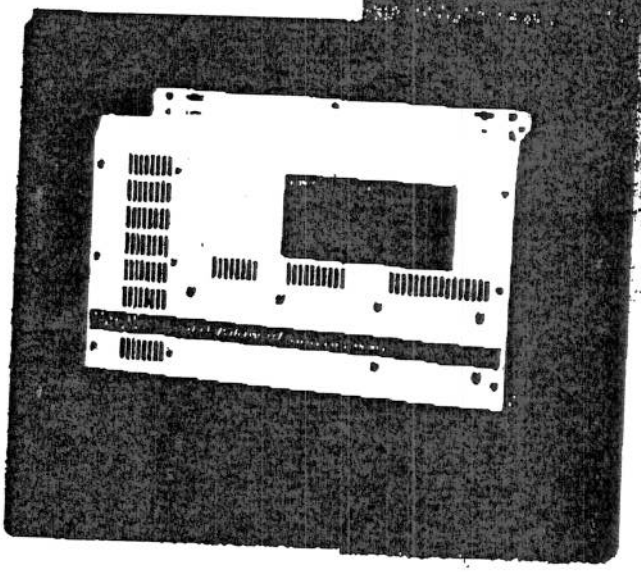
- *Continuous 120 amp rated. High efficiency, low current distortion design allows the use of smaller generators.*
- *Three stage, temperature compensated charging algorithm ensures maximum battery life. Remote battery temperature probe is standard.*
- *Adjustable temperature compensation, charge rate. 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

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.*

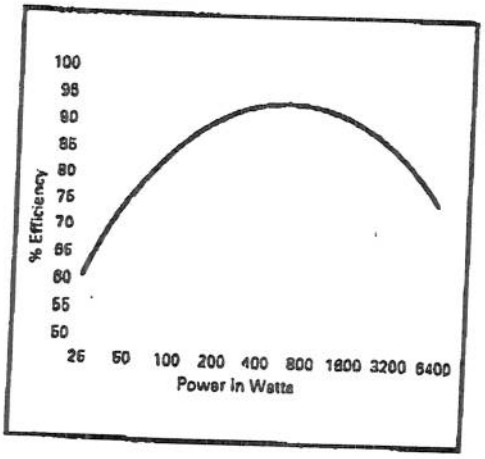
Peak Load Shaving Modes - *(1) The SW4024 may be programmed to operate from batteries only during a specified period of the day. Batteries may be charged during lower rate periods. (2) During a programmable time of the day, power is delivered to the grid from the batteries. An alternative (lower) adjustable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

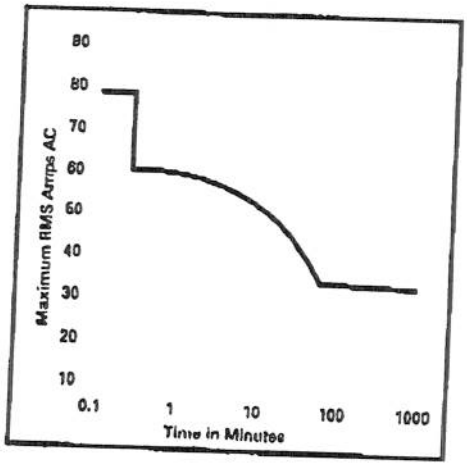
Three user adjustable voltage-controlled relays are provided to turn charging sources and loads on and off.

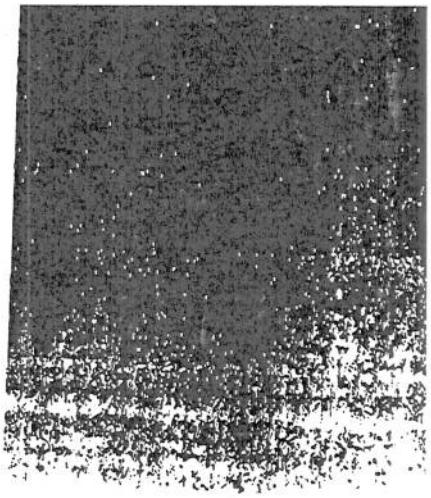
Selecting modes, enabling features and adjusting parameters are easily accomplished by moving thru a menu tree that is displayed on the control panel's LCD read-out. Doubling as a meter, the LCD will display INVERTER AMPS, INPUT AMPS, LOAD AMPS, BATTERY VOLTS DC and INVERTER VOLTS AC. Additionally, control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

Efficiency	94% maximum	94% maximum
Voltage Regulation	±2%	±2%
Frequency Regulation	±.04%	±.04%
Input Requirements		
Min Search Power	1 watt	1watt
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.

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DILLON
Consulting Engineers • Planners
Environmental Scientists

Telephone Discussion Record

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 ⇒ $45k to $50K.

- If Building cladding can be put on after - saves shipping hassels -

- Bill willing to help in costing various building types

Signed: G Strang

MMD-154-67 (Rev. 3)

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Consulting Engineers • Planners
Environmental Scientists

Telephone Discussion Record

Call to: Midnight Sun From: Gary Strang

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: _____

DILLON
Consulting Engineers • Planners
Environmental Scientists

Telephone Discussion Record

Call to: _____ From: Gary Strang.

Organization: Prairie Chem Inc Date: Oct 23/96

Phone No. 403-452-6000 File No. 96-3817

Project: Arctic Bay and Clyde River Truck fill

Regarding: Disinfectant Prices.

Looking for disinfectant prices

Sodium in 12% 22.7 liter non returnable
in flats of 24 → $17.71 each

- shelf life - end of 90 days Strength will decrease
- can not be frozen (can stand ± 70°C)

Normally fly Calcium - 65% available

Calcium - 2.5kg plastic Bottles
- Cases of 9
- $133.20 / case.

Signed: _____

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Consulting Engineers • Planners
Environmental Scientists

Telephone Discussion Record

Call to: Graham Redwork From: Gary Strong

Organization: ~~First~~ A Petro Canada Date: 23 Oct / 96

Phone No. 403-250-2650 File No. 96-3817

Project: Arctic Bay & Clyde River

Regarding:

- $50 to $60 per tank for Cadium
- Pump stays the same
- total system is ± $200 to delete the tank from the system.
- The use of sodium is common, it doesn't present a problem to the system.

Signed:

MMD-154-67 (Rev. 3)

FACSIMILE COVER SHEET

M. M. Dillon Limited
#201, 5102 - 51 St.
Yellowknife, NWT, X1A 1S7
Phone: (403) 920 - 4555
Fax: (403) 873 - 3328

TO COMPANY: Transport Nanuk
FAX NO.: 1-514-523-7875
ATTENTION: John
DATE: Oct 23
FROM: Gary Strong
TIME:
DILLON PROJECT NO.: 96-3817
TOTAL PAGES SENT (including this page): 1

MESSAGE

Re Shipping Rates:

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

Fairly large by and Volume

Call or fax information to my attention @ F 403 873-3328
call 920-4555

Thanking you in advance

G Strong

DILLON
Consulting Engineers · Planners
Environmental Scientists

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.

Clyder River $379/tonne or $379/2.5$m^3$

Arctic Bay $384/tonne or $384/2.5$m^3$

If a large quantity is being shipped the rate would be closer to $350/tonne on 2.5$m^3$

Signed: GS

MMD-154-67 (Rev. 3)

GARY

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

RTG 7F YFB 7F

DELIVERY N/A

RATE	KG	$/KG	PIVOT
GEN	MIN	31 00	4
GEN	1	7 33	41
GEN	45	6 71	196
GEN	200	6 59	459
GEN	500	6 06	
PRI	MIN	48 00	4
PRI	1	9 90	41
PRI	45	9 06	196
PRI	200	8 90	459
PRI	500	8 18	
ENV	MIN	25 00	

CAMBRIDGE BAY YCB

RTG 7F DIRECT

DELIVERY N/A

RATE	KG	$/KG	PIVOT
GEN	MIN	25 00	9
GEN	1	2 52	43
GEN	45	2 46	198
GEN	200	2 44	497
GEN	500	2 43	
PRI	MIN	39 00	11
PRI	1	3 40	43
PRI	45	3 32	198
PRI	200	3 29	497
PRI	500	3 28	
ENV	MIN	12 50	
SCR	MIN	25 00	
#16	1	1 89	13

CAPE DORSET YTE

RTG 7F YFB 7F

DELIVERY N/A

RATE	KG	$/KG	PIVOT
GEN	MIN	31 00	4
GEN	1	6 87	41
GEN	45	6 26	195
GEN	200	6 13	457
GEN	500	5 61	
PRI	MIN	48 00	5
PRI	1	9 27	41
PRI	45	8 45	195
PRI	200	8 28	457
PRI	500	7 57	
ENV	MIN	25 00	

CLYDE RIVER YCY

RTG 7F YSR 7F YIO 7F

DELIVERY N/A

RATE	KG	$/KG	PIVOT
GEN	MIN	31.00	3
GEN	1	8 16	42
GEN	45	7 79	198
GEN	200	7 72	495
GEN	500	7.65	
PRI	MIN	48 00	4
PRI	1	11 02	42
PRI	45	10.52	198
PRI	200	10 42	495
PRI	500	10.33	
ENV	MIN	25 00	

CORAL HARBOUR YZS

RTG 7F YFB 7F

DELIVERY N/A

RATE	KG	$/KG	PIVOT
GEN	MIN	31 00	3
GEN	1	8.16	41
GEN	45	7 44	194
GEN	200	7 23	436
GEN	500	6.31	
PRI	MIN	48 00	4
PRI	1	11 02	41
PRI	45	10 04	194
PRI	200	9 76	436
PRI	500	8.52	
ENV	MIN	25 00	

FORT RESOLUTION YFR

RTG 7F DIRECT

DELIVERY PAGE 89

RATE	KG	$/KG	PIVOT
GEN	MIN	25 00	21
GEN	1	1 15	109
GEN	200	1 09	
PRI	MIN	32 00	20
PRI	1	1 55	189
PRI	200	1 47	
ENV	MIN	20 00	

FORT SIMPSON YFS

RTG 7F DIRECT

DELIVERY INCLUDED

RATE	KG	$/KG	PIVOT
GEN	MIN	25 00	16
GEN	1	1 52	180
GEN	200	1 37	
PRI	MIN	32 00	15
PPI	1	2 05	180
PRI	200	1 85	
ENV	MIN	20 00	

GJOA HAVEN YHK

RTG 7F DIRECT

DELIVERY N/A

RATE	KG	$/KG	PIVOT
GEN	MIN	31 00	10
GEN	1	3 02	42
GEN	45	2 88	197
GEN	200	2 84	496
GEN	500	2 82	
PRI	MIN	48 00	11
PRI	1	4 08	42
PRI	45	3 89	197
PRI	200	3 83	496
PRI	500	3 81	
ENV	MIN	20 00	
SCR	MIN	31 00	
#16	1	2 27	13

HALL BEACH YUX

RTG 7F YSR 7F

DELIVERY N/A

RATE	KG	$/KG	PIVOT
GEN	MIN	31 00	4
GEN	1	6 35	43
GEN	45	6 10	198
GEN	200	6 04	494
GEN	500	5.97	
PRI	MIN	48 00	5
PRI	1	8 57	43
PRI	45	8 24	198
PRI	200	8 15	494
PRI	500	8 06	
ENV	MIN	25 00	

HAY RIVER YHY

RTG 7F DIRECT

DELIVERY PAGE 89

RATE	KG	$/KG	PIVOT
GEN	MIN	25 00	18
GEN	1	1 35	182
GEN	200	1.23	
PRI	MIN	32.00	17
PRI	1	1 82	182
PRI	200	1 66	
ENV	MIN	20 00	

HOLMAN YHI

RTG: 7F DIRECT

DELIVERY N/A

RATE	KG	$/KG	PIVOT
GEN	MIN	31.00	7
GEN	1	3 94	40
GEN	45	3.58	161
GEN	200	2 89	442
GEN	500	2.56	
PRI	MIN	48 00	9
PRI	1	5 32	40
PRI	45	4 83	161
PRI	200	3 90	442
PRI	500	3 46	
ENV	MIN	20.00	
SCR	MIN	31 00	
#16	1	2 96	10

IGLOOLIK YGT

RTG ~~7F YSO 7F~~ 4 7 ~~YFB 7F~~

DELIVERY N/A

RATE	KG	$/KG	PIVOT
GEN	MIN	31 00	4
GEN	1	6 35	43
GEN	45	6 10	198
GEN	200	6 04	494
GEN	500	5 97	
PRI	MIN	48 00	5
PRI	1	8 57	43
PRI	45	8 24	198
PRI	200	8 15	494
PRI	500	8 06	
ENV	MIN	25 00	

IQALUIT YFB

RTG 7F DIRECT

DELIVERY PAGE 89

RATE	KG	$/KG	PIVOT
GEN	MIN	25 00	6
GEN	1	4 01	39
GEN	45	3 54	194
GEN	200	3 44	427
GEN	500	2 94	
PRI	MIN	39 00	7
PRI	1	5 41	39
PRI	45	4 78	194
PRI	200	4 64	427
PRI	500	3 97	
ENV	MIN	12 50	
SCR	MIN	25 00	
#16	1	3 01	8

KIMMIRUT YLC

RTG 7F YFB 7F

DELIVERY N/A

RATE	KG	$/KG	PIVOT
GEN	MIN	31 00	5
GEN	1	5 41	40
GEN	45	4 85	195
GEN	200	4 74	446
GEN	500	4 23	
PRI	MIN	48 00	6
PRI	1	7 30	40
PRI	45	6 55	195
PRI	200	6 40	446
PRI	500	5 71	
ENV	MIN	25 00	

KUGLUKTUK YCO

RTG 7F DIRECT

DELIVERY N/A

RATE	KG	$/KG	PIVOT
GEN	MIN	25 00	13
GEN	1	1.91	39
GEN	45	1 67	197
GEN	200	1 65	493
GEN	500	1 63	
PRI	MIN	39 00	15
PRI	1	2 58	39
PRI	45	2 25	197
PRI	200	2 23	493
PRI	500	2.20	
ENV	MIN	12 50	
SCR	MIN	25 00	
#16	1	1 62	15

KUUJJUAQ YVP

RTG. 7F YFB 7F

DELIVERY PAGE 90

RATE	KG	$/KG	PIVOT
GEN	MIN	26.00	4
GEN	1	5 36	40
GEN	45	4 79	194
GEN	200	4 67	443
GEN	500	4.14	
PRI	MIN	48 00	6
PRI	1	7 24	40
PRI	45	6 47	194
PRI	200	6 30	443
PRI	500	5.59	
ENV	MIN	12 50	

LUTSEL K'E YSR

RTG: 7F DIRECT

DELIVERY PAGE 90

RATE	KG	$/KG	PIVOT
GEN	MIN	25 00	18
GEN	1	1 33	180
GEN	200	1 20	
PRI	MIN	32 00	17
PRI	1	1 80	180
PRI	200	1 62	
ENV	MIN	20 00	

MONTREAL YMQ

RTG. 7F YFB 7F

DELIVERY PAGE 90

RATE	KG	$/KG	PIVOT
GEN	MIN	26.00	4
GEN	1	6 32	40
GEN	45	5 70	177
GEN	200	5 06	489
GEN	500	4 95	
PRI	MIN	48 00	5
PRI	1	8 53	40
PRI	45	7 70	177
PRI	200	6 83	489
PRI	500	6 68	
ENV	MIN	12 50	

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 88
cancels
7th Revised Page 88

FROM **YELLOWKNIFE - YZF** **TO**

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

NANISIVIK YSR
RTG 7F DIRECT
DELIVERY N/A

RATE	KG	$/KG	PIVOT
GEN	MIN	26 00	6
GEN	1	3 63	42
GEN	45	3 63	198
GEN	200	3 61	497
GEN	500	3 59	
PRI	MIN	48.00	9
PRI	1	5 17	42
PRI	45	4 90	198
PRI	200	4 87	497
PRI	500	4 85	
ENV	MIN	12 50	

OTTAWA YOW
RTG 7F DIRECT
DELIVERY PAGE 91

RATE	KG	$/KG	PIVOT
GEN	MIN	25.00	4
GEN	1	6 32	40
GEN	45	5 70	177
GEN	200	5 06	489
GEN	500	4 95	
PRI	MIN	48 00	5
PRI	1	8 53	40
PRI	45	7 70	177
PRI	200	6 83	489
PRI	500	6 68	
ENV	MIN	12 50	

PANGNIRTUNG YXP
RTG 7F YFB 7F
DELIVERY N/A

RATE	KG	$/KG	PIVOT
GEN	MIN	31 00	4
GEN	1	6.34	40
GEN	45	5 77	195
GEN	200	5 63	454
GEN	500	5 12	
PRI	MIN	48 00	5
PRI	1	8 56	40
PRI	45	7 79	195
PRI	200	7 60	454
PRI	500	6 91	
ENV	MIN	25 00	

PELLY BAY YBB
RTG: 7F DIRECT
DELIVERY N/A

RATE	KG	$/KG	PIVOT
GEN	MIN	31.00	8
GEN	1	3.77	42
GEN	45	3.59	198
GEN	200	3.56	492
GEN	500	3.51	
PRI	MIN	48.00	9
PRI	1	5.09	42
PRI	45	4.85	198
PRI	200	4.81	492
PRI	500	4 74	
ENV	MIN	20.00	
SCR	MIN	31.00	
#16	1	2.83	10

POND INLET YIO
RTG: 7F YSR 7F
DELIVERY N/A

RATE	KG	$/KG	PIVOT
GEN	MIN	31 00	5
GEN	1	5.30	43
GEN	45	5.07	198
GEN	200	5.03	495
GEN	500	4.98	
PRI	MIN	48 00	6
PRI	1	7 16	43
PRI	45	6.84	198
PRI	200	6.79	495
PRI	500	6 72	
ENV	MIN	25 00	

RANKIN INLET YRT
RTG 7F YFB 7F
DELIVERY PAGE 91

RATE	KG	$/KG	PIVOT
GEN	MIN	31 00	4
GEN	1	5 75	38
GEN	45	5 80	189
GEN	200	5 50	440
GEN	500	4 84	
PRI	MIN	48 00	5
PRI	1	9 11	38
PRI	45	7 83	189
PRI	200	7 43	440
PRI	500	6 53	
ENV	MIN	25 00	

RESOLUTE BAY YRB
RTG 7F DIRECT
DELIVERY N/A

RATE	KG	$/KG	PIVOT
GEN	MIN	26.00	8
GEN	1	3.02	37
GEN	45	2 55	185
GEN	200	2 37	474
GEN	500	2 25	
PRI	MIN	48 00	11
PRI	1	4 08	37
PRI	45	3 44	185
PRI	200	3 20	474
PRI	500	3 04	
ENV	MIN	12 50	

TALOYOAK YYH
RTG. 7F DIRECT
DELIVERY N/A

RATE	KG	$/KG	PIVOT
GEN	MIN	31 00	9
GEN	1	3.40	42
GEN	45	3.23	198
GEN	200	3.21	493
GEN	500	3 17	
PRI	MIN	48 00	10
PRI	1	4 59	42
PRI	45	4.36	198
PRI	200	4 33	493
PRI	500	4 28	
ENV	MIN	20 00	
SCR	MIN	31.00	
#16	1	2 55	12

VAL D'OR YVO
RTG 7F YFB 7F
DELIVERY N/A

RATE	KG	$/KG	PIVOT
GEN	MIN	26 00	4
GEN	1	6.32	40
GEN	45	5.70	173
GEN	200	4.95	500
GEN	500	4.95	
ENV	MIN	12 50	

WHA TI YLE
RTG: 7F DIRECT
DELIVERY PAGE 92

RATE	KG	$/KG	PIVOT
GEN	MIN	25 00	22
GEN	1	1 13	187
GEN	200	1 06	
PRI	MIN	32 00	20
PRI	1	1 53	187
PRI	200	1 43	
ENV	MIN	20 00	

WHITEHORSE YXY
RTG 7F DIRECT
DELIVERY PAGE 92

RATE	KG	$/KG	PIVOT
GEN	MIN	25 00	16
GEN	1	1 55	185
GEN	200	1 44	
PRI	MIN	32 00	15
PRI	1	2.09	185
PRI	200	1 94	
ENV	MIN	20.00	

DELIVERIES

KUUJJUAQ 8.00/ over 16kg 10.00
[redacted]
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 -
10.00 over 50Kg
see end 40 0.5kg

ISSUED
1996 June 15

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

EFFECTIVE
1996 July 01

DILLON
Consulting Engineers · Planners
Environmental Scientists

Telephone Discussion Record

Call to: Dan Rate — From: Gary Stacey

Organization: Best Tech — Date: Oct 28/96

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 or 27 mins @ 5 day ± 60 mins @ 6 KW
  - @ 0.2 KW - 269 mins (4 or 5 hours)
- what is power requirements -
- $ for Supply. Best $12,448.00 F.O.B. Mississauga
  Battery $5,239.00
  $17,700.00
- Dimensions,
  Battery Pack included. → 3' high x 19" wide, x 32" deep - 580 lbs
  30" high x 15" wide x 32" deep - 1002 lbs

Signed: G [signature]

MMD-154-67 (Rev. 3)

APPENDIX D

SAMPLE CALCULATIONS

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 m^3**

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 Cl 5.0E-07

Design Year	Litres of Cl
0	11.8
1	12
2	12.3
3	12.6
4	12.95
5	13.3
6	13.65
7	14
8	14.4
9	14.75
10	15.1
11	15.5
12	15.9
13	16.3
14	16.75
15	17.15
16	17.6
17	18.05
18	18.6
19	19.05
20	19.55

Calculation of Chlorine Costs on Annual basis

Litres Required	Sodium Hypochloride Supply Cost	Transport	Maintenanc	Operation	Total Annua	Present value
98.3	76.7	398.4	500.0	40.0	1015.1	1015.1
100.0	78.0	405.2	500.0	40.0	1023.2	947.4
102.5	80.0	415.3	500.0	40.0	1035.3	887.6
105.0	81.9	425.5	500.0	40.0	1047.4	831.4
107.9	84.2	437.3	500.0	40.0	1061.5	780.2
110.8	86.5	449.1	500.0	40.0	1075.5	732.0
113.8	88.7	460.9	500.0	40.0	1089.6	686.7
116.7	91.0	472.7	500.0	40.0	1103.7	644.0
120.0	93.6	486.2	500.0	40.0	1119.8	605.0
122.9	95.9	498.1	500.0	40.0	1133.9	567.2
125.8	98.2	509.9	500.0	40.0	1148.0	531.8
129.2	100.8	523.4	500.0	40.0	1164.1	499.3
132.5	103.4	536.9	500.0	40.0	1180.2	468.7
135.8	106.0	550.4	500.0	40.0	1196.3	439.9
139.6	108.9	565.6	500.0	40.0	1214.5	413.5
142.9	111.5	579.1	500.0	40.0	1230.6	387.9
146.7	114.4	594.3	500.0	40.0	1248.7	364.5
150.4	117.3	609.5	500.0	40.0	1266.8	342.4
155.0	120.9	628.1	500.0	40.0	1289.0	322.6
158.8	123.8	643.3	500.0	40.0	1307.1	302.9
162.9	127.1	660.1	500.0	40.0	1327.2	284.8
						12054.8

Kilograms	Calcium Hypochloride Supply Cost	Transport	Maintenanc	Operation	Total Annua	Present val
18.2	107.5	7.0	500.0	520.0	1134.4	1134.4
18.5	109.3	7.1	500.0	520.0	1136.4	1136.4
18.9	112.0	7.3	500.0	520.0	1139.3	1139.3
19.4	114.8	7.4	500.0	520.0	1142.2	1142.2
19.9	117.9	7.7	500.0	520.0	1145.6	1145.6
20.5	121.1	7.9	500.0	520.0	1149.0	1063.9
21.0	124.3	8.1	500.0	520.0	1152.4	988.0
21.5	127.5	8.3	500.0	520.0	1155.8	917.5
22.2	131.2	8.5	500.0	520.0	1159.7	852.4
22.7	134.3	8.7	500.0	520.0	1163.1	791.6
23.2	137.5	8.9	500.0	520.0	1166.4	735.1
23.8	141.2	9.2	500.0	520.0	1170.3	682.9
24.5	144.8	9.4	500.0	520.0	1174.2	634.4
25.1	148.5	9.6	500.0	520.0	1178.1	589.3
25.8	152.6	9.9	500.0	520.0	1182.4	547.7
26.4	156.2	10.1	500.0	520.0	1186.3	508.8
27.1	160.3	10.4	500.0	520.0	1190.7	472.8
27.8	164.4	10.7	500.0	520.0	1195.1	439.4
28.6	169.4	11.0	500.0	520.0	1200.4	408.7
29.3	173.5	11.3	500.0	520.0	1204.8	379.8
30.1	178.1	11.5	500.0	520.0	1209.6	353.1
						16063.2

Arctic Bay Chlorine costs

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.

Six (6) 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
Fuel Supply System	4.5	4.6