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Holyrood Combined Cycle Plant
Combined Cycle Plant Study Update
Supplementary Report

Final Report

November, 2001

P13971.00

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Newfoundland and Labrador Hydro
4th Level, Hydro Place
500 Columbus Drive
St. John's, Newfoundland A1B 4K7

Attention: Mr. John Mallam, P.Eng.

Dear Sir:

Holyrood Generating Station
Combined Cycle Plant Study Update

We are pleased to submit four copies of our final report on the addition of a combined cycle plant at Holyrood. This report has been prepared as a supplement to the study carried out by Acres and Stone & Webster Canada in 1997 and incorporates comments by Hydro in our draft report.

The study work addressed both capital and operating costs, plant performance and project schedule based on current data. As requested, we have included combined cycle plants that are available in the 125MW range in addition to updating those in the 175MW range for a total of six plants ranging in output from 128 to 174MW. Details of the capital cost estimates and cash flows are provided in appendices.

We trust that this report addresses all of the matters that we have undertaken to provide, and we thank you for the opportunity to carry out this assignment. We would be pleased to discuss the report with you.

Yours very truly,

R.J. Gill, P.Eng.
Vice President, Atlantic Region

GDM:ndl

Table of Contents

List of Tables
List of Figures
Glossary of Abbreviations

			Page	
1	**Introduction**		1-1	
	1.1	Purpose of Study	1-2	RE*
	1.2	Background	1-2	NC
	1.3	Project Procedures	1-2	RE
	1.4	Resource Material	1-2	NC
	1.5	Project Criteria	1-3	NC
2	**Conceptual Approach**		2-1	
	2.1	Basic Plant	2-1	
	2.1.1	Combined Cycle Power Block	2-1	RE
	2.1.2	Availability of Fuels	2-1	NC
	2.1.3	Implications of Heavy Fuel Firing	2-1	SI
	2.1.4	Selection of Qualified Combustion Gas Turbines	2-2	RE
	2.1.5	Basic Combined Cycle Configurations	2-2	NC
	2.1.6	Heat Cycle Selection	2-2	NC
	2.2	Interfacing with Existing Plant Facilities	2-2	NC
	2.3	Plant Emissions	2-2	NC
	2.4	Design Criteria	2-3	NC
	2.5	Data on Existing Plants	2-3	NC
3	**Preliminary Design of Plant**		3-1	
	3.1	Site Layout	3-1	NC
	3.2	Cycle Heat Balance	3-1	RE
	3.3	Civil Works	3-1	NC
	3.4	Plant and Equipment Layout	3-1	NC
	3.5	Power Block Description	3-2	NC
	3.6	Balance of Plant	3-2	NC
	3.7	Plant Controls	3-2	NC
	3.8	Plant Electrical Systems	3-2	SI
4	**Capital Cost Estimates**		4-1	
	4.1	Details of Manufacturers' Pricing	4-2	RE
	4.1.1	Single Combustion Turbine Configuration	4-3	RE
	4.1.2	Two-Combustion Turbine Configuration	4-3	RE
	4.1.3	Other Vendor Information	4-4	RE
	4.2	Estimate Summary	4-4	RE
	4.2.1	Power Block Estimate	4-4	RE
	4.2.2	Balance of Plant Estimate	4-4	RE

	4.2.3	Indirect Costs	4-5	RE
	4.3	Project Cost Comparison of the Estimates	4-5	RE
	4.4	Exceptions	4-5	NC
	4.5	Accuracy of Project Estimate	4-6	NC
	4.6	Simple Cycle Operating Using Exhaust Gas Bypass	4-7	NC
5	**Operating and Maintenance Costs and Plant Availability**			
	5.1	Staff Operating Cost	5-1	RE
	5.2	Non-Staff O&M	5-2	RE
	5.2.1	Fuel Cost	5-2	RE
	5.2.2	Maintenance Costs	5-3	RE
	5.3	Maintenance Aspects of Plant Components	5-7	SI
	5.4	Plant Availability Estimates	5-7	SI
6	**Project Implementation and Schedule**		6-1	
	6.1	Implementation Strategy Considerations	6-1	NC
	6.1.1	Engineered Package Approach	6-1	NC
	6.1.2	Turnkey Approach	6-1	NC
	6.1.3	Discussion	6-1	NC
	6.2	Schedule to Completion	6-1	RE
	6.3	Constraints and Sensitivities	6-2	RE
7	**Plant Performance**		7-1	NC
8	**Conclusions and Recommendations**		8-1	
	8.1	Conclusions	8-1	RE
	8.2	Recommendations	8-3	RE

Appendix A - Details of Capital Cost Estimates
Appendix B - Cash Flow Tables
Appendix C - Vendor Data

* NC = No change from 1997 report.
RE = Replaced entirely from 1997 report.
SI = Supplement included.

List of Tables

Number	Title	Changed From 1997 Report
2.1	Potential Combustion Turbines for CC Plant	No
4.1A	125 MW Class Cost Summary, Power Block Cost	Yes
4.2A	Balance of Plant Cost	Yes
4.3A	125 MW Class Cost Summary, Indirect Cost	Yes
4.4A	125 MW Class Cost Summary, Project Cost Summary	Yes
4.1B	175 MW Class Cost Summary, Power Block Cost	Yes
4.2B	Balance of Plant Cost	Yes
4.3B	175 MW Class Cost Summary, Indirect Cost	Yes
4.4B	175 MW Class Cost Summary, Project Cost Summary	Yes
5.1	Annual Incremental Operating Staff Cost for CC Plant	Yes
5.2	Summary of Westinghouse Maintenance Periods and Cost Estimates	Yes
5.3	Summary of Alstom Maintenance Periods and Cost Estimates	Yes
5.4	Summary of GE Maintenance Periods and Cost Estimates	Yes
5.5	Summary of Rolls Royce Maintenance Periods and Cost Estimates	Yes
5.6	Summary of O&M Costs for Combined Cycle Plants	Yes
7.1	Simple and Combined Cycle Plant Performance	Yes

List of Figures

Number	Title	Changed From 1997 Report
3.1	Heat Balance for Single CT Plant S107EA	Yes
3.2	Heat Balance for Two CT Plant S206B	Yes
3.3	Two CT Plant Trent/60	Yes
3.4	Single CT Plant W501D5A	Yes
3.5	Single CT Plant KA11N2-1	Yes
3.6	Two CT Plant KA8C2-2	Yes

Glossary of Abbreviations

ABB	Asea Brown-Boveri
ASL	Above Sea Level
BOP	Balance of Plant
BTU	British Thermal Unit
CC	Combined Cycle
CCE	Capital Cost Estimate
CT	Combustion Turbine
CTG	Combustion Turbine Generator
CW	Circulating (or Cooling) Water
DCS	Distributed Control System
EOH	Equivalent Operating Hours
EPRI	Electric Power Research Institute
GE	General Electric
HFO	Heavy Fuel Oil
HRSG	Heat Recovery Steam Generator
HVAC	Heating, Ventilation and Air Conditioning
ISO	International Standards Organization
MCC	Motor Control Centre
MTBF	Mean Time Between Failures
NO_x	Nitrous Oxides
RFO	Residual Fuel Oil
ST	Steam Turbine
STG	Steam Turbine Generator
TEWAC	Totally Enclosed, Water-to-Air Cooled

Introduction

1 Introduction

1.1 Purpose of Study

In January 1997, Acres International and Stone & Webster Canada completed a feasibility study for Newfoundland and Labrador Hydro (Hydro) addressing the addition of a combustion turbine combined cycle facility to be located at the site of Hydro's existing 500-MW thermal generating plant at Holyrood, Conception Bay, Newfoundland.

The 1997 study considered various combined cycle plants between 150 MW and 200 MW in capacity. Plant options studied included single as well as dual combustion turbine (CT) configurations. Thermal cycles and preliminary designs were developed along with capital and operating costs.

Hydro engaged Acres, in August 2001, to update the study for combined cycle plant options in two capacity ranges, namely 125 MW and 175 MW. It was agreed that three plant options in both capacity ranges were to be investigated, as follows:

(a)	125-MW Class:	General Electric model S107EA (1 CT)
		General Electric model S206B (2 CT)
		Rolls Royce model Trent/60 (2 CT)
(b)	175-MW Class:	Siemens-Westinghouse model W501D5A (1 CT)
		Alstom model KA11N2-1 (1 CT)
		Alstom model KA8C2-2 (2 CT)

The updated study is contained in this report and addresses the following principal matters.

- Plant performance
- Project capital costs
- Project schedule impacts
- Operating and maintenance cost update
- Plant availability update
- Impacts on plant footprint

This report is a supplement to the 1997 report and thus should be read in that context. The same report section numbering has been used to facilitate continuity between the two reports.

1.2 Background

(No change)

1.3 Project Procedures

The work of this study was carried out using the resources of Acres. Manufacturers of the major equipment were contacted to supply cost, performance and delivery information. Major equipment included the following.

- Combustion turbine generators
- Steam turbine generators
- Heat recovery steam generators (HRSGs)
- Steam condensers

Suppliers of other plant equipment and materials were contacted to establish price escalation data for the period 1997-2001 which was then applied to establish balance of plant costs. Construction materials and labour costs were updated in a similar fashion.

Operating and maintenance costs as well as plant availability data were reviewed and where appropriate have been revised to reflect current knowledge and practice.

Current delivery data has been collected and the project schedule modified to reflect plant procurement of combustion turbine equipment by the end of the second quarter 2002 and earliest completion thereafter. Delivery of CTG equipment in the current market environment is not significantly changed from 1997 so that the overall schedule at 33 months to commercial operation can be maintained.

1.4 Resource Material

(No change)

1.5 Project Criteria

(No change)

Conceptual Approach

2 Conceptual Approach

2.1 Basic Plant

2.1.1 Combined Cycle Power Block

In the 1997 study, aeroderivitive type combustion turbines were not addressed due to the unsuitability of the plant sizes for the capacity range being considered at the time. With the current study investigating plants in the 125-MW range, Rolls Royce would be able to offer two Trent CTGs in combined cycle which, at around 130 MW, fits the 125-MW range considerations. GE's model LM6000 in a two CTG configuration of aeroderivitive type CTGs is too small to meet the capacity requirements being considered. All other considerations are unchanged.

2.1.2 Availability of Fuels

(No change)

2.1.3 Implications of Heavy Fuel Firing

Supplement:

The use of heavy fuel oils in aeroderivative combustion turbines such as Rolls Royce's Trent is not a practical consideration. Combustion turbine development is proceeding at an ever increasing rate toward higher operating temperatures and greater thermal efficiency. These advances are being achieved using materials and design techniques adopted in large part from the aero engine industry resulting in hybrids such as Alstom's GT8C2. The days of the rugged and low temperature firing engines that could tolerate some measure of ash deposit within the turbine section are effectively in the past. The so-called E class technology, represented by GE's Frame 7EA machine, is likely the last technology that would have some expectation of burning ash-bearing fuel oils under derated conditions. Each performance upgrade, whether applied to an established design or incorporated in a new machine, has the effect of making operation with heavy oils more impractical. Even with the E technology, the fuel would have to be unusually clean in its delivered state or major cleanup would be undertaken at site, and this has practical limitations. The normal Bunker C that has been available in eastern Canada has high concentrations of vanadium which would make it completely impractical to burn in even the Frame 7EA due to the rate of ash deposition on the blading. To neutralize the corrosive effects of vanadium

compounds in the ash at temperatures above the ash melting point, large amounts of magnesium additives have to be employed. The magnesium additives exacerbate the deposition problem since a magnesium-to-vanadium ratio of 3 to 1 is required.

Light crude oil low in ash, salts and heavy metals probably represents the best practical and economic chance for burning heavy oil in E technology combustion turbines. Finding such a source outside of crude oil at economic cost would have to be examined in some detail. The absence of practical experience to effectively quantify the effects of performance derating, scheduled and unscheduled downtime, and additive and fuel treatment costs would be a challenge, particularly in a relatively low utilization factor application.

2.1.4 Selection of Qualified Combustion Gas Turbines

The selection of the combustion turbines for the two capacity ranges being studied was agreed with Hydro prior to commencement as being fully representative of types of plant and sources of supply for commercially experienced equipment.

The plants selected for investigation are those identified in Section 1.1.

2.1.5 Basic Combined Cycle Configurations

(No change)

2.1.6 Heat Cycle Selection

(No change)

2.2 Interfacing with Existing Plant Facilities

(No change)

2.3 Plant Emissions

(No change)

2.4 Design Criteria

(No change)

2.5 Data on Existing Plants

(No change)

Preliminary Design of Plant

3 Preliminary Design of Plant

3.1 Site Layout

(No change)

3.2 Cycle Heat Balance

Thermal cycle heat balance diagrams are included for all six plant options analyzed and are presented as Figures 3.1 through 3.6.

Due to the presence of sulfur compounds in the flue gases of combustion turbines firing distillate fuel oils, it is necessary to maintain a stack gas temperature of around 140°C as well as utilize an extraction feedwater heater (not shown in diagrams) for optimum cycle performance, in order to prevent corrosion in the cold end of the HRSG caused by feedwater supply at below the acid dew point.

Rated steam conditions are 5516 kPag/490°C (800 psig/915°F) at the steam turbine throttle and 689.5 kPag/258°C (100 psig/496°F) at the LP admission point. These conditions are considered as being representative of a lower capacity factor combined cycle facility. However, throttle steam conditions of 8222 kPag/510°C (1200 psig/950°F) should not be discounted as some overall economic advantage could be realized during plant procurement. LP steam conditions are dependent upon the particular steam turbine selection.

3.3 Civil Works

(No change)

3.4 Plant and Equipment Layout

The building sizings that were developed in the 1997 study for both the one-turbine and the two-turbine cases are suited to the cases now investigated, including the 125-MW category. Any space savings that result from using smaller capacity combustion turbines in the 125-MW category are minor and as such do not represent significant cost savings at this level of engineering analysis. Even the space requirements for Rolls Royce Trent two-turbine arrangement with a relatively small

steam turbine capacity can be suitably accommodated in the two-turbine building arrangement previously designed.

3.5 Power Block Description

(No change)

3.6 Balance of Plant

(No change)

3.7 Plant Controls

(No change)

3.8 Plant Electrical Systems

Supplement to Section 3.8.4:

(3) The Trent engines are started using compressed air as the cranking means and, as a result, can be started without a source of ac supply.

Supplement to Section 3.8.5:

In the case of the twin Trent option, starting is achieved using compressed air; thus both combustion turbines would not require auxiliary power for startup but provide alternative black start capability for the station.

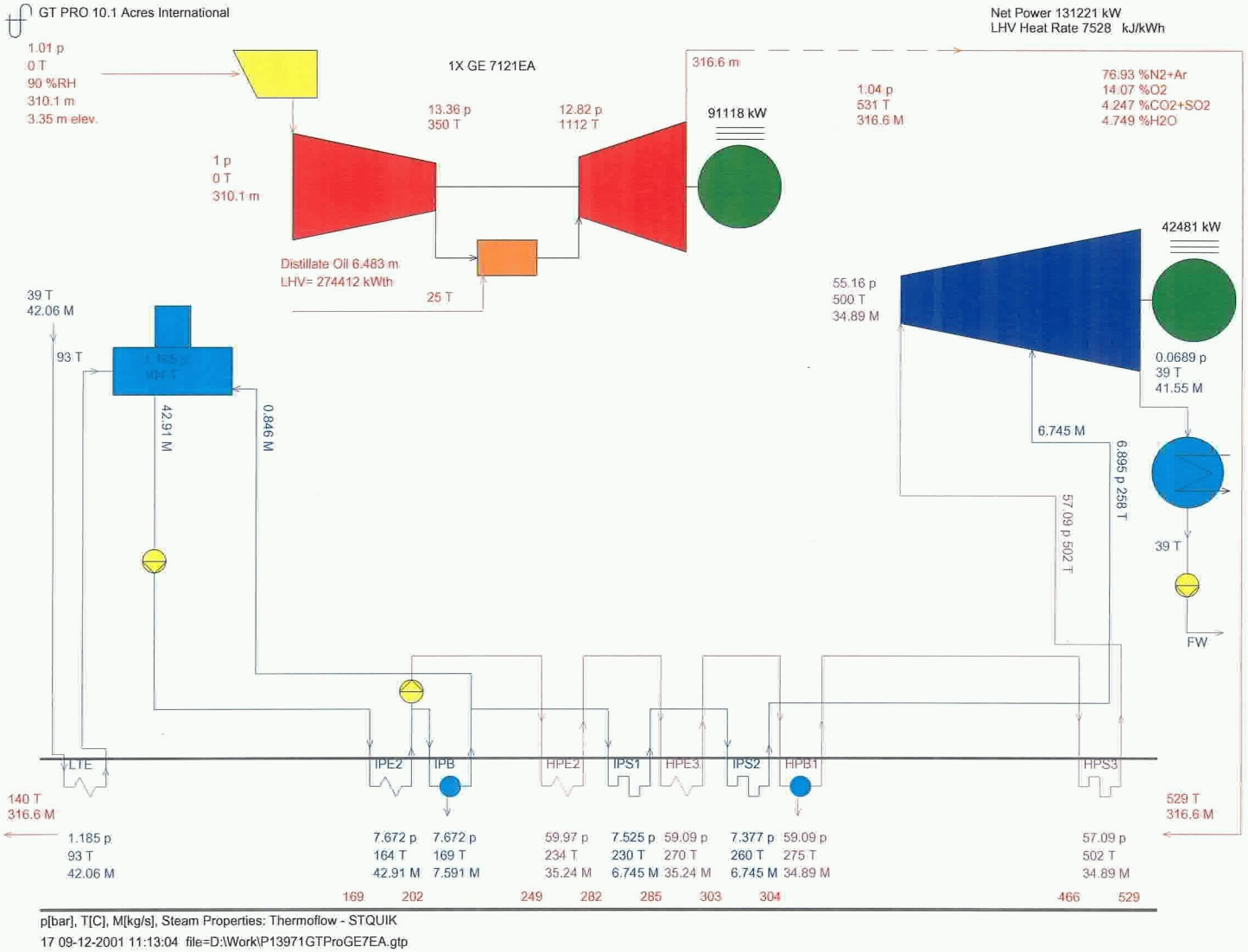

Figure 3.1
Heat Balance Diagram for Single CT Plant Model S107EA

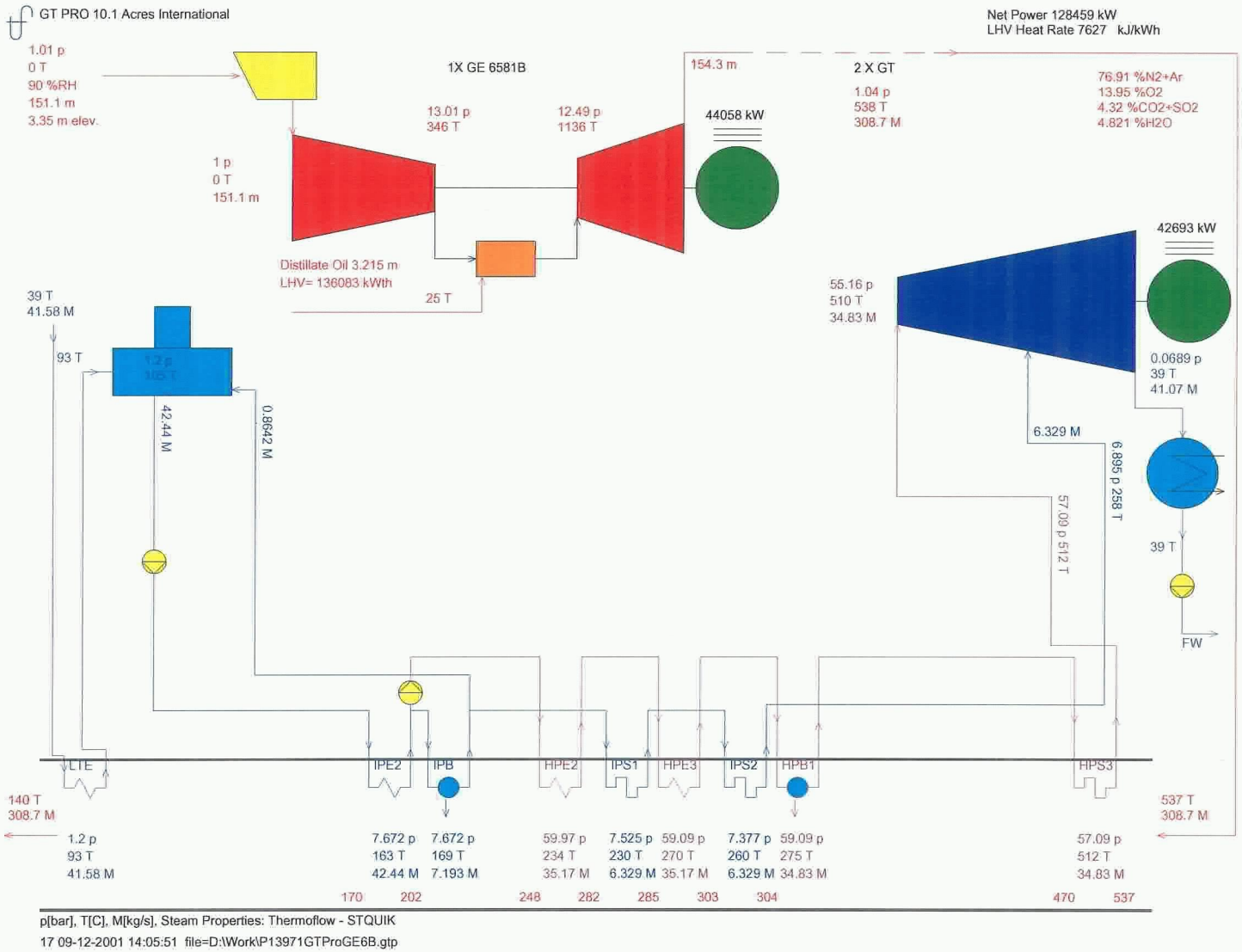

Figure 3.2
Heat Balance Diagram for Double CT Plant Model S206B

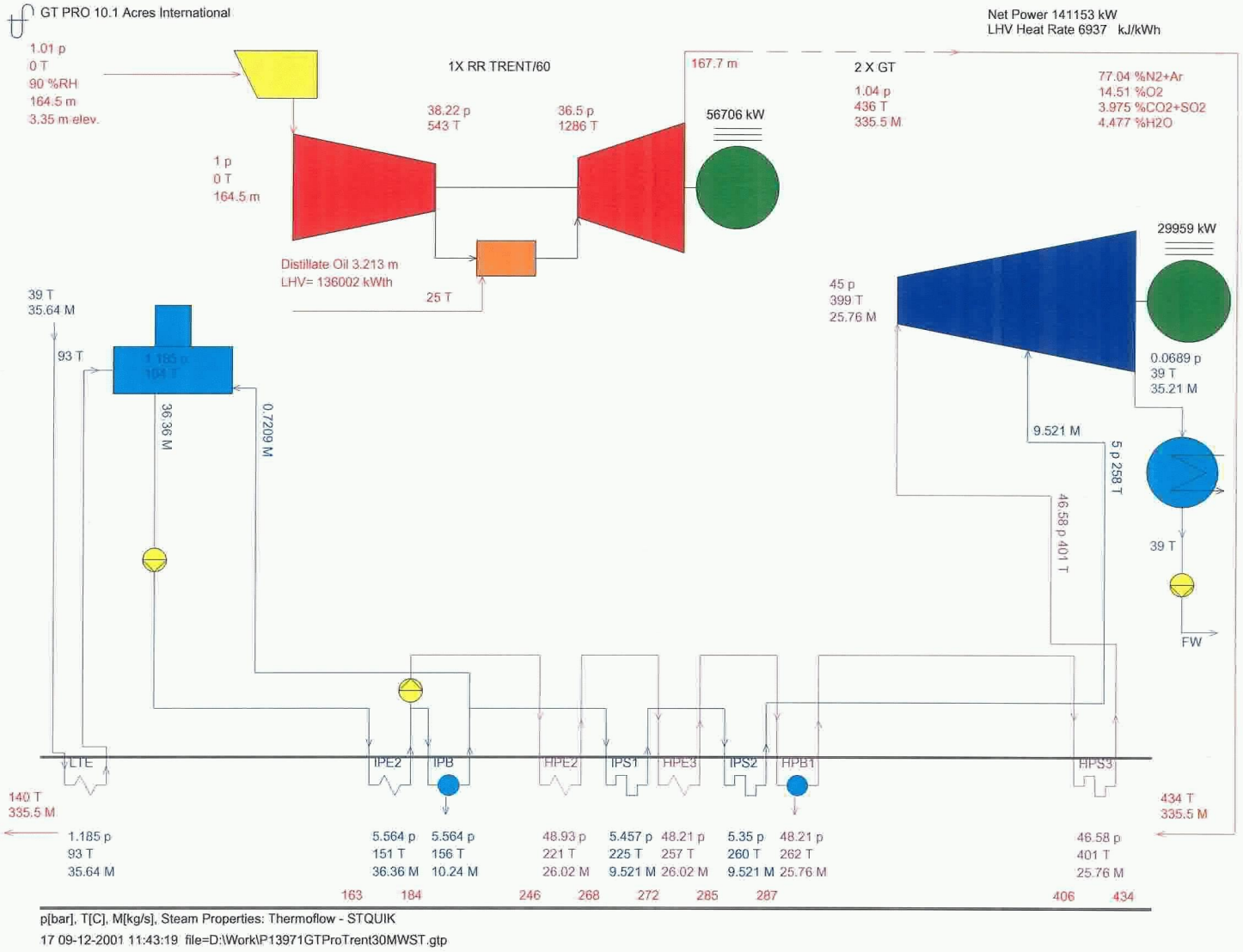

Figure 3.3
Heat Balance Diagram For Double CT Plant Model Trent/60

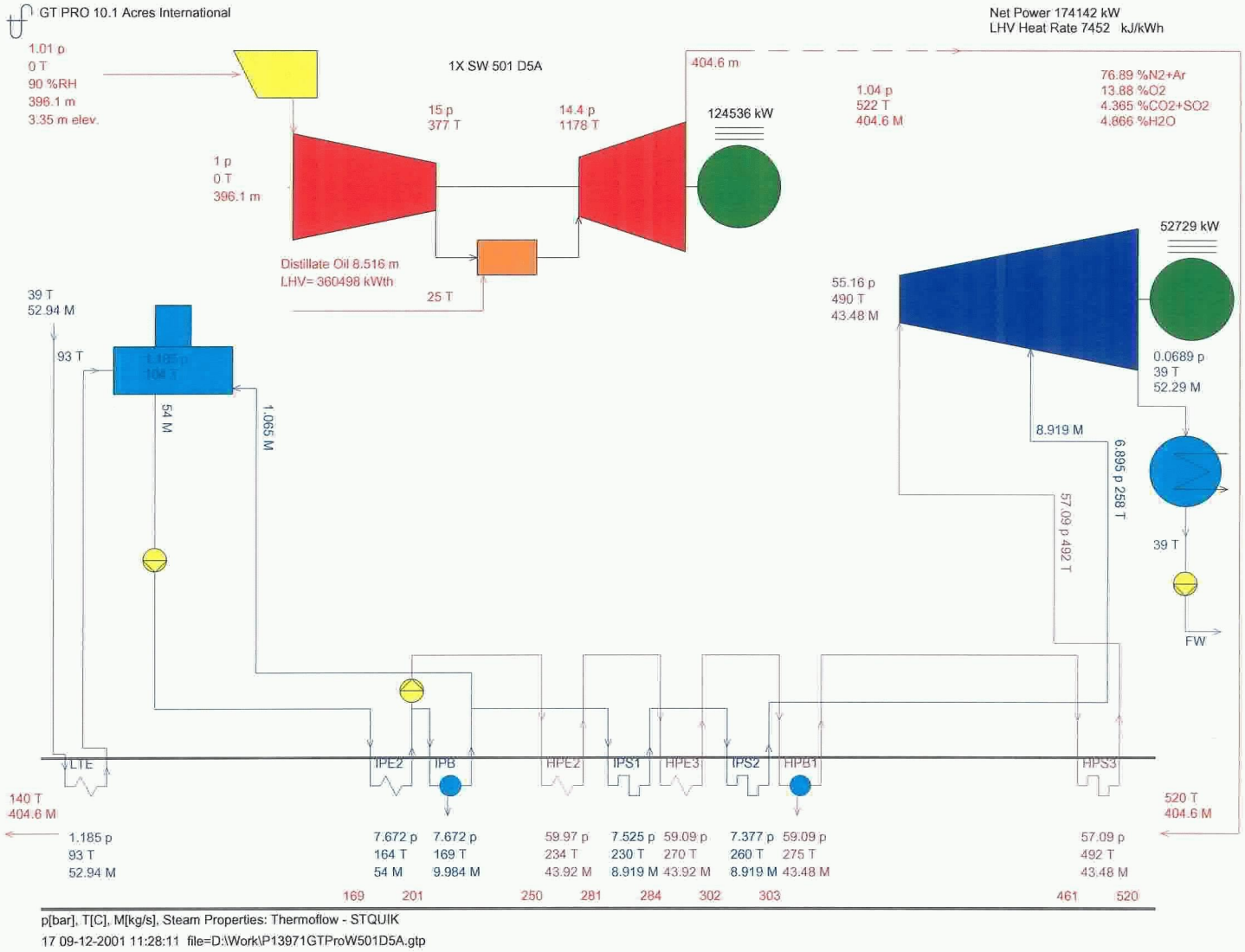

Figure 3.4
Heat Balance Diagram for Single CT Plant Model W501D5A

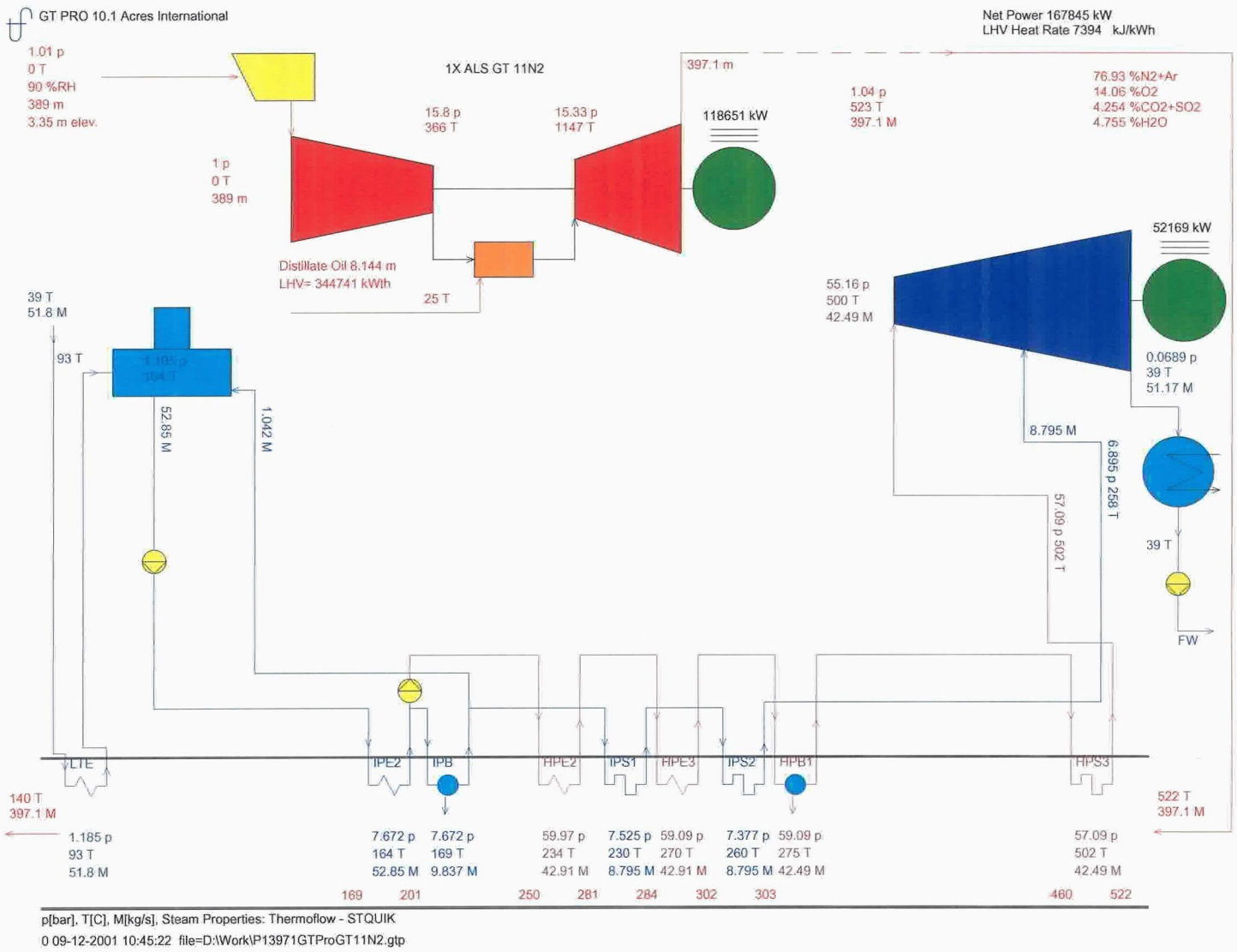

Figure 3.5
Heat Balance Diagram for Single CT Plant Model KA11N2-1

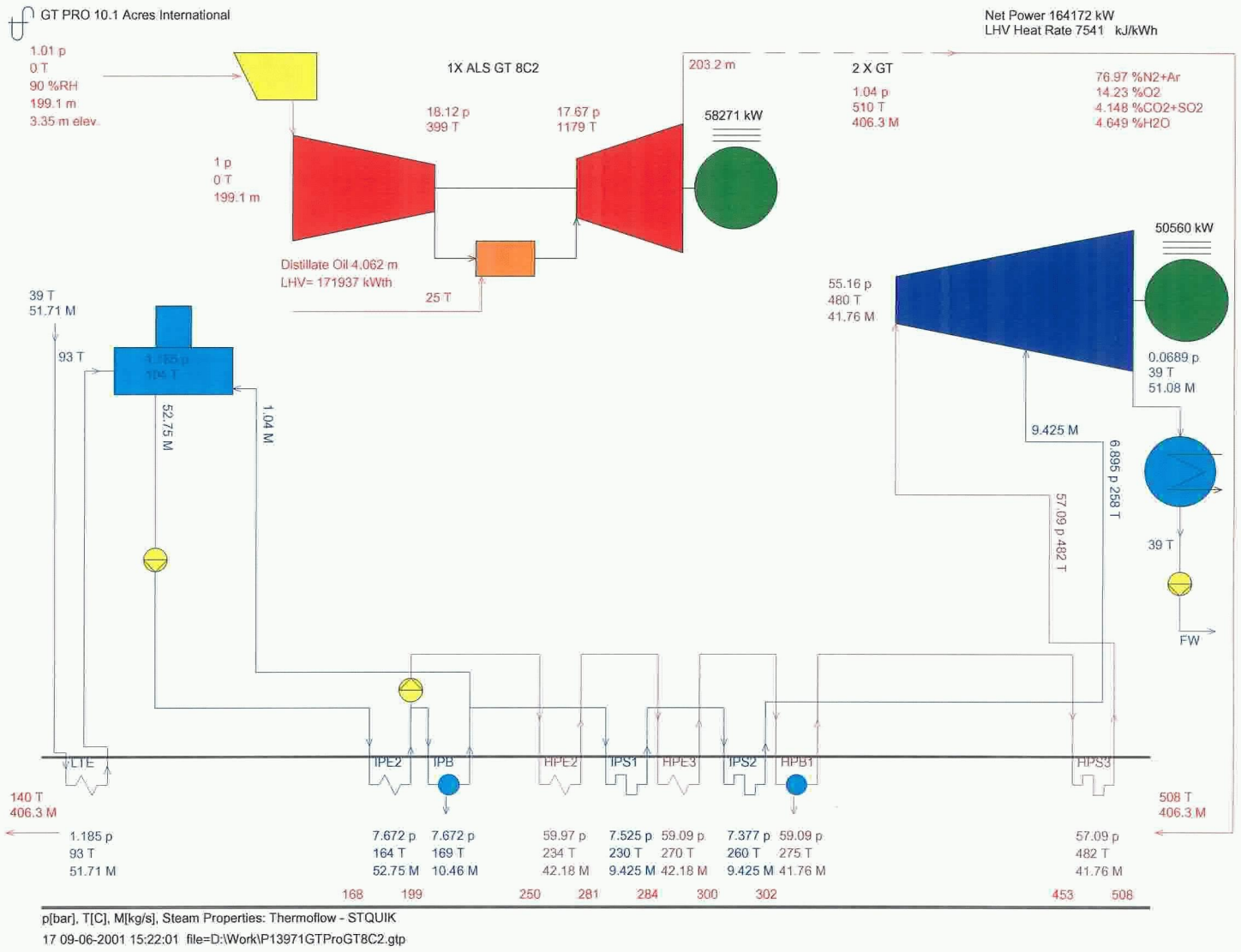

Figure 3.6
Heat Balance Diagram for Double CT Plant Model KA8C2-2

Capital Cost Estimates

4 Capital Cost Estimates

Capital cost estimates were updated for all six cases under investigation. Budgetary pricing was obtained from the major equipment manufacturers for combustion turbine generators, HRSGs, steam turbine generators and steam condensers. Costs for other equipment and services have been escalated by factors obtained from principal suppliers and cross-checked with Means estimating reference data for the period 1997-2001. Erection labour costs were escalated on the basis of Statistics Canada data for wages in the St. John's area for the years 1997 and 2001. Because some of these rates are unchanged due to the length of the wage contract, an arbitrary increase was used assuming that these contracts would be renegotiated before the subject project is built. Thus the Statistics Canada escalation, which is an average for various trades, of 3.83 percent was increased to 4.5 percent for the purposes of this exercise.

In 1997 costs for combustion turbine based facilities were still relatively low as a result of slow growth in the power sector and over-capacity in manufacturing of major generating equipment occurring through the mid-1990s. The emergence of competitive markets in the USA in the late 1990s has seen a dramatic increase in demand for the largest, most efficient combustion turbines in combined cycle plant applications. Equipment and other costs have increased significantly as a consequence of this increased demand. While the greatest demand has been for the largest CTs, smaller units, including those investigated as part of this study, have been affected in terms of shrinking production levels invoked to meet large unit demand. By obtaining current pricing from the major equipment manufacturers as well as establishing the various levels of escalation that have occurred since 1997, the costs presented in this study are representative of current year 2001 costs. Any updating of costs should use inflation factors to year end, e.g., end December 2002.

Alstom, with the data provided for their model 11N2 based plant, were the only vendor to offer pricing for the complete power block equipment supply (at time of finalizing this report Alstom supplied power block cost for the 8C2 case). GE only provided costs for steam and combustion turbines. When the Alstom and GE pricing data was compared to costs obtained separately for steam turbines, HRSGs and condensers, it became clear that the power block equipment margins were very high. Pricing obtained for steam turbine generators and condensers were particularly affected and it is assumed that the reason for this is that international competition is still severe. HRSGs are significantly less affected since manufacturers of HRSGs have been participating fully in the 60-Hz combined cycle market boom. Thus power block equipment cost is not the summation of the individual equipment

comprising the block. A margin, perhaps as much as 10 percent, can be expected for engineering, project management and performance guarantees associated with the power block supply contract. However, both Siemens-Westinghouse and Alstom acknowledge the disparity in their equipment costs but cannot offer a reasonable explanation beyond the higher demand for combined cycle plants. The costs used for this estimate have recognized this differential as reality of the current market climate and have used steam turbine pricing from the higher "power block" range as the yardstick for power block pricing. Alstom's power block price has been used to develop the cost levels considered appropriate for power block costs.

Pricing for steam condensing equipment was obtained separately from two manufacturers, Foster Wheeler and Alstom. It is likely that the so-called "power block" margins for this equipment will, in a similar fashion as the steam turbine, result in higher pricing.

4.1 Details of Manufacturers' Pricing

Requests were sent to Alstom, GE, Rolls Royce and Siemens-Westinghouse for budget cost and plant performance information for the major equipment comprising the power block, i.e., combustion turbine generators (CTG), HRSGs and steam turbine generators (STG). In addition, pricing was requested for HRSGs and condenser equipment from Foster Wheeler as well as STG equipment from Siemens-Westinghouse. Comments on the information provided are included below.

Updating estimates for changes in currency should recognize the following sources of power block equipment:

US$:	GE Frame 7EA
	Siemens-Westinghouse W501D5A
	All HRSGs
Euro:	GE Frame 6B and GE STG equipment
	S-W and RR STG equipment
	Alstom GT8C2 and 11N2 including STGs
	Rolls Royce Trent

4.1.1 Single Combustion Turbine Configuration

Alstom

Alstom provided cost data for the 11N2 combustion turbine along with the power block equipment cost. Alstom were the only vendor to include all the major equipment.

GE

Cost data for CTG and STG equipment was provided by GE in US dollars for model Frame 7EA. These costs needed adjustment for oil only burners (MNQC) with a deduction of US $250,000 for the 7EA plant. The costs provided by GE for steam turbine generators appear high by comparison to other industrial steam turbine cost data; however, their cost was included in their estimate in accordance with the explanation at the beginning of this section. No cost data was provided for the HRSG equipment or condensers.

Siemens-Westinghouse, Orlando

In response to information on the power block, the cost data provided by Siemens-Westinghouse in Orlando addressed only the CTG supply in US dollars. Westinghouse no longer manufactures non-reheat steam turbines.

4.1.2 Two-Combustion Turbine Configuration

Alstom

At time of finalizing this report, Alstom provided the power block cost for the model GT 8C2. This information has been checked to confirm the data included in the capital cost estimate.

GE

Cost data for CTG and STG equipment was provided by GE in US dollars for the model Frame 6B. These costs needed adjustment for oil only burners (MNQC) with a deduction of US $500,000. No data was provided for HRSG equipment or steam condensers.

Rolls Royce

The Rolls Royce response provided only the cost covering the CTG supply.

4.1.3 Other Vendor Information

Siemens-Westinghouse, Hamilton
Due to lack of response from Siemens-Westinghouse in Orlando, Acres approached Siemens-Westinghouse in Hamilton to obtain steam turbine generator pricing (given in Canadian dollars) for equipment manufactured in Germany and costs were provided for four steam turbine generator cases.

Foster Wheeler
Foster Wheeler, as a major North American manufacturer of boiler and heat exchange equipment for the power sector, were approached for HRSG and steam condenser pricing. They quoted prices in US dollars covering the range of combustion turbines under study.

Alstom
Alstom (formerly Ecolaire) are one of only three manufacturers of surface condensers in North America. Cost data for the six plant cases investigated was provided.

4.2 Estimate Summary

The capital costs for the six combined cycle plants investigated within the two capacity ranges are shown in Tables 4.1A and 4.1B for the major equipment, Tables 4.2A and 4.2B for the balance of plant, Tables 4.3A and 4.3B for indirect costs, and Tables 4.4A and 4.4B for the Total Project Estimate.

4.2.1 Power Block Estimate

Tables 4.1A and 4.1B show the estimated installed costs for the major equipment making up the power block. These costs have been obtained from the major manufacturers and are representative of the principal US and European sources of supply.

4.2.2 Balance of Plant Estimate

Tables 4.2A and 4.2B show the costs that have been obtained by escalating costs that were developed in the 1997 study. Escalation factors were obtained, for several categories of equipment and material, from reputable Canadian vendors.

On average, escalation varied between 12 and 15 percent for the period January 1997 to present.

4.2.3 Indirect Costs

Tables 4.3A and 4.3B show the Indirect Costs for both plant size categories. The costs shown were obtained by escalating the data presented in the previous study by average material and labour cost escalation factors used in the main capital cost estimate. As with the 1997 Study, Interest During Construction and other similar costs were calculated by Hydro.

4.3 Project Cost Comparison of the Estimates

Tables 4.4A and 4.4B show the project cost summary for all six plant cases studied within the two capacity categories.

Combustion turbines, making up about one third the total project cost, generally vary in cost in two main ways. First, the larger the unit the lower the specific cost ($/kW).

This factor is one of the principal reasons that two turbine plants are more costly than single turbine combined cycle plants. Secondly, the newer units are more thermally efficient and more costly. An example of this is Rolls Royce's Trent engine which costs considerably more than GE's Frame 6B even though the Frame 6B has undergone several performance upgrades over its lifespan.

The total project costs shown reflect these general rules. The savings in capital cost of a one-turbine over a two-turbine configuration is of the order of 20 percent. Savings in specific cost of a 175-MW plant over one at a 125-MW plant show about a 15 to 20 percent differential.

4.4 Exceptions

(No change)

4.5 Accuracy of Project Estimate

The power block major equipment costs represent over 50 percent of the total project cost and as such have the greatest influence on the accuracy of the estimate. Reliance on the budgetary cost data from Alstom, GE, Rolls Royce and

Siemens-Westinghouse to provide accurate costs is crucial. In the present market situation, combustion turbines of 150 MW and larger have been in great demand such that orders are being placed without the usual competitive influences which would lower plant costs against the seller's preferred margins. While the market for the turbines in this study, particularly those making up the two turbine cases, is not as intensive as the larger sizes, there is nevertheless a seller's market situation at play. Thus the budget quotations for combustion turbines, and to a large extent also for HRSGs and steam turbines, should be closer to that which would be obtained in a competitive bid situation as compared to the situation which existed in 1997 which could be classed as a buyer's market.

An attempt has been made in this cost estimate to adjust combustion turbine pricing based on firing liquid fuel without NO_x control. The unusual nature of this situation is such that there is some uncertainty with manufacturers on the cost impact of the combustion system that would not occur with natural gas, for example. The level of uncertainty for the liquid fuel system is expected to be no more that US $500 000 per unit. For a two-turbine plant this would come to about 1 percent of the project cost.

The estimates for the Balance of Plant items have been derived from escalating the previous (1997 estimate) costs. The 1997 estimate was derived from supplier budget quotes and experience on recent combined cycle projects of the time. At that time, the buildings and the fuel system were engineered to a level of detail that was considered to be within the ±10 percent. Likewise the other mechanical and electrical systems were considered to be within the same range of accuracy. The uncertainty of the cost for major equipment foundations, resulting from the absence of specific geotechnical data, was identified but considered to have a minor impact on the overall level of accuracy. The use of factors for actual escalation over the some 4 years since the 1997 study will tend to increase the overall inaccuracy of the balance of plant portion. However, the extent of this increase is not considered to be of significance in the context of the overall estimate.

Compared to the stated accuracy of the 1997 cost estimate at +10/-15 percent, the present estimate is considered to be no worse. Indeed the -15 percent may be improved due to the above-mentioned competitive bid influence being reduced due to the current seller's market situation. Signs of a deteriorating economic climate in the US could conceivably impact the market for 60-Hz combustion turbine equipment before procurement of the major equipment presently thought to be during second quarter 2002. However, no allowance has been made for any such influence in this supplementary study.

4.6 Simple Cycle Operating Using Exhaust Gas Bypass

(No change)

Table 4.1A
125 MW Class Cost Summary
Power Block Cost (x 1,000)

Power Block	One Turbine GE Fr 7EA	Two Turbines GE Fr 6B	Two Turbines RR Trent / 60
Net Plant Output (MW)	131.2	128.4	141.4
Combustion Turbine	37508	43899	55029
Heat Recovery Steam Generator	15840	24479	24479
Steam Turbine	13790	10792	9860
Condenser	1840	1573	1356
Step Up Transformer	1908	2804	2714
Exchange Rate @ 1.50 CDN$ = 1.00 US$	Incl	Incl	Incl
Sub-Total Power Block	70890	83550	93440

Table 4.1B
175 MW Class Cost Summary
Power Block Cost (x 1,000)

Power Block	One Turbine S-W D5A	One Turbine Alstom 11N2	Two Turbines Alstom 8C2
Net Plant Output (MW)	174.1	167.8	164.1
Combustion Turbine	44168	42502	55029
Heat Recovery Steam Generator	21285	21285	26294
Steam Turbine	11768	12332	12332
Condenser	1839	1840	1839
Step Up Transformer	2212	2212	3084
Exchange Rate @ 1.50 CDN$ = 1.00 US$	Incl	Incl	Incl
Sub-Total Power Block	81272	80171	98578

Table 4.2A
Balance of Plant Cost (x 1,000)

Balance of Plant	One Turbine GE Fr 7EA	Two Turbines GE Fr 6B	Two Turbines RR Trent / 60
Net Plant Output (MW)	131.2	128.4	141.4
Yard Work	3150	3150	3150
Building, Building Services & Cabling	12010	15730	15730
Electrical & Switchgear	2210	3390	3390
Control Room	1330	1460	1460
Existing Control Room	170	170	170
Pedestrian Walkway	320	320	320
Combustion Turbine Miscellaneous Systems	470	870	870
Steam & Condensate Piping	7912	14613	14613
Steam Turbine Miscellaneous Systems	2200	2200	2200
Steam Condenser Miscellaneous Systems	376	376	376
Water Treatment System	90	100	100
Cooling Water Intake Structure - Modifications	2520	2520	2520
Station Transformers	50	65	65
Fuel Oil Storage	3500	3500	3500
Exchange Rate @ 1.50 CDN$ = 1.00 US$	Incl	Incl	Incl
Sub-Total Balance of Plant Equipment	36308	48464	48464

Table 4.2B
Balance of Plant Cost (x 1,000)

Balance of Plant	One Turbine S-W D5A	One Turbine Alstom 11N2	Two Turbines Alstom 8C2
Net Plant Output (MW)	174.1	167.8	164.1
Yard Work	3150	3150	3150
Building, Building Services & Cabling	12010	12010	15730
Electrical & Switchgear	2210	2210	3390
Control Room	1330	1330	1460
Existing Control Room	170	170	170
Pedestrian Walkway	320	320	320
Combustion Turbine Miscellaneous Systems	470	470	870
Steam & Condensate Piping	8065	8065	14707
Steam Turbine Miscellaneous Systems	2200	2200	2200
Steam Condenser Miscellaneous Systems	376	376	376
Water Treatment System	90	90	100
Cooling Water Intake Structure - Modifications	2520	2520	2520
Station Transformers	50	50	65
Fuel Oil Storage	3500	3500	3500
Exchange Rate @ 1.50 CDN$ = 1.00 US$	Incl	Incl	Incl
Sub-Total Balance of Plant Equipment	36461	36461	48558

Table 4.3A
125 MW Class Cost Summary
Indirect Cost (x 1,000)

Indirect Costs	One Turbine GE Fr 7EA	Two Turbines GE Fr 6B	Two Turbines RR Trent / 60
Net Plant Output (MW)	131.2	128.4	141.4
Temporary Construction	1530	2013	2013
Startup	2500	3250	3250
Taxes (Provincial and Federal)	0	0	0
Interest During Construction	0	0	0
Capital Spares	700	700	700
Insurance and Bonds	700	700	700
Engineering - Consultants	8580	9110	9110
Construction Management	4150	4821	4821
Contingency	11000	11000	11000
Sub-Total Indirects	29160	31594	31594

Table 4.3B
175 MW Class Cost Summary
Indirect Cost (x 1,000)

Indirect Costs	One Turbine S-W D5A	One Turbine Alstom 11N2	Two Turbines Alstom 8C2
Net Plant Output (MW)	174.1	167.8	164.1
Temporary Construction	1530	1530	2013
Startup	2500	2500	3250
Taxes (Provincial and Federal)	0	0	0
Interest During Construction	0	0	0
Capital Spares	700	700	700
Insurance and Bonds	700	700	700
Engineering - Consultants	8580	8580	9110
Construction Management	4210	4210	4990
Contingency	11000	11000	11000
Sub-Total Indirects	29220	29220	31763

Table 4.4A
125 MW Class Cost Summary
Project Cost Summary (x 1,000)

Project Cost Summary	One Turbine GE Fr 7EA	Two Turbines GE Fr 6B	Two Turbines RR Trent / 60
Net Plant Output (MW)	131.2	128.4	141.4
Power Block Equipment	70890	83550	93440
Balance of Plant	36308	48464	48464
Indirects	29160	31594	31594
Total Project Cost	136358	163608	173498
Cost per kW ($)	1039.3	1274.2	1227.0

Table 4.4B
175 MW Class Cost Summary
Project Cost Summary (x 1,000)

Project Cost Summary	One Turbine S-W D5A	One Turbine Alstom 11N2	Two Turbines Alstom 8C2
Net Plant Output (MW)	174.1	167.8	164.1
Power Block Equipment	81272	80171	98578
Balance of Plant	36461	36461	48558
Indirects	29220	29220	31763
Total Project Cost	146953	145852	178899
Cost per kW ($)	844.1	869.2	1090.2

Operating and Maintenance Costs and Plant Availability

5 Operating and Maintenance Costs and Plant Availability

The operating and maintenance costs for the combined cycle plant are the sum of fixed and variable cost components. The fixed maintenance cost is primarily the owner's labour costs directly associated with operating and maintaining the plant. Variable costs are those costs directly attributable to operation and maintenance and include fuel, replacement parts and other consumables as well as labour that is specially contracted for maintenance work. This section addresses the different maintenance recommendations of each manufacturer and the associated costs.

Plant availability takes account of both scheduled and unscheduled maintenance in terms of its impact on the generating capability of the plant. This section addresses the expected availability data of the individual combined cycle plants.

5.1 Staff Operating Cost

Hydro's operators' union agreement stipulates the working hours for each operator as 12 hours per shift for a total 2080 hours per year. On average, each operator works 3.5 days per week. Five shifts of operators are required to fully cover the entire year including weekends and vacations. The combined cycle plant has a central DCS system with highly automated monitoring and control functions and it is quite common to operate with lower staff complements. It is assumed that maintenance staff such as instrument technicians, electricians, mechanics, welders, carpenters, etc, are available and can be shared with the existing plant.

In discussions with Hydro during the 1997 study on the use of existing plant personnel, it was agreed that two additional operators would be added per shift for the new plant. Certain present shift operators will extend their watch-keeping duties to include the new plant. Likewise present shift supervisory duties will be extended.

The incremental cost associated with the operation of the new plant is shown in Table 5.1.

Table 5.1
Annual Incremental Operating Staff Cost for CC Plant

		2001
Lead thermal plant operator	($/hr)	25.03
Thermal plant operator	($/hr)	23.82
Cost per hour per crew	($/hr)	48.85
Cost per crew-shift	(12 hours)	$586.20
Total operating hours per year per crew		2080
Number of shifts/year		174
Annual cost per crew of 2		$101,999
Newfoundland Hydro's overhead multiplier		1.63
Annual cost per crew of 2		$166,258
Number of crews required per year		5
Total annual incremental operating staff cost		$831,290

5.2 Non-Staff O&M

5.2.1 Fuel Cost

Due to differences in output between the combined cycle plants studied, the fuel cost has been presented for comparison on the basis of $/kWh. The net plant heat rate data presented in Section 7 was used together with the current fuel cost ($0.386/L) and heating value (5.7MMBTU/barrel, HHV) obtained from Hydro to calculate the fuel costs shown below. Note should be taken that the fuel costs presented are for the combined cycle operation while in the new and clean condition. Deterioration will occur and increase with operating time and number of starts. Some of the deterioration will be reclaimed as a result of maintenance.

Fuel Cost Comparison

Plant		GE 7EA	GE 6B	RR Trent	Alstom 8C2	Alstom 11N2	S-W 501D5A
Fuel Cost*	$/kWh	0.0814	0.0825	0.075	0.0816	0.080	0.0805

*Calculated using HHV-based net plant heat ratio.

5.2.2 Maintenance Costs

The plant maintenance costs in $/kWh are presented in Tables 5.2 through 5.6. These data are statistical averages based on the maintenance requirement of the particular model of combustion turbine. The comparative outage requirements for the manufacturers are also compared on a common basis of 50 000 hours of operation. This period was selected so that all the plants would have completed at least one major overhaul. Intervals for combustor and hot section inspections are also presented.

The O&M costs shown in Tables 5.2, 5.3, 5.4, and 5.5 are indicative of combustion turbine manufacturers' projections to cover expected costs of replacement of the critical CT components under normal operating conditions. These costs have been developed from data for natural gas fuel operation and modified to suit expectations for liquid fuel. This kind of data should be regarded as optimistic due to the promotional nature of its offering. Table 5.6 shows a range of O&M costs which embrace the complete combined cycle plant and within which normal O&M costs for liquid fuel operation are likely to fall.

Table 5.2
Summary of Westinghouse Maintenance Periods and Cost Estimates
Combustion Turbine (intervals x 0.8 for Oil Fuel)
(From Westinghouse for the W501D5A)

Inspection Type (Oil fuel)	O & M $/kWh	Intervals Hours	Intervals Starts	Down time Days	Owner Labour M-hr	Total Labour M-hr
Combustor		6,400	320	5	N. A.	960
Hot combustion path		19,200	640	9	N. A.	2,380
Major Overhaul		38,400	1,280	21	N. A.	6,100
Major overhaul Parts & Labour (501D5 CT)	0.003					

Note: Due to absence of new data from Siemens-Westinghouse, only the estimated cost of major overhaul parts and labour has been escalated by 15 percent.

Table 5.3
Summary of Alstom Maintenance Periods and Cost Estimates Combustion Turbine (Oil Fuel) (Intervals for Fuel Oil = Natural Gas Fuel x 0.67)

Inspection Type (Oil fuel)	O & M $/kWh	Intervals (EOH) Equiv. Op. Hrs Hours	Starts	Down-time Days	Owner Labour M-hr	Total Labour M-hr
Combustor		4,000		2	60	80
		12,000		2	60	80
Hot combustion path		8,000		3	140	210
Major Overhaul		16,000		24.5	2935	3,810
Total down days between 50,000 hours (see Note 1)				94.5		
Parts & Labour Cost (1 x GT-11N2) (2 x GT-8C) (see Note 2)	0.0028					

Notes:

1 Downtime per CT.

2 Parts cost only for hot gas path parts of CT. Labour cost is for outside labour only.

Table 5.4
Summary of GE Maintenance Periods and Cost Estimates
Combustion Turbine (for Oil Fuel)
(For 6B and 7EA, Adjusted for Fuel Oil)

Inspection Type (Oil fuel)	O & M $/kWh	Intervals Hours	Intervals Starts	Down time Days	Aver crew size	Total Labour M-hr
Combustor		6,400	640	5	6	576
Hot gas path		16,000	1,200	12	10	2,400
Major Overhaul		32,000	2,400	20	11	4,400
Total down days between 50,000 hours				74*		
Parts & Labour (1 x 7EA CT) (2 x 6B CT)	0.00432					

*74 days per CT.

Note: Table updated to reflect changed inspection/overhaul intervals and in-house parts and labour cost data.

Table 5.5
Summary of Rolls Royce Maintenance Periods and Cost Estimates
Combustion Turbine (for Oil Fuel)

(Note: RR have only provided data for gas fuel. For comparison, this data has been factored by an assumed 0.67 to reflect distillate oil.)

Inspection Type (Oil fuel)	O & M $/kWh	Intervals (EOH) Hours	Starts	Down time Days	Aver crew size	Total Labour M-hr
Combustor		4,000		4		
Hot combustion path		16,000		9		
Major Overhaul		32,000	<1500	24.5		
Total down days between 50,000 hours				69.5		
Parts & Labour (CT only) (2 x Trent/60)	0.0033					

Table 5.6
Summary of O&M Costs for Combined Cycle Plants Based on 4000 hours annual operating hours

		All Plants
Fixed Cost		
Staff Cost (Hydro)	$/kWh	0.00187
Variable Cost		
Fuel Cost (range)	$/kWh	0.075 - 0.825
Estimated Operating and Maintenance Cost Combined Cycle	$/kWh	0.0035 - 0.0055
Total O&M - Combined Cycle	$/kWh	0.084 - 0.899

5.3 Maintenance Aspects of Plant Components

Supplement under Combustion Turbine:

Major maintenance of aeroderivative combustion turbines such as the Trent is undertaken at specialized facilities such as the Rolls Royce factory in Montreal. Time must be allowed to remove and transport the engine to the repair facility and vice versa. This can add a week or more to the downtime of a major overhaul. Scheduled maintenance can be arranged such that the additional time does not result in serious economic impact. Unscheduled maintenance that must be done in a remote repair facility can have a greater impact on unit availability. Operators of aeroderivative engines can, however, avail themselves of rental engines available from the manufacturer to ensure maximum availability of the generating capability. The cost of this facility is high and has to be evaluated against costs and other impacts of downtime. Hydro's expected operating regime should permit the timing of scheduled maintenance during periods when the plant is not being dispatched. Unscheduled maintenance necessitating a remote repair facility should be evaluated in more depth if consideration is to be given to the Trent option. It should be noted that Rolls Royce have indicated they would be willing to enter into a maintenance agreement which would involve a gas-based availability guarantee of 95 percent which is of the same order of availability expected from the combustion turbines that are overhauled onsite.

5.4 Plant Availability Estimates

Supplement:

Availability of the Rolls Royce Trent based plant is not expected to be radically different from that of the other plant options being considered. As noted above, Rolls Royce has indicated willingness to enter into a maintenance agreement that would guarantee a gas fuel based availability of 95 percent which is what would be generally expected from the other plants. Thus on a generic basis, the Trent should be capable of the same availability on distillate fuel oil as the other plants, i.e., 90 percent. Being able to carry out scheduled maintenance during the seven-month non-operating period means that reliability is the major criterion affecting availability during the operating period. Whereas 2 percent forced outage is the expected gas fuel rate, the rate for distillate fuel oil should be higher but no more than 5 percent. The assumption is that this will also apply to the Trent. However, the early operation history of the Trent has not been without problems. The prototype unit installed in Whitby, Ontario, in 1996 in a cogeneration application suffered very high outage

rates. Rolls Royce is indicating these problems are behind them. If the Trent is being considered further, then an investigation of fleet operating experience is recommended.

Project Implementation and Schedule

6 Project Implementation and Schedule

6.1 Implementation Strategy Considerations

(No change)

6.1.1 Engineered Package Approach

(No change)

6.1.2 Turnkey Approach

(No change)

6.1.3 Discussion

(No change)

6.2 Schedule to Completion

Prior to the implementation of the project, based upon the capital cost and operating cost estimates, Hydro should establish the desired capacity expansion, the reliability requirements, and the economic parameters required to select the efficiency level and to assess the economic value of moderately larger and smaller capabilities. Finalization of the fuel flexibility requirements is required. Preliminary environmental permitting activities should confirm the acceptable levels of flue combustion and noise emissions.

Based upon the desired configuration and capacity range, tenders for the power block equipment will be invited from the combustion turbine (CT) suppliers with equipment designs matching these requirements. The complete package should include the CT, ST and HRSG. The economic evaluation factors for unit size, efficiency, and availability will be defined as part of the tender criteria. This may be an open public tender or negotiation with selected vendors. The vendors should be provided with 4 weeks to respond with another 4 weeks provided for evaluation and award.

Based upon the timing of the project it will not be possible to begin the construction of major civil foundations until the spring of 2003. This will provide adequate time to complete the structural steel and foundation design for tendering during the winter of 2002/03. Tendering with comprehensive civil and structural steel designs at that time will be cost effective and will permit the maximum utilization of local contractors for structural steel and civil construction.

The building enclosure will be suitable for erection of the major equipment commencing the fall of 2003 with completion anticipated by the summer of 2004 with commissioning, start-up, and testing starting during the fall of 2004. If necessary, the combustion turbine could be prepared for operation during the summer of 2004 if dictated by the system load requirements but at a cost premium to the budget indicated.

The overall project schedule (Figure 6.1) is unchanged from 1997 except that combustion turbine delivery is now 14 months instead of 12 months. However, this extension can be made up during the erection period such that the commissioning period remains as before.

6.3 Constraints and Sensitivities

The schedule is predicated on several critical factors including

1. Selection of the basic plant configuration by release of project.

2. The need to proceed with up-front engineering and ordering of power block equipment prior to obtaining environmental approvals.

3. Current deliveries of major equipment being maintained. Although deliveries of combustion turbines have not been seriously impacted by demand for large (150 MW and larger) 60-Hz units, it is important to monitor trends in demand which could affect deliveries. Manufacturers are indicating that if an order is placed today, a unit could be available in 14 months. Thus, it is assumed that, for orders placed in 2002, the current 14-month deliveries will apply; however, continued high demand in the 60-Hz market could eventually have an adverse impact.

4. The delivery of the steam turbine, which is the critical delivery item, by March 2004. In addition to this, the selection of the steam turbine cannot be made until the combustion turbine is selected; hence, it is essential to initiate the procurement process as soon as possible after the decision to proceed with the project is made.

5. Completion of the building enclosure by December 2003 to achieve the equipment installation schedule.

Plant Performance

7 Plant Performance

(No change except for new Table 7.1)

Table 7.1
Simple and Combined Cycle Plant Performance

Manufacturer	Alstom		General Electric		Rolls Royce	Siemens-Westinghouse
Turbine Model	GT8C2	11N2	Frame 6B	Frame 7EA	Trent/60	501D5A
Simple Cycle Performance at Site Conditions (Note 1)						
Number of CTs	2	1	2	1	2	1
Net Plant Output (MW)	116.0	118.1	88.1	91.1	113.5	125.7
Net Plant Heat Rate (BTU/kW.h) - 100% load	10,126	9,962	10,619	10,353	8,238	9,926
- 75% load	11,137	10,928	11,845	11,129	9,062	10,989
- 50% load	10,126	11,201	10,619	11,584	8,238	11,802
CT Unit Exhaust Flow (kg/s)	203	397	154	316	168	405
CT Exhaust Temperature (°C)	510	523	538	530	436	522
Combined Cycle Performance at Site Conditions (Note 1)						
Net Plant Output (MW)	164.2	167.8	128.5	131.2	141.2	174.1
Net Plant Heat Rate (BTU/kWh) - 100% load	7,147	7,008	7,229	7,135	6,575	7,063
- 75% load	7,504	7,358	7,590	7,491	6,904	7,416
- 50% load	7,147	9,919	7,229	8,063	6,575	7,980
Typical Exhaust Emissions						
NO_x (ppmvd)	N/A	N/A	N/A	N/A	N/A	N/A
Oxygen (% vol.)	"	"	"	"	"	"
Nitrogen & Argon (% vol.)	"	"	"	"	"	"
SO_2 (% vol.)	"	"	"	"	"	"
CO_2 (% vol.)	"	"	"	"	"	"
Water vapor (% vol.)	"	"	"	"	"	"
Miscellaneous						
Combined Cycle Plant Noise @ 120 m (dBA)	N/A	N/A	N/A	N/A	N/A	N/A

Notes:

1 Site conditions - 0°C ambient, 3.35 mASL, 90% RH, Water inlet 5°C, Water outlet 30°C
2 Based on lower heat value of fuel.
3 Performance based on new and clean conditions.
4 Performance data from GT PRO.
5 1 kJ = 0.9478 BTU.
6 N/A = Not Available

Conclusions and Recommendations

8 Conclusions and Recommendations

8.1 Conclusions

The capital cost of a single combustion turbine combined cycle plant in 2001 dollars can be expected to be as follows.

- Plant of 131-MW capability: $136 million
- Plant of 174-MW capability: $145 million

In comparison, a combined cycle plant made up of two combustion turbines and one steam turbine can be expected to cost as follows.

- Plant of 128-MW capability: $163 million
- Plant of 164-MW capability: $178 million

The above costs include engineering and certain other indirect costs but do not include interest during construction.

The booming market for large 60-Hz combustion turbine generator equipment has not had a significant adverse impact on deliveries of combustion turbines in the unit size range considered in this study and, as a result, a plant could be constructed in the same construction period as delineated in the 1997 report, i.e., 33 months from release of engineering to start of commercial operation. This contracting strategy involves procurement of the plant in four main contracts, namely, a power block supply contract, a fuel system supply and erect contract, a civil/structural erection contract and a mechanical/electrical erection contract.

The principal advantages of adding a combined cycle plant adjacent to the existing plant at Holyrood are as follows.

- No new land purchase necessary.
- Use of existing dock for delivery of fuel.
- Use of existing 230 kV switchyard and HV transmission system.
- Use of existing plant facilities for demineralized and potable water supply, waste water treatment.

- Use of existing CW intake pumphouse and discharge structure.
- Environmental approval facilitated within existing allowances for Holyrood site.
- Use of existing station administration, laboratory facilities, maintenance and security facilities.

These advantages will allow the lowest cost plant compared to a green field site.

Using No. 2 fuel oil will allow the plant to run at base load during the winter period without the necessity of shutdowns for scheduled maintenance. Some reduced load operation will likely be necessary to wash the compressor of the combustion turbine in order to restore full load and optimum thermal efficiency. The frequency of compressor washing is dependent on the ambient air quality and the efficiency of the air intake filtration system.

The response for cost and other information from the major suppliers of the power block equipment was disappointing since only Alstom provided the complete cost of power block equipment. GE did not include HRSG or condenser costs. Siemens-Westinghouse and Rolls Royce only offered combustion turbine costs. However, the costs presented in the report are considered to have an accuracy of +10/-15 percent or better mainly due to the expectation that budget costs for major equipment, representing over 50 percent of the total project cost, will not vary much from costs that would be received in international competitive bidding. In the mid-1990s competitive pressures resulted in competitive pricing being significantly lower than the usual margins adopted for budgetary costing.

Control of oxides of nitrogen is a matter that impacts costs, both capital as well as operating, and performance of the plant. Combustion turbine manufacturers have made considerable progress in commercializing dry low NO_x control systems for natural gas firing, the industry generally has not yet developed similar systems for oil firing, and most manufacturers continue to offer water or steam injection as the only reliable control means. Two manufacturers, Alstom for their GT8C2 and Rolls Royce for their Trent, have indicated that, as of today, they have no production-level oil-firing option but that such a feature is imminent. These units are nevertheless represented in this study based on the expectation that, in both cases, the oil-firing feature will be commercially available at the time of project implementation. Also, this study is based on the expectation that this plant can be permitted with no NO_x control at the turbine and with emission targets being met by dispersal using the exhaust stack.

Noise emissions from the new plant are not expected to exceed Hydro's target limitation of 55 dBA measured at the existing residences on the eastern shore of Indian Pond.

The combined cycle plants examined in this study include, because of the plant size range realignment, only three plants that were addressed in the 1997 study. The plants investigated, together with their output ratings under site conditions, were the following:

Single Turbine Plant

GE	S107EA	131 MW
Alstom	GT11N2	167 MW
Siemens-Westinghouse	W501D5A	174 MW

Double Turbine Plant

GE	S206B	128 MW
Rolls Royce	Trent/60	141 MW
Alstom	GT8C2	164 MW

8.2 Recommendations

The following recommendations are presented in the light of Hydro's ongoing task of confirming their least cost generating option, as well as confirming the inclusion of this new oil-fired capability within the existing environmental approval for the Holyrood site.

(1) A clean middle distillate fuel oil, such as one meeting ASTM No. 2, grade GT fuel requirements, should be used to obtain optimum performance and O&M costs.

(2) A new unloading arm, supply pipeline and two fuel storage tanks should be added to accommodate sea tanker fuel delivery.

(3) The location of the new powerhouse should be adjacent to the northeast corner of the 230-kV switchyard to take advantage of the lower cost for excavation and plant foundations in that area.

(4) The implementation of the project should be carried out using four major contracts covering the supply and erection of the plant in order to realize lowest capital cost, optimum quality of equipment and maximum local content.

(5) If of interest, Hydro should continue to evaluate commercial operating experience with particular emphasis on the GT8C2 and the Trent combustion turbine. Also, Hydro should continue to monitor commercial development of oil-firing capability on these two units.

(6) Hydro should confirm capability of existing plant 230-kV switchyard and associated transmission system capability to accommodate the additional plant output.

(7) Hydro should confirm minimum requirements for plant exhaust and noise emissions prior to release of procurement engineering for the project.

Appendix A
Details of Capital Cost Estimates

125 MW

CAPITAL COST ESTIMATE

NEWFOUNDLAND & LABRADOR HYDRO

HOLYROOD GENERATING STATION

COMBINED CYCLE PLANT - OPTION 1 (1 CGTG, 1 HRSG, 1 STG, 125MW)

1 x GE Frame 7EA - 131.2 MW

Date: 24-Sep-01

Currency: CDN $

WBS	DESCRIPTION	MATERIAL DOLLARS	LABOR DOLLARS	TOTAL DOLLARS	TRADE HOURS
0390	**YARD WORK**				
0110	SITE PREPARATION	169,152	34,485	203,637	600
0120	ROADS AND PARKING	100,198	257,070	357,268	2,700
0150	GENERAL EXCAVATION & BACKFILL	0	111,815	111,815	1,100
0200	SITE IMPROVEMENTS - RETAINING WALL	967,505	435,765	1,403,270	9,300
0600	WATER, SEWER & OTHER SERVICE LINES	86,192	32,395	118,587	500
0630	STORM DRAINAGE	0	0	0	0
2240	DEMINERALIZED WATER	49,560	34,485	84,045	600
5000	ELECTRICAL	258,576	83,600	342,176	1,800
5100	DIESEL GENERATOR - 500kW SYSTEM	183,158	11,495	194,653	200
5390	YARD LIGHTING	23,703	9,405	33,108	200
5970	CATHODIC PROTECTION SYSTEM	42,019	11,495	53,514	300
6705	YARD FIRE PROTECTION	190,700	58,520	249,220	1,100
0390	**YARD WORK**	**2,070,000**	**1,080,000**	**3,150,000**	**18,400**
1010	**BUILDING**				
1121	BUILDING FOUNDATIONS	390,019	1,451,505	1,841,524	16,300
1123	SLAB ON GRADE, PITS, TRENCHES	580,719	210,045	790,764	4,500
1310	STRUCTURAL STEEL	2,016,893	257,070	2,273,963	5,500
1320	IRON WORK	193,932	25,080	219,012	500
1630	ROOFING	162,687	121,220	283,907	2,600
1640	SIDING	178,848	200,640	379,488	4,300
1650	INTERIOR FINISHES	64,644	28,215	92,859	600
1660	MASONRY	25,858	29,260	55,118	600
1670	DOORS	89,424	12,540	101,964	300
1975	PIPE RACK	103,430	16,720	120,150	400
5110	POWER CABLE	1,038,967	987,525	2,026,492	21,000
5120	INSTRUMENT & CONTROL CABLE	382,006	205,865	587,871	4,400
5415	TRANSFORMERS	10,142	4,180	14,322	100
5510	CONDUIT	45,074	47,025	92,099	1,000
5520	CABLE TRAY	304,253	282,150	586,403	6,000
5610	TERMINATIONS - POWER CABLE	43,948	101,365	145,313	2,200
5620	TERMINATIONS - INSTRUMENT & CONTROL CABLE	24,791	103,455	128,246	2,300
5915	LIGHTNING PROTECTION & GROUNDING	118,321	61,655	179,976	1,300
5920	BUILDING LIGHTING & ELECTRICAL	174,664	93,005	267,669	2,000
5940	FIRE ALARM SYSTEM	160,014	36,575	196,589	800
5950	BUILDING COMMUNICATIONS	84,515	11,495	96,010	200
5960	SECURITY SYSTEM	16,903	2,090	18,993	100
6210	PLUMBING	37,186	16,720	53,906	400
6211	DOMESTIC WATER SYSTEM	205,089	98,230	303,319	2,100
6212	SANITARY SEWAGE SYSTEM	20,284	12,540	32,824	300
6231	ROOF DRAINS	12,395	8,360	20,755	200
6232	FLOOR DRAINS	99,164	51,205	150,369	1,100
6233	OIL WATER SEPARATOR	22,537	5,225	27,762	100
6310	HVAC SYSTEMS	315,521	226,765	542,286	4,800
6700	BUILDING FIRE PROTECTION	90,149	37,620	127,769	800

CAPITAL COST ESTIMATE
NEWFOUNDLAND & LABRADOR HYDRO
HOLYROOD GENERATING STATION

COMBINED CYCLE PLANT - OPTION 1 (1 CGTG, 1 HRSG, 1 STG, 125MW)

1 x GE Frame 7EA - 131.2 MW

Date: 24-Sep-01

Currency: CDN $

WBS	DESCRIPTION	MATERIAL DOLLARS	LABOR DOLLARS	TOTAL DOLLARS	TRADE HOURS
7220	SERVICE AIR SYSTEM	187,059	68,970	256,029	1,500
1010	**BUILDING**	**7,200,000**	**4,810,000**	**12,010,000**	**88,300**
1020	**ELECTRICAL / SWITCHGEAR ROOM**				
5350	BUS DUCT	440,524	74,195	514,719	1,600
5400	POWER SWITCHING & DISTRIBUTION	34,778	0	34,778	0
5410	SWITCHGEAR	161,139	27,170	188,309	600
5420	MOTOR CONTROL CENTRES	278,226	26,125	304,351	600
5430	600V SWITCHGEAR	350,101	29,260	379,361	600
5440	4.160KV SWITCHGEAR	347,782	27,170	374,952	600
5470	UPS SYSTEM	178,528	11,495	190,023	200
5730	RELAY BOARDS & PANELS	202,873	21,945	224,818	500
1020	**ELECTRICAL / SWITCHGEAR ROOM**	**1,990,000**	**220,000**	**2,210,000**	**4,700**
1030	**CONTROL ROOM**				
1650	INTERIOR FINISHES & RAISED FLOOR	40,941	6,270	47,211	100
5705	DCS	811,492	74,195	885,687	1,600
5706	DCS - EXISTING PERFORMANCE MONITORING	162,298	0	162,298	0
5710	MAIN CONTROL BOARDS & PANELS	112,450	16,720	129,170	400
5740	COMPUTER	89,264	14,630	103,894	300
1030	**CONTROL ROOM**	**1,220,000**	**110,000**	**1,330,000**	**2,400**
1040	**EXISTING CONTROL ROOM**				
5120	INSTRUMENT AND CONTROL CABLE	2,319	3,135	5,454	100
5520	CABLE TRAY	12,752	11,495	24,247	300
5705	DCS	115,927	24,035	139,962	500
1040	**EXISTING CONTROL ROOM**	**130,000**	**40,000**	**170,000**	**900**
1050	**PEDESTRIAN OVERPASS**				
1320	MISCELLANEOUS STEEL	215,480	104,500	319,980	1,000
1050	**PEDESTRIAN OVERPASS**	**220,000**	**100,000**	**320,000**	**1,000**
1100	**COMBUSTION TURBINE GENERATOR**				
1261	COMBUSTION TURBINE FOUNDATION	244,570	85,690	330,260	1,800
1320	IRONWORK	113,127	16,720	129,847	400
1610	PAINTING & PROTECTIVE FINISHES	5,387	2,090	7,477	0
3910	COMBUSTION TURBINE GENERATOR	36,630,000	877,800	37,507,800	18,700
1100	**COMBUSTION TURBINE GENERATOR**	**36,990,000**	**980,000**	**37,980,000**	**20,900**
1200	**HEAT RECOVERY STEAM GENERATOR**				
1262	HRSG FOUNDATIONS	232,718	90,915	323,633	1,900
2010	HEAT RECOVERY STEAM GENERATOR	12,705,000	3,135,000	15,840,000	25,000
2015	EXHAUST BYPASS	1,100,000	250,000	1,350,000	5,000
2100	STEAM SYSTEMS	343,693	47,025	390,718	1,000
2120	HP STEAM SYSTEM	378,626	110,770	489,396	2,400
2135	IP STEAM SYSTEM	416,939	238,260	655,199	5,100

CAPITAL COST ESTIMATE

NEWFOUNDLAND & LABRADOR HYDRO

HOLYROOD GENERATING STATION

COMBINED CYCLE PLANT - OPTION 1 (1 CGTG, 1 HRSG, 1 STG, 125MW)

1 x GE Frame 7EA - 131.2 MW

Date: 24-Sep-01

Currency: CDN $

WBS	DESCRIPTION	MATERIAL DOLLARS	LABOR DOLLARS	TOTAL DOLLARS	TRADE HOURS
2140	LP STEAM SYSTEM	339,186	181,830	521,016	3,900
2180	STEAM LINE BLOWOUT	22,537	2,090	24,627	0
2212	CHEMICAL FEED SYSTEM	56,343	16,720	73,063	400
2215	CONDENSATE SYSTEM	360,596	249,755	610,351	5,500
2240	DEMINERALIZED WATER SYSTEM	298,619	96,140	394,759	2,100
2312	BOILER FEED & CONDENSATE SYSTEM	1,019,738	163,020	1,182,758	3,500
2750	SAMPLING SYSTEM	33,806	18,810	52,616	400
3005	CONTINUOUS EMISSIONS MONITORING SYSTEM	225,372	58,520	283,892	1,300
3410	COMPONENT COOLING SYSTEM	667,102	126,445	793,547	2,700
5700	CONTROLS AND INSTRUMENTATION	146,069	47,025	193,094	1,000
5720	LOCAL CONTROL BOARDS & PANELS	28,982	16,720	45,702	400
5750	TRANSMITTERS, TUBING & RELAY RACKS	400,036	127,490	527,526	2,700
1200	**HEAT RECOVERY STEAM GENERATOR**	**18,780,000**	**4,980,000**	**23,750,000**	**64,300**
1300	**STEAM TURBINE GENERATOR**				
1272	STEAM TURBINE GENERATOR FOUNDATION	852,223	300,960	1,153,183	6,400
1600	MISCELLANEOUS STRUCTURAL STEEL	57,102	35,530	92,632	800
1610	PAINTING	3,232	4,180	7,412	100
3100	STEAM TURBINE GENERATOR	13,320,000	470,250	13,790,250	10,000
3700	CRANES, HOISTS & MONORAILS	907,124	24,035	931,159	500
1300	**STEAM TURBINE GENERATOR**	**15,140,000**	**830,000**	**15,970,000**	**17,800**
1301	**CONDENSER**				
3210	CONDENSING SYSTEM	1,618,050	221,540	1,839,590	4,700
3400	AUXILIARY COOLING WATER SYSTEM	281,716	94,050	375,766	2,000
1301	**CONDENSER**	**1,900,000**	**320,000**	**2,215,000**	**6,700**
3200	**WATER TREATMENT SYSTEMS**				
2230	CONDENSATE MAKEUP & DRAWOFF	9,015	2,090	11,105	0
2243	DEMINERALIZED WATER STORAGE	56,343	20,900	77,243	400
3200	**WATER TREATMENT SYSTEMS**	**70,000**	**20,000**	**90,000**	**400**
3311	**INTAKE STRUCTURE**				
3300	CIRCULATING WATER SYSTEM	1,968,556	422,180	2,390,736	9,000
5000	ELECTRICAL	115,927	11,495	127,422	200
3311	**INTAKE STRUCTURE**	**2,080,000**	**430,000**	**2,520,000**	**9,200**
3770	**TRANSFORMERS**				
1149	MAIN TRANSFORMER FOUNDATION	19,393	14,630	34,023	300
5415	STEP-UP TRANSFORMERS	1,868,750	39,710	1,908,460	800
9009	PRE-OPERATIONAL TESTING	0	17,765	17,765	200
3770	**TRANSFORMERS**	**1,890,000**	**70,000**	**1,960,000**	**1,300**
6010	**FUEL OIL STORAGE**				
1125	MAJOR EQUIPMENT FOUNDATIONS	0	0	0	
4620	NO.2 FUEL OIL DELIVERY & STORAGE SYSTEM	2,293,785	821,370	3,115,155	17,500

CAPITAL COST ESTIMATE

NEWFOUNDLAND & LABRADOR HYDRO

HOLYROOD GENERATING STATION

COMBINED CYCLE PLANT - OPTION 1 (1 CGTG, 1 HRSG, 1 STG, 125MW)

1 x GE Frame 7EA - 131.2 MW

Date: 24-Sep-01

Currency: CDN $

WBS	DESCRIPTION	MATERIAL DOLLARS	LABOR DOLLARS	TOTAL DOLLARS	TRADE HOURS
5000	ELECTRICAL	107,740	24,035	131,775	500
6750	FIRE PROTECTION SYSTEM _ FOAM	161,610	94,050	255,660	2,000
6010	**FUEL OIL STORAGE**	**2,560,000**	**940,000**	**3,500,000**	**20,000**
9001	**START UP**				
9001	SPARES FOR START UP	112,686	0	112,686	0
9002	VENDOR REP FOR START UP	560,000	0	560,000	0
9004	TRADE SUPPORT DURING START UP	0	313,500	313,500	5,000
9005	ENGINEERING CHECKOUT - COMMISSIONING	840,000	0	840,000	
9006	PLANT OPERATORS - COMMISSIONING	560,000	0	560,000	
9007	INITIAL FILL LUBRICANTS & FUEL TO SYNC IDLE	112,686	0	112,686	
9001	**START UP**	**2,190,000**	**310,000**	**2,500,000**	**5,000**
9101	**PROVINCIAL / FEDERAL TAXES (NIC)**				
9101	PROVINCIAL / FEDERAL TAXES (NIC)	0	0	0	0
9101	**PROVINCIAL / FEDERAL TAXES (NIC)**	**0**	**0**	**0**	**0**
9105	**COST OF MONEY**				
9105	INTEREST DURING CONSTRUCTION	0	0	0	0
9105	**COST OF MONEY**	**0**	**0**	**0**	**0**
9200	**INSURANCE AND BONDS**				
9200	INSURANCE AND BONDS	700,000	0	700,000	0
9200	**INSURANCE AND BONDS**	**700,000**	**0**	**700,000**	**0**
9301	**CAPITAL SPARES**				
9301	CAPITAL SPARES	700,000	0	700,000	0
9301	**CAPITAL SPARES**	**700,000**	**0**	**700,000**	**0**
9500	**ENGINEERING - CONSULTANTS**				
9501	ENGINEERING - CONSULTANTS	6,608,000	0	6,608,000	0
9503	SITE ENGINEERING EXPENSES	1,892,800	0	1,892,800	0
9504	ALLOWANCE FOR PLANNED OVERTIME	78,400	0	78,400	0
9500	**ENGINEERING - CONSULTANTS**	**8,580,000**	**0**	**8,580,000**	**0**
9600	**CONSTRUCTION MANAGEMENT**				
9501	CONSTRUCTION MANAGEMENT - SERVICES	2,128,000	0	2,128,000	0
9503	CONSTRUCTION MANAGEMENT - EXPENSES	560,000	0	560,000	0
9610	CONSTRUCTION DISTRIBUTABLES	777,000	578,930	1,355,930	0
9900	ALLOWANCE FOR PLANNED OVERTIME	0	103,500	103,500	2,000
9600	**CONSTRUCTION MANAGEMENT**	**3,470,000**	**680,000**	**4,150,000**	**2,000**
9703	**EXCHANGE RATE US DOLLARS = $1.50**				
9703	EXCHANGE RATE US DOLLARS = $1.50	0	0	0	0
9703	**EXCHANGE RATE US DOLLARS = $1.50**	**0**	**0**	**0**	**0**

CAPITAL COST ESTIMATE

NEWFOUNDLAND & LABRADOR HYDRO

HOLYROOD GENERATING STATION

COMBINED CYCLE PLANT - OPTION 1 (1 CGTG, 1 HRSG, 1 STG, 125MW)

1 x GE Frame 7EA - 131.2 MW

Date: 24-Sep-01

Currency: CDN $

WBS	DESCRIPTION	MATERIAL DOLLARS	LABOR DOLLARS	TOTAL DOLLARS	TRADE HOURS
9900	**TEMPORARY CONSTRUCTION**				
9900	TEMPORARY CONSTRUCTION	1,530,000	0	1,530,000	0
9900	**TEMPORARY CONSTRUCTION**	**1,530,000**	**0**	**1,530,000**	**0**
Total Estimate 2001 Canadian Dollars - Taxes Excluded		**109,410,000**	**15,920,000**	**125,335,000**	**263,300**

ACRES International

CAPITAL COST ESTIMATE

NEWFOUNDLAND & LABRADOR HYDRO

HOLYROOD GENERATING STATION

COMBINED CYCLE PLANT - OPTION 1 (2 CGTG, 2 HRSG, 1 STG, 125MW)

2 x GE Frame 6B - 128.4 MW

Date: 24-Sep-01

Currency: CDN $

WBS	DESCRIPTION	MATERIAL DOLLARS	LABOR DOLLARS	TOTAL DOLLARS	TRADE HOURS
0390	**YARD WORK**				
0110	SITE PREPARATION	169,152	34,485	203,637	610
0120	ROADS AND PARKING	100,198	257,070	357,268	2,690
0150	GENERAL EXCAVATION & BACKFILL	0	111,815	111,815	1,070
0200	SITE IMPROVEMENTS - RETAINING WALL	967,505	435,765	1,403,270	9,280
0600	WATER, SEWER & OTHER SERVICE LINES	86,192	32,395	118,587	480
0630	STORM DRAINAGE	0	0	0	0
2240	DEMINERALIZED WATER	49,560	34,485	84,045	620
5000	ELECTRICAL	258,576	83,600	342,176	1,780
5100	DIESEL GENERATOR - 500kW SYSTEM	183,158	11,495	194,653	240
5390	YARD LIGHTING	23,703	9,405	33,108	210
5970	CATHODIC PROTECTION SYSTEM	42,019	11,495	53,514	250
6705	YARD FIRE PROTECTION	190,700	58,520	249,220	1,050
0390	**YARD WORK**	**2,070,000**	**1,080,000**	**3,150,000**	**18,280**
1010	**BUILDING**				
1121	BUILDING FOUNDATIONS	488,062	1,516,295	2,004,357	17,450
1123	SLAB ON GRADE, PITS, TRENCHES	1,100,025	290,510	1,390,535	6,170
1310	STRUCTURAL STEEL	2,792,621	355,300	3,147,921	7,560
1320	IRON WORK	258,576	33,440	292,016	720
1630	ROOFING	243,492	182,875	426,367	3,880
1640	SIDING	183,158	260,205	443,363	5,540
1650	INTERIOR FINISHES	64,644	28,215	92,859	600
1660	MASONRY	25,858	29,260	55,118	630
1670	DOORS	89,424	12,540	101,964	280
1975	PIPE RACK	206,861	33,440	240,301	720
5110	POWER CABLE	1,326,317	1,286,395	2,612,712	27,350
5120	INSTRUMENT & CONTROL CABLE	305,380	165,110	470,490	3,520
5415	TRANSFORMERS	13,522	6,270	19,792	130
5510	CONDUIT	56,343	58,520	114,863	1,250
5520	CABLE TRAY	366,230	353,210	719,440	7,500
5610	TERMINATIONS - POWER CABLE	57,470	132,715	190,185	2,820
5620	TERMINATIONS - INSTRUMENT & CONTROL CABLE	31,552	131,670	163,222	2,800
5915	LIGHTNING PROTECTION & GROUNDING	135,223	73,150	208,373	1,550
5920	BUILDING LIGHTING & ELECTRICAL	206,216	115,995	322,211	2,460
5940	FIRE ALARM SYSTEM	233,260	55,385	288,645	1,180
5950	BUILDING COMMUNICATIONS	84,515	11,495	96,010	250
5960	SECURITY SYSTEM	16,903	2,090	18,993	50
6210	PLUMBING	37,186	16,720	53,906	350
6211	DOMESTIC WATER SYSTEM	360,596	169,290	529,886	3,600
6212	SANITARY SEWAGE SYSTEM	34,933	21,945	56,878	480
6231	ROOF DRAINS	22,537	17,765	40,302	370
6232	FLOOR DRAINS	140,858	74,195	215,053	1,570
6233	OIL WATER SEPARATOR	22,537	5,225	27,762	120
6310	HVAC SYSTEMS	454,126	343,805	797,931	7,300
6700	BUILDING FIRE PROTECTION	180,298	75,240	255,538	1,600
7220	SERVICE AIR SYSTEM	227,626	102,410	330,036	2,170

ACRES International

CAPITAL COST ESTIMATE

NEWFOUNDLAND & LABRADOR HYDRO

HOLYROOD GENERATING STATION

COMBINED CYCLE PLANT - OPTION 1 (2 CGTG, 2 HRSG, 1 STG, 125MW)

2 x GE Frame 6B - 128.4 MW

Date: 24-Sep-01

Currency: CDN $

WBS	DESCRIPTION	MATERIAL DOLLARS	LABOR DOLLARS	TOTAL DOLLARS	TRADE HOURS
1010	**BUILDING**	**9,770,000**	**5,960,000**	**15,730,000**	**111,970**
1020	**ELECTRICAL / SWITCHGEAR ROOM**				
5350	BUS DUCT	881,048	148,390	1,029,438	3,160
5400	POWER SWITCHING & DISTRIBUTION	34,778	0	34,778	0
5410	SWITCHGEAR	321,119	54,340	375,459	1,150
5420	MOTOR CONTROL CENTRES	347,782	52,250	400,032	1,100
5430	600V SWITCHGEAR	405,746	37,620	443,366	800
5440	4.160KV SWITCHGEAR	463,710	39,710	503,420	850
5470	UPS SYSTEM	178,528	11,495	190,023	250
5730	RELAY BOARDS & PANELS	376,764	38,665	415,429	830
1020	**ELECTRICAL / SWITCHGEAR ROOM**	**3,010,000**	**380,000**	**3,390,000**	**8,140**
1030	**CONTROL ROOM**				
1650	INTERIOR FINISHES & RAISED FLOOR	40,941	6,270	47,211	140
5705	DCS	869,456	108,680	978,136	2,300
5706	DCS - EXISTING PERFORMANCE MONITORING	162,298	0	162,298	0
5710	MAIN CONTROL BOARDS & PANELS	112,450	16,720	129,170	360
5740	COMPUTER	124,042	19,855	143,897	430
1030	**CONTROL ROOM**	**1,310,000**	**150,000**	**1,460,000**	**3,230**
1040	**EXISTING CONTROL ROOM**				
5120	INSTRUMENT AND CONTROL CABLE	2,319	3,135	5,454	100
5520	CABLE TRAY	12,752	11,495	24,247	300
5705	DCS	115,927	24,035	139,962	500
1040	**EXISTING CONTROL ROOM**	**130,000**	**40,000**	**170,000**	**900**
1050	**PEDESTRIAN OVERPASS**				
1320	MISCELLANEOUS STEEL	215,480	104,500	319,980	1,000
1050	**PEDESTRIAN OVERPASS**	**220,000**	**105,000**	**320,000**	**1,000**
1100	**COMBUSTION TURBINE GENERATOR**				
1261	COMBUSTION TURBINE FOUNDATION	495,604	173,470	669,074	3,700
1320	IRONWORK	161,610	24,035	185,645	500
1610	PAINTING & PROTECTIVE FINISHES	10,774	3,135	13,909	70
3910	COMBUSTION TURBINE GENERATOR	42,150,000	1,749,330	43,899,330	37,210
1100	**COMBUSTION TURBINE GENERATOR**	**42,820,000**	**1,950,000**	**44,770,000**	**41,480**
1200	**HEAT RECOVERY STEAM GENERATOR**				
1262	HRSG FOUNDATIONS	581,796	204,820	786,616	4,350
2010	HEAT RECOVERY STEAM GENERATOR	19,965,000	4,514,400	24,479,400	36,000
2015	EXHAUST BYPASS	1,600,000	375,000	1,975,000	6,500
2100	STEAM SYSTEMS	602,871	94,050	696,921	2,000
2120	HP STEAM SYSTEM	588,222	178,695	766,917	3,800
2135	IP STEAM SYSTEM	832,751	476,520	1,309,271	10,130
2140	LP STEAM SYSTEM	679,498	364,705	1,044,203	7,750
2180	STEAM LINE BLOWOUT	43,948	4,180	48,128	100

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NEWFOUNDLAND & LABRADOR HYDRO

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2 x GE Frame 6B - 128.4 MW

Date: 24-Sep-01

Currency: CDN $

WBS	DESCRIPTION	MATERIAL DOLLARS	LABOR DOLLARS	TOTAL DOLLARS	TRADE HOURS
2212	CHEMICAL FEED SYSTEM	56,343	16,720	73,063	350
2215	CONDENSATE SYSTEM	721,192	498,465	1,219,657	11,000
2240	DEMINERALIZED WATER SYSTEM	597,237	193,325	790,562	4,100
2312	BOILER FEED & CONDENSATE SYSTEM	2,039,476	304,095	2,343,571	6,460
2750	SAMPLING SYSTEM	67,612	37,620	105,232	800
3005	CONTINUOUS EMISSIONS MONITORING SYSTEM	450,745	118,085	568,830	2,500
3410	COMPONENT COOLING SYSTEM	1,333,078	252,890	1,585,968	5,370
5700	CONTROLS AND INSTRUMENTATION	226,058	68,970	295,028	1,470
5720	LOCAL CONTROL BOARDS & PANELS	48,690	22,990	71,680	490
5750	TRANSMITTERS, TUBING & RELAY RACKS	693,020	241,395	934,415	5,140
1200	**HEAT RECOVERY STEAM GENERATOR**	**31,130,000**	**7,970,000**	**39,090,000**	**108,310**
1300	**STEAM TURBINE GENERATOR**				
1272	STEAM TURBINE GENERATOR FOUNDATION	852,223	300,960	1,153,183	6,400
1600	MISCELLANEOUS STRUCTURAL STEEL	57,102	35,530	92,632	800
1610	PAINTING	3,232	4,180	7,412	100
3100	STEAM TURBINE GENERATOR	10,322,500	470,250	10,792,750	10,000
3700	CRANES, HOISTS & MONORAILS	907,124	24,035	931,159	500
1300	**STEAM TURBINE GENERATOR**	**12,140,000**	**830,000**	**12,980,000**	**17,800**
1301	**CONDENSER**				
3210	CONDENSING SYSTEM	1,352,400	221,540	1,573,940	4,700
3400	AUXILIARY COOLING WATER SYSTEM	281,716	94,050	375,766	2,000
1301	**CONDENSER**	**1,630,000**	**320,000**	**1,950,000**	**6,700**
3200	**WATER TREATMENT SYSTEMS**				
2230	CONDENSATE MAKEUP & DRAWOFF	18,030	4,180	22,210	100
2243	DEMINERALIZED WATER STORAGE	56,343	20,900	77,243	440
3200	**WATER TREATMENT SYSTEMS**	**70,000**	**25,000**	**100,000**	**540**
3311	**INTAKE STRUCTURE**				
3300	CIRCULATING WATER SYSTEM	1,968,556	422,180	2,390,736	9,000
5000	ELECTRICAL	115,927	11,495	127,422	240
3311	**INTAKE STRUCTURE**	**2,080,000**	**430,000**	**2,520,000**	**9,240**
3770	**TRANSFORMERS**				
1149	MAIN TRANSFORMER FOUNDATION	19,393	14,630	34,023	300
5415	STEP-UP TRANSFORMERS	2,730,000	74,195	2,804,195	1,580
9009	PRE-OPERATIONAL TESTING	0	31,350	31,350	300
3770	**TRANSFORMERS**	**2,750,000**	**120,000**	**2,870,000**	**2,180**
6010	**FUEL OIL STORAGE**				
1125	MAJOR EQUIPMENT FOUNDATIONS	0	0	0	
4620	NO.2 FUEL OIL DELIVERY & STORAGE SYSTEM	2,293,785	821,370	3,115,155	17,500
5000	ELECTRICAL	107,740	24,035	131,775	500
6750	FIRE PROTECTION SYSTEM _ FOAM	161,610	94,050	255,660	2,000
6010	**FUEL OIL STORAGE**	**2,560,000**	**940,000**	**3,500,000**	**20,000**

ACRES International

CAPITAL COST ESTIMATE

NEWFOUNDLAND & LABRADOR HYDRO

HOLYROOD GENERATING STATION

COMBINED CYCLE PLANT - OPTION 1 (2 CGTG, 2 HRSG, 1 STG, 125MW)

2 x GE Frame 6B - 128.4 MW

Date: 24-Sep-01

Currency: CDN $

WBS	DESCRIPTION	MATERIAL DOLLARS	LABOR DOLLARS	TOTAL DOLLARS	TRADE HOURS
9001	**START UP**				
9001	SPARES FOR START UP	140,858	0	140,858	0
9002	VENDOR REP FOR START UP	728,000	0	728,000	0
9004	TRADE SUPPORT DURING START UP	0	407,550	407,550	6,500
9005	ENGINEERING CHECKOUT - COMMISSIONING	985,600	0	985,600	
9006	PLANT OPERATORS - COMMISSIONING	840,000	0	840,000	
9007	INITIAL FILL LUBRICANTS & FUEL TO SYNC IDLE	146,492	0	146,492	
9001	**START UP**	**2,840,000**	**410,000**	**3,250,000**	**6,500**
9101	**PROVINCIAL / FEDERAL TAXES (NIC)**				
9101	PROVINCIAL / FEDERAL TAXES (NIC)	0	0	0	0
9101	**PROVINCIAL / FEDERAL TAXES (NIC)**	**0**	**0**	**0**	**0**
9105	**COST OF MONEY**				
9105	INTEREST DURING CONSTRUCTION	0	0	0	0
9105	**COST OF MONEY**	**0**	**0**	**0**	**0**
9200	**INSURANCE AND BONDS**				
9200	INSURANCE AND BONDS	700,000	0	700,000	0
9200	**INSURANCE AND BONDS**	**700,000**	**0**	**700,000**	**0**
9301	**CAPITAL SPARES**				
9301	CAPITAL SPARES	700,000	0	700,000	0
9301	**CAPITAL SPARES**	**700,000**	**0**	**700,000**	**0**
9500	**ENGINEERING - CONSULTANTS**				
9501	ENGINEERING - CONSULTANTS	6,944,000	0	6,944,000	0
9503	SITE ENGINEERING EXPENSES	2,072,000	0	2,072,000	0
9504	ALLOWANCE FOR PLANNED OVERTIME	89,600	0	89,600	0
9500	**ENGINEERING - CONSULTANTS**	**9,110,000**	**0**	**9,110,000**	**0**
9600	**CONSTRUCTION MANAGEMENT**				
9501	CONSTRUCTION MANAGEMENT - SERVICES	2,352,000	0	2,352,000	0
9503	CONSTRUCTION MANAGEMENT - EXPENSES	560,000	0	560,000	0
9610	CONSTRUCTION DISTRIBUTABLES	1,122,651	578,930	1,701,581	0
9900	ALLOWANCE FOR PLANNED OVERTIME	0	207,000	207,000	4,000
9600	**CONSTRUCTION MANAGEMENT**	**4,035,000**	**786,000**	**4,821,000**	**4,000**
9703	**EXCHANGE RATE US DOLLARS = $1.50**				
9703	EXCHANGE RATE US DOLLARS = $1.50	0	0	0	0
9703	**EXCHANGE RATE US DOLLARS = $1.50**	**0**	**0**	**0**	**0**
9900	**TEMPORARY CONSTRUCTION**				
9900	TEMPORARY CONSTRUCTION	2,013,000	0	2,013,000	0
9900	**TEMPORARY CONSTRUCTION**	**2,013,000**	**0**	**2,013,000**	**0**

ACRES International

CAPITAL COST ESTIMATE
NEWFOUNDLAND & LABRADOR HYDRO
HOLYROOD GENERATING STATION

COMBINED CYCLE PLANT - OPTION 1 (2 CGTG, 2 HRSG, 1 STG, 125MW)

2 x GE Frame 6B - 128.4 MW

Date: 24-Sep-01

Currency: CDN $

WBS	DESCRIPTION	MATERIAL DOLLARS	LABOR DOLLARS	TOTAL DOLLARS	TRADE HOURS
Total Estimate 2001 Canadian Dollars - Taxes Excluded		**131,088,000**	**21,496,000**	**152,594,000**	**360,270**

ACRES International

CAPITAL COST ESTIMATE

NEWFOUNDLAND & LABRADOR HYDRO

HOLYROOD GENERATING STATION

COMBINED CYCLE PLANT - OPTION 1 (2 CGTG, 2 HRSG, 1 STG, 125MW)

2 x Rolls-Royce Trent / 60 - 141.4 MW

Date: 24-Sep-01

Currency: CDN $

WBS	DESCRIPTION	MATERIAL DOLLARS	LABOR DOLLARS	TOTAL DOLLARS	TRADE HOURS
0390	**YARD WORK**				
0110	SITE PREPARATION	169,152	34,485	203,637	610
0120	ROADS AND PARKING	100,198	257,070	357,268	2,690
0150	GENERAL EXCAVATION & BACKFILL	0	111,815	111,815	1,070
0200	SITE IMPROVEMENTS - RETAINING WALL	967,505	435,765	1,403,270	9,280
0600	WATER, SEWER & OTHER SERVICE LINES	86,192	32,395	118,587	480
0630	STORM DRAINAGE	0	0	0	0
2240	DEMINERALIZED WATER	49,560	34,485	84,045	620
5000	ELECTRICAL	258,576	83,600	342,176	1,780
5100	DIESEL GENERATOR - 500kW SYSTEM	183,158	11,495	194,653	240
5390	YARD LIGHTING	23,703	9,405	33,108	210
5970	CATHODIC PROTECTION SYSTEM	42,019	11,495	53,514	250
6705	YARD FIRE PROTECTION	190,700	58,520	249,220	1,050
0390	**YARD WORK**	**2,071,000**	**1,080,000**	**3,150,000**	**18,280**
1010	**BUILDING**				
1121	BUILDING FOUNDATIONS	488,062	1,516,295	2,004,357	17,450
1123	SLAB ON GRADE, PITS, TRENCHES	1,100,025	290,510	1,390,535	6,170
1310	STRUCTURAL STEEL	2,792,621	355,300	3,147,921	7,560
1320	IRON WORK	258,576	33,440	292,016	720
1630	ROOFING	243,492	182,875	426,367	3,880
1640	SIDING	183,158	260,205	443,363	5,540
1650	INTERIOR FINISHES	64,644	28,215	92,859	600
1660	MASONRY	25,858	29,260	55,118	630
1670	DOORS	89,424	12,540	101,964	280
1975	PIPE RACK	206,861	33,440	240,301	720
5110	POWER CABLE	1,326,317	1,286,395	2,612,712	27,350
5120	INSTRUMENT & CONTROL CABLE	305,380	165,110	470,490	3,520
5415	TRANSFORMERS	13,522	6,270	19,792	130
5510	CONDUIT	56,343	58,520	114,863	1,250
5520	CABLE TRAY	366,230	353,210	719,440	7,500
5610	TERMINATIONS - POWER CABLE	57,470	132,715	190,185	2,820
5620	TERMINATIONS - INSTRUMENT & CONTROL CABLE	31,552	131,670	163,222	2,800
5915	LIGHTNING PROTECTION & GROUNDING	135,223	73,150	208,373	1,550
5920	BUILDING LIGHTING & ELECTRICAL	206,216	115,995	322,211	2,460
5940	FIRE ALARM SYSTEM	233,260	55,385	288,645	1,180
5950	BUILDING COMMUNICATIONS	84,515	11,495	96,010	250
5960	SECURITY SYSTEM	16,903	2,090	18,993	50
6210	PLUMBING	37,186	16,720	53,906	350
6211	DOMESTIC WATER SYSTEM	360,596	169,290	529,886	3,600
6212	SANITARY SEWAGE SYSTEM	34,933	21,945	56,878	480
6231	ROOF DRAINS	22,537	17,765	40,302	370
6232	FLOOR DRAINS	140,858	74,195	215,053	1,570
6233	OIL WATER SEPARATOR	22,537	5,225	27,762	120
6310	HVAC SYSTEMS	454,126	343,805	797,931	7,300
6700	BUILDING FIRE PROTECTION	180,298	75,240	255,538	1,600

ACRES International

CAPITAL COST ESTIMATE
NEWFOUNDLAND & LABRADOR HYDRO
HOLYROOD GENERATING STATION
COMBINED CYCLE PLANT - OPTION 1 (2 CGTG, 2 HRSG, 1 STG, 125MW)
2 x Rolls-Royce Trent / 60 - 141.4 MW

Date: 24-Sep-01
Currency: CDN $

WBS	DESCRIPTION	MATERIAL DOLLARS	LABOR DOLLARS	TOTAL DOLLARS	TRADE HOURS
7220	SERVICE AIR SYSTEM	227,626	102,410	330,036	2,170
1010	**BUILDING**	**9,770,000**	**5,960,000**	**15,730,000**	**111,970**
1020	**ELECTRICAL / SWITCHGEAR ROOM**				
5350	BUS DUCT	881,048	148,390	1,029,438	3,160
5400	POWER SWITCHING & DISTRIBUTION	34,778	0	34,778	0
5410	SWITCHGEAR	321,119	54,340	375,459	1,150
5420	MOTOR CONTROL CENTRES	347,782	52,250	400,032	1,100
5430	600V SWITCHGEAR	405,746	37,620	443,366	800
5440	4.160KV SWITCHGEAR	463,710	39,710	503,420	850
5470	UPS SYSTEM	178,528	11,495	190,023	250
5730	RELAY BOARDS & PANELS	376,764	38,665	415,429	830
1020	**ELECTRICAL / SWITCHGEAR ROOM**	**3,010,000**	**380,000**	**3,390,000**	**8,140**
1030	**CONTROL ROOM**				
1650	INTERIOR FINISHES & RAISED FLOOR	40,941	6,270	47,211	140
5705	DCS	869,456	108,680	978,136	2,300
5706	DCS - EXISTING PERFORMANCE MONITORING	162,298	0	162,298	0
5710	MAIN CONTROL BOARDS & PANELS	112,450	16,720	129,170	360
5740	COMPUTER	124,042	19,855	143,897	430
1030	**CONTROL ROOM**	**1,310,000**	**150,000**	**1,460,000**	**3,230**
1040	**EXISTING CONTROL ROOM**				
5120	INSTRUMENT AND CONTROL CABLE	2,319	3,135	5,454	100
5520	CABLE TRAY	12,752	11,495	24,247	300
5705	DCS	115,927	24,035	139,962	500
1040	**EXISTING CONTROL ROOM**	**130,000**	**40,000**	**170,000**	**900**
1050	**PEDESTRIAN OVERPASS**				
1320	MISCELLANEOUS STEEL	215,480	104,500	319,980	1,000
1050	**PEDESTRIAN OVERPASS**	**220,000**	**105,000**	**320,000**	**1,000**
1100	**COMBUSTION TURBINE GENERATOR**				
1261	COMBUSTION TURBINE FOUNDATION	495,604	173,470	669,074	3,700
1320	IRONWORK	161,610	24,035	185,645	500
1610	PAINTING & PROTECTIVE FINISHES	10,774	3,135	13,909	70
3910	COMBUSTION TURBINE GENERATOR	53,280,000	1,749,330	55,029,330	37,210
1100	**COMBUSTION TURBINE GENERATOR**	**53,950,000**	**1,950,000**	**55,900,000**	**41,480**
1200	**HEAT RECOVERY STEAM GENERATOR**				
1262	HRSG FOUNDATIONS	581,796	204,820	786,616	4,350
2010	HEAT RECOVERY STEAM GENERATOR	19,965,000	4,514,400	24,479,400	36,000
2015	EXHAUST BYPASS	1,600,000	375,000	1,975,000	6,500
2100	STEAM SYSTEMS	602,871	94,050	696,921	2,000
2120	HP STEAM SYSTEM	588,222	178,695	766,917	3,800
2135	IP STEAM SYSTEM	832,751	476,520	1,309,271	10,130

ACRES International

CAPITAL COST ESTIMATE

NEWFOUNDLAND & LABRADOR HYDRO

HOLYROOD GENERATING STATION

COMBINED CYCLE PLANT - OPTION 1 (2 CGTG, 2 HRSG, 1 STG, 125MW)

2 x Rolls-Royce Trent / 60 - 141.4 MW

Date: 24-Sep-01

Currency: CDN $

WBS	DESCRIPTION	MATERIAL DOLLARS	LABOR DOLLARS	TOTAL DOLLARS	TRADE HOURS
2140	LP STEAM SYSTEM	679,498	364,705	1,044,203	7,750
2180	STEAM LINE BLOWOUT	43,948	4,180	48,128	100
2212	CHEMICAL FEED SYSTEM	56,343	16,720	73,063	350
2215	CONDENSATE SYSTEM	721,192	498,465	1,219,657	11,000
2240	DEMINERALIZED WATER SYSTEM	597,237	193,325	790,562	4,100
2312	BOILER FEED & CONDENSATE SYSTEM	2,039,476	304,095	2,343,571	6,460
2750	SAMPLING SYSTEM	67,612	37,620	105,232	800
3005	CONTINUOUS EMISSIONS MONITORING SYSTEM	450,745	118,085	568,830	2,500
3410	COMPONENT COOLING SYSTEM	1,333,078	252,890	1,585,968	5,370
5700	CONTROLS AND INSTRUMENTATION	226,058	68,970	295,028	1,470
5720	LOCAL CONTROL BOARDS & PANELS	48,690	22,990	71,680	490
5750	TRANSMITTERS, TUBING & RELAY RACKS	693,020	241,395	934,415	5,140
1200	**HEAT RECOVERY STEAM GENERATOR**	**31,130,000**	**7,970,000**	**39,090,000**	**108,310**
1300	**STEAM TURBINE GENERATOR**				
1272	STEAM TURBINE GENERATOR FOUNDATION	852,223	300,960	1,153,183	6,400
1600	MISCELLANEOUS STRUCTURAL STEEL	57,102	35,530	92,632	800
1610	PAINTING	3,232	4,180	7,412	100
3100	STEAM TURBINE GENERATOR	9,389,700	470,250	9,859,950	10,000
3700	CRANES, HOISTS & MONORAILS	907,124	24,035	931,159	500
1300	**STEAM TURBINE GENERATOR**	**11,210,000**	**830,000**	**12,040,000**	**17,800**
1301	**CONDENSER**				
3210	CONDENSING SYSTEM	1,135,000	221,540	1,356,540	4,700
3400	AUXILIARY COOLING WATER SYSTEM	281,716	94,050	375,766	2,000
1301	**CONDENSER**	**1,420,000**	**320,000**	**1,730,000**	**6,700**
3200	**WATER TREATMENT SYSTEMS**				
2230	CONDENSATE MAKEUP & DRAWOFF	18,030	4,180	22,210	100
2243	DEMINERALIZED WATER STORAGE	56,343	20,900	77,243	440
3200	**WATER TREATMENT SYSTEMS**	**70,000**	**25,000**	**100,000**	**540**
3311	**INTAKE STRUCTURE**				
3300	CIRCULATING WATER SYSTEM	1,968,556	422,180	2,390,736	9,000
5000	ELECTRICAL	115,927	11,495	127,422	240
3311	**INTAKE STRUCTURE**	**2,080,000**	**430,000**	**2,520,000**	**9,240**
3770	**TRANSFORMERS**				
1149	MAIN TRANSFORMER FOUNDATION	19,393	14,630	34,023	300
5415	STEP-UP TRANSFORMERS	2,640,000	74,195	2,714,195	1,580
9009	PRE-OPERATIONAL TESTING	0	31,350	31,350	300
3770	**TRANSFORMERS**	**2,660,000**	**120,000**	**2,780,000**	**2,180**
6010	**FUEL OIL STORAGE**				
1125	MAJOR EQUIPMENT FOUNDATIONS	0	0	0	
4620	NO.2 FUEL OIL DELIVERY & STORAGE SYSTEM	2,293,785	821,370	3,115,155	17,500

ACRES International

CAPITAL COST ESTIMATE

NEWFOUNDLAND & LABRADOR HYDRO

HOLYROOD GENERATING STATION

COMBINED CYCLE PLANT - OPTION 1 (2 CGTG, 2 HRSG, 1 STG, 125MW)

2 x Rolls-Royce Trent / 60 - 141.4 MW

Date: 24-Sep-01

Currency: CDN $

WBS	DESCRIPTION	MATERIAL DOLLARS	LABOR DOLLARS	TOTAL DOLLARS	TRADE HOURS
5000	ELECTRICAL	107,740	24,035	131,775	500
6750	FIRE PROTECTION SYSTEM _ FOAM	161,610	94,050	255,660	2,000
6010	**FUEL OIL STORAGE**	**2,560,000**	**940,000**	**3,500,000**	**20,000**
9001	**START UP**				
9001	SPARES FOR START UP	140,858	0	140,858	0
9002	VENDOR REP FOR START UP	728,000	0	728,000	0
9004	TRADE SUPPORT DURING START UP	0	407,550	407,550	6,500
9005	ENGINEERING CHECKOUT - COMMISSIONING	985,600	0	985,600	
9006	PLANT OPERATORS - COMMISSIONING	840,000	0	840,000	
9007	INITIAL FILL LUBRICANTS & FUEL TO SYNC IDLE	146,492	0	146,492	
9001	**START UP**	**2,840,000**	**410,000**	**3,250,000**	**6,500**
9101	**PROVINCIAL / FEDERAL TAXES (NIC)**				
9101	PROVINCIAL / FEDERAL TAXES (NIC)	0	0	0	0
9101	**PROVINCIAL / FEDERAL TAXES (NIC)**	**0**	**0**	**0**	**0**
9105	**COST OF MONEY**				
9105	INTEREST DURING CONSTRUCTION	0	0	0	0
9105	**COST OF MONEY**	**0**	**0**	**0**	**0**
9200	**INSURANCE AND BONDS**				
9200	INSURANCE AND BONDS	700,000	0	700,000	0
9200	**INSURANCE AND BONDS**	**700,000**	**0**	**700,000**	**0**
9301	**CAPITAL SPARES**				
9301	CAPITAL SPARES	700,000	0	700,000	0
9301	**CAPITAL SPARES**	**700,000**	**0**	**700,000**	**0**
9500	**ENGINEERING - CONSULTANTS**				
9501	ENGINEERING - CONSULTANTS	6,944,000	0	6,944,000	0
9503	SITE ENGINEERING EXPENSES	2,072,000	0	2,072,000	0
9504	ALLOWANCE FOR PLANNED OVERTIME	89,600	0	89,600	0
9500	**ENGINEERING - CONSULTANTS**	**9,110,000**	**0**	**9,110,000**	**0**
9600	**CONSTRUCTION MANAGEMENT**				
9501	CONSTRUCTION MANAGEMENT - SERVICES	2,352,000	0	2,352,000	0
9503	CONSTRUCTION MANAGEMENT - EXPENSES	560,000	0	560,000	0
9610	CONSTRUCTION DISTRIBUTABLES	1,122,651	578,930	1,701,581	0
9900	ALLOWANCE FOR PLANNED OVERTIME	0	207,000	207,000	4,000
9600	**CONSTRUCTION MANAGEMENT**	**4,035,000**	**786,000**	**4,821,000**	**4,000**
9703	**EXCHANGE RATE US DOLLARS = $1.50**				
9703	EXCHANGE RATE US DOLLARS = $1.50	0	0	0	0
9703	**EXCHANGE RATE US DOLLARS = $1.50**	**0**	**0**	**0**	**0**

ACRES International

CAPITAL COST ESTIMATE
NEWFOUNDLAND & LABRADOR HYDRO
HOLYROOD GENERATING STATION

COMBINED CYCLE PLANT - OPTION 1 (2 CGTG, 2 HRSG, 1 STG, 125MW)

2 x Rolls-Royce Trent / 60 - 141.4 MW

Date: 24-Sep-01

Currency: CDN $

WBS	DESCRIPTION	MATERIAL DOLLARS	LABOR DOLLARS	TOTAL DOLLARS	TRADE HOURS
9900	**TEMPORARY CONSTRUCTION**				
9900	TEMPORARY CONSTRUCTION	2,013,000	0	2,013,000	0
9900	**TEMPORARY CONSTRUCTION**	**2,013,000**	**0**	**2,013,000**	**0**
Total Estimate 2001 Canadian Dollars - Taxes Excluded		**140,989,000**	**21,496,000**	**162,474,000**	**360,270**

175 MW

ACRES International

CAPITAL COST ESTIMATE

NEWFOUNDLAND & LABRADOR HYDRO

HOLYROOD GENERATING STATION

COMBINED CYCLE PLANT - (1 CGTG, 1 HRSG, 1 STG, 175MW)

1 x Siemens-Westinghouse D5A - 174.1 MW

Date: 24-Sep-01

Currency: CDN $

WBS	DESCRIPTION	MATERIAL DOLLARS	LABOR DOLLARS	TOTAL DOLLARS	TRADE HOURS
0390	**YARD WORK**				
0110	SITE PREPARATION	169,152	34,485	203,637	600
0120	ROADS AND PARKING	100,198	257,070	357,268	2,700
0150	GENERAL EXCAVATION & BACKFILL	0	111,815	111,815	1,100
0200	SITE IMPROVEMENTS - RETAINING WALL	967,505	435,765	1,403,270	9,300
0600	WATER, SEWER & OTHER SERVICE LINES	86,192	32,395	118,587	500
0630	STORM DRAINAGE	0	0	0	0
2240	DEMINERALIZED WATER	49,560	34,485	84,045	600
5000	ELECTRICAL	258,576	83,600	342,176	1,800
5100	DIESEL GENERATOR - 500kW SYSTEM	183,158	11,495	194,653	200
5390	YARD LIGHTING	23,703	9,405	33,108	200
5970	CATHODIC PROTECTION SYSTEM	42,019	11,495	53,514	300
6705	YARD FIRE PROTECTION	190,700	58,520	249,220	1,100
0390	**YARD WORK**	**2,071,000**	**1,080,000**	**3,150,000**	**18,400**
1010	**BUILDING**				
1121	BUILDING FOUNDATIONS	390,019	1,451,505	1,841,524	16,300
1123	SLAB ON GRADE, PITS, TRENCHES	580,719	210,045	790,764	4,500
1310	STRUCTURAL STEEL	2,016,893	257,070	2,273,963	5,500
1320	IRON WORK	193,932	25,080	219,012	500
1630	ROOFING	162,687	121,220	283,907	2,600
1640	SIDING	178,848	200,640	379,488	4,300
1650	INTERIOR FINISHES	64,644	28,215	92,859	600
1660	MASONRY	25,858	29,260	55,118	600
1670	DOORS	89,424	12,540	101,964	300
1975	PIPE RACK	103,430	16,720	120,150	400
5110	POWER CABLE	1,038,967	987,525	2,026,492	21,000
5120	INSTRUMENT & CONTROL CABLE	382,006	205,865	587,871	4,400
5415	TRANSFORMERS	10,142	4,180	14,322	100
5510	CONDUIT	45,074	47,025	92,099	1,000
5520	CABLE TRAY	304,253	282,150	586,403	6,000
5610	TERMINATIONS - POWER CABLE	43,948	101,365	145,313	2,200
5620	TERMINATIONS - INSTRUMENT & CONTROL CABLE	24,791	103,455	128,246	2,300
5915	LIGHTNING PROTECTION & GROUNDING	118,321	61,655	179,976	1,300
5920	BUILDING LIGHTING & ELECTRICAL	174,664	93,005	267,669	2,000
5940	FIRE ALARM SYSTEM	160,014	36,575	196,589	800
5950	BUILDING COMMUNICATIONS	84,515	11,495	96,010	200
5960	SECURITY SYSTEM	16,903	2,090	18,993	100
6210	PLUMBING	37,186	16,720	53,906	400
6211	DOMESTIC WATER SYSTEM	205,089	98,230	303,319	2,100
6212	SANITARY SEWAGE SYSTEM	20,284	12,540	32,824	300
6231	ROOF DRAINS	12,395	8,360	20,755	200
6232	FLOOR DRAINS	99,164	51,205	150,369	1,100
6233	OIL WATER SEPARATOR	22,537	5,225	27,762	100
6310	HVAC SYSTEMS	315,521	226,765	542,286	4,800
6700	BUILDING FIRE PROTECTION	90,149	37,620	127,769	800
7220	SERVICE AIR SYSTEM	187,059	68,970	256,029	1,500

ACRES International

CAPITAL COST ESTIMATE

NEWFOUNDLAND & LABRADOR HYDRO

HOLYROOD GENERATING STATION

COMBINED CYCLE PLANT - (1 CGTG, 1 HRSG, 1 STG, 175MW)

1 x Siemens-Westinghouse D5A - 174.1 MW

Date: 24-Sep-01

Currency: CDN $

WBS	DESCRIPTION	MATERIAL DOLLARS	LABOR DOLLARS	TOTAL DOLLARS	TRADE HOURS
1010	**BUILDING**	**7,199,000**	**4,810,000**	**12,010,000**	**88,300**
1020	**ELECTRICAL / SWITCHGEAR ROOM**				
5350	BUS DUCTS	440,524	74,195	514,719	1,600
5400	POWER SWITCHING & DISTRIBUTION	34,778	0	34,778	0
5410	SWITCHGEAR	161,139	27,170	188,309	600
5420	MOTOR CONTROL CENTRES	278,226	26,125	304,351	600
5430	600V SWITCHGEAR	350,101	29,260	379,361	600
5440	4.160KV SWITCHGEAR	347,782	27,170	374,952	600
5470	UPS SYSTEM	178,528	11,495	190,023	200
5730	RELAY BOARDS & PANELS	202,873	21,945	224,818	500
1020	**ELECTRICAL / SWITCHGEAR ROOM**	**1,990,000**	**220,000**	**2,210,000**	**4,700**
1030	**CONTROL ROOM**				
1650	INTERIOR FINISHES & RAISED FLOOR	40,941	6,270	47,211	100
5705	DCS	811,492	74,195	885,687	1,600
5706	DCS - EXISTING PERFORMANCE MONITORING	162,298	0	162,298	0
5710	MAIN CONTROL BOARDS & PANELS	112,450	16,720	129,170	400
5740	COMPUTER	89,264	14,630	103,894	300
1030	**CONTROL ROOM**	**1,220,000**	**112,000**	**1,330,000**	**2,400**
1040	**EXISTING CONTROL ROOM**				
5120	INSTRUMENT AND CONTROL CABLE	2,319	3,135	5,454	100
5520	CABLE TRAY	12,752	11,495	24,247	300
5705	DCS	115,927	24,035	139,962	500
1040	**EXISTING CONTROL ROOM**	**130,000**	**39,000**	**170,000**	**900**
1050	**PEDESTRIAN OVERPASS**				
1320	MISCELLANEOUS STEEL	215,480	104,500	319,980	1,000
1050	**PEDESTRIAN OVERPASS**	**220,000**	**105,000**	**320,000**	**1,000**
1100	**COMBUSTION TURBINE GENERATOR**				
1261	COMBUSTION TURBINE FOUNDATION	244,570	85,690	330,260	1,800
1320	IRONWORK	113,127	16,720	129,847	400
1610	PAINTING & PROTECTIVE FINISHES	5,387	2,090	7,477	0
3910	COMBUSTION TURBINE GENERATOR	43,290,000	877,800	44,167,800	18,700
1100	**COMBUSTION TURBINE GENERATOR**	**43,653,000**	**982,000**	**44,640,000**	**20,900**
1200	**HEAT RECOVERY STEAM GENERATOR**				
1262	HRSG FOUNDATIONS	232,718	90,915	323,633	1,900
2010	HEAT RECOVERY STEAM GENERATOR	18,150,000	3,135,000	21,285,000	25,000
2015	EXHAUST BYPASS	1,250,000	250,000	1,500,000	5,000
2100	STEAM SYSTEMS	343,693	47,025	390,718	1,000
2120	HP STEAM SYSTEM	378,626	110,770	489,396	2,400
2135	IP STEAM SYSTEM	416,939	238,260	655,199	5,100
2140	LP STEAM SYSTEM	339,186	181,830	521,016	3,900
2180	STEAM LINE BLOWOUT	22,537	2,090	24,627	0

ACRES International

CAPITAL COST ESTIMATE

NEWFOUNDLAND & LABRADOR HYDRO

HOLYROOD GENERATING STATION

COMBINED CYCLE PLANT - (1 CGTG, 1 HRSG, 1 STG, 175MW)

1 x Siemens-Westinghouse D5A - 174.1 MW

Date: 24-Sep-01

Currency: CDN $

WBS	DESCRIPTION	MATERIAL DOLLARS	LABOR DOLLARS	TOTAL DOLLARS	TRADE HOURS
2212	CHEMICAL FEED SYSTEM	56,343	16,720	73,063	400
2215	CONDENSATE SYSTEM	360,596	249,755	610,351	5,500
2240	DEMINERALIZED WATER SYSTEM	298,619	96,140	394,759	2,100
2312	BOILER FEED & CONDENSATE SYSTEM	1,019,738	163,020	1,182,758	3,500
2750	SAMPLING SYSTEM	33,806	18,810	52,616	400
3005	CONTINUOUS EMISSIONS MONITORING SYSTEM	225,372	58,520	283,892	1,300
3410	COMPONENT COOLING SYSTEM	667,102	126,445	793,547	2,700
5700	CONTROLS AND INSTRUMENTATION	141,985	47,025	189,010	1,000
5720	LOCAL CONTROL BOARDS & PANELS	28,172	16,720	44,892	400
5750	TRANSMITTERS, TUBING & RELAY RACKS	400,036	127,490	527,526	2,700
1200	**HEAT RECOVERY STEAM GENERATOR**	**24,370,000**	**4,977,000**	**29,342,000**	**64,300**
1300	**STEAM TURBINE GENERATOR**				
1272	STEAM TURBINE GENERATOR FOUNDATION	852,223	300,960	1,153,183	6,400
1600	MISCELLANEOUS STRUCTURAL STEEL	57,102	35,530	92,632	800
1610	PAINTING	3,232	4,180	7,412	100
3100	STEAM TURBINE GENERATOR	11,297,700	470,250	11,767,950	10,000
3700	CRANES, HOISTS & MONORAILS	907,124	24,035	931,159	500
1300	**STEAM TURBINE GENERATOR**	**13,117,000**	**835,000**	**13,950,000**	**17,800**
1301	**CONDENSER**				
3210	CONDENSING SYSTEM	1,618,050	221,540	1,839,590	4,700
3400	AUXILIARY COOLING WATER SYSTEM	281,716	94,050	375,766	2,000
1301	**CONDENSER**	**1,900,000**	**320,000**	**2,220,000**	**6,700**
3200	**WATER TREATMENT SYSTEMS**				
2230	CONDENSATE MAKEUP & DRAWOFF	9,015	2,090	11,105	0
2243	DEMINERALIZED WATER STORAGE	56,343	20,900	77,243	400
3200	**WATER TREATMENT SYSTEMS**	**70,000**	**23,000**	**90,000**	**400**
3311	**INTAKE STRUCTURE**				
3300	CIRCULATING WATER SYSTEM	1,968,556	422,180	2,390,736	9,000
5000	ELECTRICAL	115,927	11,495	127,422	200
3311	**INTAKE STRUCTURE**	**2,080,000**	**434,000**	**2,520,000**	**9,200**
3770	**TRANSFORMERS**				
1149	MAIN TRANSFORMER FOUNDATION	19,393	14,630	34,023	300
5415	STEP-UP TRANSFORMERS	2,172,480	39,710	2,212,190	800
9009	PRE-OPERATIONAL TESTING	0	17,765	17,765	200
3770	**TRANSFORMERS**	**2,190,000**	**72,000**	**2,260,000**	**1,300**
6010	**FUEL OIL STORAGE**				
1125	MAJOR EQUIPMENT FOUNDATIONS	0	0	0	
4620	NO.2 FUEL OIL DELIVERY & STORAGE SYSTEM	2,293,785	821,370	3,115,155	17,500
5000	ELECTRICAL	107,740	24,035	131,775	500
6750	FIRE PROTECTION SYSTEM _ FOAM	161,610	94,050	255,660	2,000
6010	**FUEL OIL STORAGE**	**2,563,000**	**939,000**	**3,500,000**	**20,000**

ACRES International

CAPITAL COST ESTIMATE

NEWFOUNDLAND & LABRADOR HYDRO

HOLYROOD GENERATING STATION

COMBINED CYCLE PLANT - (1 CGTG, 1 HRSG, 1 STG, 175MW)

1 x Siemens-Westinghouse D5A - 174.1 MW

Date: 24-Sep-01

Currency: CDN $

WBS	DESCRIPTION	MATERIAL DOLLARS	LABOR DOLLARS	TOTAL DOLLARS	TRADE HOURS
9001	**START UP**				
9001	SPARES FOR START UP	112,686	0	112,686	0
9002	VENDOR REP FOR START UP	560,000	0	560,000	0
9004	TRADE SUPPORT DURING START UP	0	313,500	313,500	5,000
9005	ENGINEERING CHECKOUT - COMMISSIONING	840,000	0	840,000	
9006	PLANT OPERATORS - COMMISSIONING	560,000	0	560,000	
9007	INITIAL FILL LUBRICANTS & FUEL TO SYNC IDLE	112,686	0	112,686	
9001	**START UP**	**2,190,000**	**314,000**	**2,500,000**	**5,000**
9101	**PROVINCIAL / FEDERAL TAXES (NIC)**				
9101	PROVINCIAL / FEDERAL TAXES (NIC)	0	0	0	0
9101	**PROVINCIAL / FEDERAL TAXES (NIC)**	**0**	**0**	**0**	**0**
9105	**COST OF MONEY**				
9105	INTEREST DURING CONSTRUCTION	0	0	0	0
9105	**COST OF MONEY**	**0**	**0**	**0**	**0**
9200	**INSURANCE AND BONDS**				
9200	INSURANCE AND BONDS	700,000	0	700,000	0
9200	**INSURANCE AND BONDS**	**700,000**	**0**	**700,000**	**0**
9301	**CAPITAL SPARES**				
9301	CAPITAL SPARES	700,000	0	700,000	0
9301	**CAPITAL SPARES**	**700,000**	**0**	**700,000**	**0**
9500	**ENGINEERING - CONSULTANTS**				
9501	ENGINEERING - CONSULTANTS	6,608,000	0	6,608,000	0
9503	SITE ENGINEERING EXPENSES	1,892,800	0	1,892,800	0
9504	ALLOWANCE FOR PLANNED OVERTIME	78,400	0	78,400	0
9500	**ENGINEERING - CONSULTANTS**	**8,580,000**	**0**	**8,580,000**	**0**
9600	**CONSTRUCTION MANAGEMENT**				
9501	CONSTRUCTION MANAGEMENT - SERVICES	2,128,000	0	2,128,000	0
9503	CONSTRUCTION MANAGEMENT - EXPENSES	560,000	0	560,000	0
9610	CONSTRUCTION DISTRIBUTABLES	837,140	578,930	1,416,070	0
9900	ALLOWANCE FOR PLANNED OVERTIME	0	103,500	103,500	2,000
9600	**CONSTRUCTION MANAGEMENT**	**3,530,000**	**680,000**	**4,210,000**	**2,000**
9703	**EXCHANGE RATE US DOLLARS = $1.50**				
9703	EXCHANGE RATE US DOLLARS = $1.50	0	0	0	0
9703	**EXCHANGE RATE US DOLLARS = $1.50**	**0**	**0**	**0**	**0**
9900	**TEMPORARY CONSTRUCTION**				
9900	TEMPORARY CONSTRUCTION	1,530,000	0	1,530,000	0
9900	**TEMPORARY CONSTRUCTION**	**1,530,000**	**0**	**1,530,000**	**0**

ACRES International

CAPITAL COST ESTIMATE

NEWFOUNDLAND & LABRADOR HYDRO

HOLYROOD GENERATING STATION

COMBINED CYCLE PLANT - (1 CGTG, 1 HRSG, 1 STG, 175MW)

1 x Siemens-Westinghouse D5A - 174.1 MW

Date: 24-Sep-01

Currency: CDN $

WBS	DESCRIPTION	MATERIAL DOLLARS	LABOR DOLLARS	TOTAL DOLLARS	TRADE HOURS
Total Estimate 2001 Canadian Dollars - Taxes Excluded		**120,003,000**	**15,942,000**	**135,932,000**	**263,300**

ACRES International

CAPITAL COST ESTIMATE

NEWFOUNDLAND & LABRADOR HYDRO

HOLYROOD GENERATING STATION

COMBINED CYCLE PLANT - (1 CGTG, 1 HRSG, 1 STG, 175MW)

1 x Alstom 11N2 - 167.8 MW

Date: 24-Sep-01

Currency: CDN $

WBS	DESCRIPTION	MATERIAL DOLLARS	LABOR DOLLARS	TOTAL DOLLARS	TRADE HOURS
0390	**YARD WORK**				
0110	SITE PREPARATION	169,152	34,485	203,637	600
0120	ROADS AND PARKING	100,198	257,070	357,268	2,700
0150	GENERAL EXCAVATION & BACKFILL	0	111,815	111,815	1,100
0200	SITE IMPROVEMENTS - RETAINING WALL	967,505	435,765	1,403,270	9,300
0600	WATER, SEWER & OTHER SERVICE LINES	86,192	32,395	118,587	500
0630	STORM DRAINAGE	0	0	0	0
2240	DEMINERALIZED WATER	49,560	34,485	84,045	600
5000	ELECTRICAL	258,576	83,600	342,176	1,800
5100	DIESEL GENERATOR - 500kW SYSTEM	183,158	11,495	194,653	200
5390	YARD LIGHTING	23,703	9,405	33,108	200
5970	CATHODIC PROTECTION SYSTEM	42,019	11,495	53,514	300
6705	YARD FIRE PROTECTION	190,700	58,520	249,220	1,100
0390	**YARD WORK**	**2,070,000**	**1,081,000**	**3,150,000**	**18,400**
1010	**BUILDING**				
1121	BUILDING FOUNDATIONS	390,019	1,451,505	1,841,524	16,300
1123	SLAB ON GRADE, PITS, TRENCHES	580,719	210,045	790,764	4,500
1310	STRUCTURAL STEEL	2,016,893	257,070	2,273,963	5,500
1320	IRON WORK	193,932	25,080	219,012	500
1630	ROOFING	162,687	121,220	283,907	2,600
1640	SIDING	178,848	200,640	379,488	4,300
1650	INTERIOR FINISHES	64,644	28,215	92,859	600
1660	MASONRY	25,858	29,260	55,118	600
1670	DOORS	89,424	12,540	101,964	300
1975	PIPE RACK	103,430	16,720	120,150	400
5110	POWER CABLE	1,038,967	987,525	2,026,492	21,000
5120	INSTRUMENT & CONTROL CABLE	382,006	205,865	587,871	4,400
5415	TRANSFORMERS	10,142	4,180	14,322	100
5510	CONDUIT	45,074	47,025	92,099	1,000
5520	CABLE TRAY	304,253	282,150	586,403	6,000
5610	TERMINATIONS - POWER CABLE	43,948	101,365	145,313	2,200
5620	TERMINATIONS - INSTRUMENT & CONTROL CABLE	24,791	103,455	128,246	2,300
5915	LIGHTNING PROTECTION & GROUNDING	118,321	61,655	179,976	1,300
5920	BUILDING LIGHTING & ELECTRICAL	174,664	93,005	267,669	2,000
5940	FIRE ALARM SYSTEM	160,014	36,575	196,589	800
5950	BUILDING COMMUNICATIONS	84,515	11,495	96,010	200
5960	SECURITY SYSTEM	16,903	2,090	18,993	100
6210	PLUMBING	37,186	16,720	53,906	400
6211	DOMESTIC WATER SYSTEM	205,089	98,230	303,319	2,100
6212	SANITARY SEWAGE SYSTEM	20,284	12,540	32,824	300
6231	ROOF DRAINS	12,395	8,360	20,755	200
6232	FLOOR DRAINS	99,164	51,205	150,369	1,100
6233	OIL WATER SEPARATOR	22,537	5,225	27,762	100
6310	HVAC SYSTEMS	315,521	226,765	542,286	4,800
6700	BUILDING FIRE PROTECTION	90,149	37,620	127,769	800
7220	SERVICE AIR SYSTEM	187,059	68,970	256,029	1,500

ACRES International

CAPITAL COST ESTIMATE

NEWFOUNDLAND & LABRADOR HYDRO

HOLYROOD GENERATING STATION

COMBINED CYCLE PLANT - (1 CGTG, 1 HRSG, 1 STG, 175MW)

1 x Alstom 11N2 - 167.8 MW

Date: 24-Sep-01

Currency: CDN $

WBS	DESCRIPTION	MATERIAL DOLLARS	LABOR DOLLARS	TOTAL DOLLARS	TRADE HOURS
1010	**BUILDING**	**7,200,000**	**4,814,000**	**12,010,000**	**88,300**
1020	**ELECTRICAL / SWITCHGEAR ROOM**				
5350	BUS DUCTS	440,524	74,195	514,719	1,600
5400	POWER SWITCHING & DISTRIBUTION	34,778	0	34,778	0
5410	SWITCHGEAR	161,139	27,170	188,309	600
5420	MOTOR CONTROL CENTRES	278,226	26,125	304,351	600
5430	600V SWITCHGEAR	350,101	29,260	379,361	600
5440	4.160KV SWITCHGEAR	347,782	27,170	374,952	600
5470	UPS SYSTEM	178,528	11,495	190,023	200
5730	RELAY BOARDS & PANELS	202,873	21,945	224,818	500
1020	**ELECTRICAL / SWITCHGEAR ROOM**	**1,990,000**	**217,000**	**2,210,000**	**4,700**
1030	**CONTROL ROOM**				
1650	INTERIOR FINISHES & RAISED FLOOR	40,941	6,270	47,211	100
5705	DCS	811,492	74,195	885,687	1,600
5706	DCS - EXISTING PERFORMANCE MONITORING	162,298	0	162,298	0
5710	MAIN CONTROL BOARDS & PANELS	112,450	16,720	129,170	400
5740	COMPUTER	89,264	14,630	103,894	300
1030	**CONTROL ROOM**	**1,220,000**	**112,000**	**1,330,000**	**2,400**
1040	**EXISTING CONTROL ROOM**				
5120	INSTRUMENT AND CONTROL CABLE	2,319	3,135	5,454	100
5520	CABLE TRAY	12,752	11,495	24,247	300
5705	DCS	115,927	24,035	139,962	500
1040	**EXISTING CONTROL ROOM**	**130,000**	**39,000**	**170,000**	**900**
1050	**PEDESTRIAN OVERPASS**				
1320	MISCELLANEOUS STEEL	215,480	104,500	319,980	1,000
1050	**PEDESTRIAN OVERPASS**	**220,000**	**105,000**	**320,000**	**1,000**
1100	**COMBUSTION TURBINE GENERATOR**				
1261	COMBUSTION TURBINE FOUNDATION	244,570	85,690	330,260	1,800
1320	IRONWORK	113,127	16,720	129,847	400
1610	PAINTING & PROTECTIVE FINISHES	5,387	2,090	7,477	0
3910	COMBUSTION TURBINE GENERATOR	41,625,000	877,800	42,502,800	18,700
1100	**COMBUSTION TURBINE GENERATOR**	**41,990,000**	**982,000**	**42,970,000**	**20,900**
1200	**HEAT RECOVERY STEAM GENERATOR**				
1262	HRSG FOUNDATIONS	232,718	90,915	323,633	1,900
2010	HEAT RECOVERY STEAM GENERATOR	18,150,000	3,135,000	21,285,000	25,000
2015	EXHAUST BYPASS	1,250,000	250,000	1,500,000	5,000
2100	STEAM SYSTEMS	343,693	47,025	390,718	1,000
2120	HP STEAM SYSTEM	378,626	110,770	489,396	2,400
2135	IP STEAM SYSTEM	416,939	238,260	655,199	5,100
2140	LP STEAM SYSTEM	339,186	181,830	521,016	3,900
2180	STEAM LINE BLOWOUT	22,537	2,090	24,627	0

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NEWFOUNDLAND & LABRADOR HYDRO

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1 x Alstom 11N2 - 167.8 MW

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WBS	DESCRIPTION	MATERIAL DOLLARS	LABOR DOLLARS	TOTAL DOLLARS	TRADE HOURS
2212	CHEMICAL FEED SYSTEM	56,343	16,720	73,063	400
2215	CONDENSATE SYSTEM	360,596	249,755	610,351	5,500
2240	DEMINERALIZED WATER SYSTEM	298,619	96,140	394,759	2,100
2312	BOILER FEED & CONDENSATE SYSTEM	1,019,738	163,020	1,182,758	3,500
2750	SAMPLING SYSTEM	33,806	18,810	52,616	400
3005	CONTINUOUS EMISSIONS MONITORING SYSTEM	225,372	58,520	283,892	1,300
3410	COMPONENT COOLING SYSTEM	667,102	126,445	793,547	2,700
5700	CONTROLS AND INSTRUMENTATION	141,985	47,025	189,010	1,000
5720	LOCAL CONTROL BOARDS & PANELS	28,172	16,720	44,892	400
5750	TRANSMITTERS, TUBING & RELAY RACKS	400,036	127,490	527,526	2,700
1200	**HEAT RECOVERY STEAM GENERATOR**	**24,370,000**	**4,977,000**	**29,340,000**	**64,300**
1300	**STEAM TURBINE GENERATOR**				
1272	STEAM TURBINE GENERATOR FOUNDATION	852,223	300,960	1,153,183	6,400
1600	MISCELLANEOUS STRUCTURAL STEEL	57,102	35,530	92,632	800
1610	PAINTING	3,232	4,180	7,412	100
3100	STEAM TURBINE GENERATOR	11,862,000	470,250	12,332,250	10,000
3700	CRANES, HOISTS & MONORAILS	907,124	24,035	931,159	500
1300	**STEAM TURBINE GENERATOR**	**13,680,000**	**830,000**	**14,520,000**	**17,800**
1301	**CONDENSER**				
3210	CONDENSING SYSTEM	1,618,050	221,540	1,839,590	4,700
3400	AUXILIARY COOLING WATER SYSTEM	281,716	94,050	375,766	2,000
1301	**CONDENSER**	**1,900,000**	**320,000**	**2,220,000**	**6,700**
3200	**WATER TREATMENT SYSTEMS**				
2230	CONDENSATE MAKEUP & DRAWOFF	9,015	2,090	11,105	0
2243	DEMINERALIZED WATER STORAGE	56,343	20,900	77,243	400
3200	**WATER TREATMENT SYSTEMS**	**70,000**	**23,000**	**90,000**	**400**
3311	**INTAKE STRUCTURE**				
3300	CIRCULATING WATER SYSTEM	1,968,556	422,180	2,390,736	9,000
5000	ELECTRICAL	115,927	11,495	127,422	200
3311	**INTAKE STRUCTURE**	**2,080,000**	**434,000**	**2,520,000**	**9,200**
3770	**TRANSFORMERS**				
1149	MAIN TRANSFORMER FOUNDATION	19,393	14,630	34,023	300
5415	STEP-UP TRANSFORMERS	2,172,480	39,710	2,212,190	800
9009	PRE-OPERATIONAL TESTING	0	17,765	17,765	200
3770	**TRANSFORMERS**	**2,190,000**	**72,000**	**2,260,000**	**1,300**
6010	**FUEL OIL STORAGE**				
1125	MAJOR EQUIPMENT FOUNDATIONS	0	0	0	
4620	NO.2 FUEL OIL DELIVERY & STORAGE SYSTEM	2,293,785	821,370	3,115,155	17,500
5000	ELECTRICAL	107,740	24,035	131,775	500
6750	FIRE PROTECTION SYSTEM _ FOAM	161,610	94,050	255,660	2,000
6010	**FUEL OIL STORAGE**	**2,563,000**	**939,000**	**3,500,000**	**20,000**

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1 x Alstom 11N2 - 167.8 MW

Date: 24-Sep-01

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WBS	DESCRIPTION	MATERIAL DOLLARS	LABOR DOLLARS	TOTAL DOLLARS	TRADE HOURS
9001	**START UP**				
9001	SPARES FOR START UP	112,686	0	112,686	0
9002	VENDOR REP FOR START UP	560,000	0	560,000	0
9004	TRADE SUPPORT DURING START UP	0	313,500	313,500	5,000
9005	ENGINEERING CHECKOUT - COMMISSIONING	840,000	0	840,000	
9006	PLANT OPERATORS - COMMISSIONING	560,000	0	560,000	
9007	INITIAL FILL LUBRICANTS & FUEL TO SYNC IDLE	112,686	0	112,686	
9001	**START UP**	**2,190,000**	**314,000**	**2,500,000**	**5,000**
9101	**PROVINCIAL / FEDERAL TAXES (NIC)**				
9101	PROVINCIAL / FEDERAL TAXES (NIC)	0	0	0	0
9101	**PROVINCIAL / FEDERAL TAXES (NIC)**	**0**	**0**	**0**	**0**
9105	**COST OF MONEY**				
9105	INTEREST DURING CONSTRUCTION	0	0	0	0
9105	**COST OF MONEY**	**0**	**0**	**0**	**0**
9200	**INSURANCE AND BONDS**				
9200	INSURANCE AND BONDS	700,000	0	700,000	0
9200	**INSURANCE AND BONDS**	**700,000**	**0**	**700,000**	**0**
9301	**CAPITAL SPARES**				
9301	CAPITAL SPARES	700,000	0	700,000	0
9301	**CAPITAL SPARES**	**700,000**	**0**	**700,000**	**0**
9500	**ENGINEERING - CONSULTANTS**				
9501	ENGINEERING - CONSULTANTS	6,608,000	0	6,608,000	0
9503	SITE ENGINEERING EXPENSES	1,892,800	0	1,892,800	0
9504	ALLOWANCE FOR PLANNED OVERTIME	78,400	0	78,400	0
9500	**ENGINEERING - CONSULTANTS**	**8,580,000**	**0**	**8,580,000**	**0**
9600	**CONSTRUCTION MANAGEMENT**				
9501	CONSTRUCTION MANAGEMENT - SERVICES	2,128,000	0	2,128,000	0
9503	CONSTRUCTION MANAGEMENT - EXPENSES	560,000	0	560,000	0
9610	CONSTRUCTION DISTRIBUTABLES	837,140	578,930	1,416,070	0
9900	ALLOWANCE FOR PLANNED OVERTIME	0	103,500	103,500	2,000
9600	**CONSTRUCTION MANAGEMENT**	**3,530,000**	**680,000**	**4,210,000**	**2,000**
9703	**EXCHANGE RATE US DOLLARS = $1.50**				
9703	EXCHANGE RATE US DOLLARS = $1.50	0	0	0	0
9703	**EXCHANGE RATE US DOLLARS = $1.50**	**0**	**0**	**0**	**0**
9900	**TEMPORARY CONSTRUCTION**				
9900	TEMPORARY CONSTRUCTION	1,530,000	0	1,530,000	0
9900	**TEMPORARY CONSTRUCTION**	**1,530,000**	**0**	**1,530,000**	**0**

ACRES International

CAPITAL COST ESTIMATE
NEWFOUNDLAND & LABRADOR HYDRO
HOLYROOD GENERATING STATION

COMBINED CYCLE PLANT - (1 CGTG, 1 HRSG, 1 STG, 175MW)

1 x Alstom 11N2 - 167.8 MW

Date: 24-Sep-01

Currency: CDN $

WBS	DESCRIPTION	MATERIAL DOLLARS	LABOR DOLLARS	TOTAL DOLLARS	TRADE HOURS
Total Estimate 2001 Canadian Dollars - Taxes Excluded		**#REF!**	**#REF!**	**#REF!**	**#REF!**

ACRES International

CAPITAL COST ESTIMATE

NEWFOUNDLAND & LABRADOR HYDRO

HOLYROOD GENERATING STATION

COMBINED CYCLE PLANT - (2 CGTG, 2 HRSG, 1 STG, 175MW)

2 x Alstom 8C2 - 164.1 MW

Date: 24-Sep-01

Currency: CDN $

WBS	DESCRIPTION	MATERIAL DOLLARS	LABOR DOLLARS	TOTAL DOLLARS	TRADE HOURS
0390	**YARD WORK**				
0110	SITE PREPARATION	169,152	34,485	203,637	610
0120	ROADS AND PARKING	100,198	257,070	357,268	2,690
0150	GENERAL EXCAVATION & BACKFILL	0	111,815	111,815	1,070
0200	SITE IMPROVEMENTS - RETAINING WALL	967,505	435,765	1,403,270	9,280
0600	WATER, SEWER & OTHER SERVICE LINES	86,192	32,395	118,587	480
0630	STORM DRAINAGE	0	0	0	0
2240	DEMINERALIZED WATER	49,560	34,485	84,045	620
5000	ELECTRICAL	258,576	83,600	342,176	1,780
5100	DIESEL GENERATOR - 500kW SYSTEM	183,158	11,495	194,653	240
5390	YARD LIGHTING	23,703	9,405	33,108	210
5970	CATHODIC PROTECTION SYSTEM	42,019	11,495	53,514	250
6705	YARD FIRE PROTECTION	190,700	58,520	249,220	1,050
0390	**YARD WORK**	**2,071,000**	**1,080,000**	**3,150,000**	**18,280**
1010	**BUILDING**				
1121	BUILDING FOUNDATIONS	488,062	1,516,295	2,004,357	17,450
1123	SLAB ON GRADE, PITS, TRENCHES	1,100,025	290,510	1,390,535	6,170
1310	STRUCTURAL STEEL	2,792,621	355,300	3,147,921	7,560
1320	IRON WORK	258,576	33,440	292,016	720
1630	ROOFING	243,492	182,875	426,367	3,880
1640	SIDING	183,158	260,205	443,363	5,540
1650	INTERIOR FINISHES	64,644	28,215	92,859	600
1660	MASONRY	25,858	29,260	55,118	630
1670	DOORS	89,424	12,540	101,964	280
1975	PIPE RACK	206,861	33,440	240,301	720
5110	POWER CABLE	1,326,317	1,286,395	2,612,712	27,350
5120	INSTRUMENT & CONTROL CABLE	305,380	165,110	470,490	3,520
5415	TRANSFORMERS	13,522	6,270	19,792	130
5510	CONDUIT	56,343	58,520	114,863	1,250
5520	CABLE TRAY	366,230	353,210	719,440	7,500
5610	TERMINATIONS - POWER CABLE	57,470	132,715	190,185	2,820
5620	TERMINATIONS - INSTRUMENT & CONTROL CABLE	31,552	131,670	163,222	2,800
5915	LIGHTNING PROTECTION & GROUNDING	135,223	73,150	208,373	1,550
5920	BUILDING LIGHTING & ELECTRICAL	206,216	115,995	322,211	2,460
5940	FIRE ALARM SYSTEM	233,260	55,385	288,645	1,180
5950	BUILDING COMMUNICATIONS	84,515	11,495	96,010	250
5960	SECURITY SYSTEM	16,903	2,090	18,993	50
6210	PLUMBING	37,186	16,720	53,906	350
6211	DOMESTIC WATER SYSTEM	360,596	169,290	529,886	3,600
6212	SANITARY SEWAGE SYSTEM	34,933	21,945	56,878	480
6231	ROOF DRAINS	22,537	17,765	40,302	370
6232	FLOOR DRAINS	140,858	74,195	215,053	1,570
6233	OIL WATER SEPARATOR	22,537	5,225	27,762	120
6310	HVAC SYSTEMS	454,126	343,805	797,931	7,300
6700	BUILDING FIRE PROTECTION	180,298	75,240	255,538	1,600
7220	SERVICE AIR SYSTEM	227,626	102,410	330,036	2,170

ACRES International

CAPITAL COST ESTIMATE

NEWFOUNDLAND & LABRADOR HYDRO

HOLYROOD GENERATING STATION

COMBINED CYCLE PLANT - (2 CGTG, 2 HRSG, 1 STG, 175MW)

2 x Alstom 8C2 - 164.1 MW

Date: 24-Sep-01

Currency: CDN $

WBS	DESCRIPTION	MATERIAL DOLLARS	LABOR DOLLARS	TOTAL DOLLARS	TRADE HOURS
1010	**BUILDING**	**9,770,000**	**5,960,000**	**15,730,000**	**111,970**
1020	**ELECTRICAL / SWITCHGEAR ROOM**				
5350	BUS DUCT	881,048	148,390	1,029,438	3,160
5400	POWER SWITCHING & DISTRIBUTION	34,778	0	34,778	0
5410	SWITCHGEAR	321,119	54,340	375,459	1,150
5420	MOTOR CONTROL CENTRES	347,782	52,250	400,032	1,100
5430	600V SWITCHGEAR	405,746	37,620	443,366	800
5440	4.160KV SWITCHGEAR	463,710	39,710	503,420	850
5470	UPS SYSTEM	178,528	11,495	190,023	250
5730	RELAY BOARDS & PANELS	376,764	38,665	415,429	830
1020	**ELECTRICAL / SWITCHGEAR ROOM**	**3,010,000**	**380,000**	**3,390,000**	**8,140**
1030	**CONTROL ROOM**				
1650	INTERIOR FINISHES & RAISED FLOOR	40,941	6,270	47,211	140
5705	DCS	869,456	108,680	978,136	2,300
5706	DCS - EXISTING PERFORMANCE MONITORING	162,298	0	162,298	0
5710	MAIN CONTROL BOARDS & PANELS	112,450	16,720	129,170	360
5740	COMPUTER	124,042	19,855	143,897	430
1030	**CONTROL ROOM**	**1,310,000**	**150,000**	**1,460,000**	**3,230**
1040	**EXISTING CONTROL ROOM**				
5120	INSTRUMENT AND CONTROL CABLE	2,254	3,135	5,389	100
5520	CABLE TRAY	12,395	11,495	23,890	300
5705	DCS	112,686	24,035	136,721	500
1040	**EXISTING CONTROL ROOM**	**130,000**	**40,000**	**170,000**	**900**
1050	**PEDESTRIAN OVERPASS**				
1320	MISCELLANEOUS STEEL	215,480	104,500	319,980	1,000
1050	**PEDESTRIAN OVERPASS**	**220,000**	**105,000**	**320,000**	**1,000**
1100	**COMBUSTION TURBINE GENERATOR**				
1261	COMBUSTION TURBINE FOUNDATION	495,604	173,470	669,074	3,700
1320	IRONWORK	161,610	24,035	185,645	500
1610	PAINTING & PROTECTIVE FINISHES	10,774	3,135	13,909	70
3910	COMBUSTION TURBINE GENERATOR	53,280,000	1,749,330	55,029,330	37,210
1100	**COMBUSTION TURBINE GENERATOR**	**53,948,000**	**1,950,000**	**55,900,000**	**41,480**
1200	**HEAT RECOVERY STEAM GENERATOR**				
1262	HRSG FOUNDATIONS	581,796	204,820	786,616	4,350
2010	HEAT RECOVERY STEAM GENERATOR	21,780,000	4,514,400	26,294,400	36,000
2015	EXHAUST BYPASS	1,700,000	375,000	2,075,000	6,500
2100	STEAM SYSTEMS	602,871	94,050	696,921	2,000
2120	HP STEAM SYSTEM	588,222	178,695	766,917	3,800
2135	IP STEAM SYSTEM	832,751	476,520	1,309,271	10,130
2140	LP STEAM SYSTEM	679,498	364,705	1,044,203	7,750
2180	STEAM LINE BLOWOUT	43,948	4,180	48,128	100

ACRES International

CAPITAL COST ESTIMATE

NEWFOUNDLAND & LABRADOR HYDRO

HOLYROOD GENERATING STATION

COMBINED CYCLE PLANT - (2 CGTG, 2 HRSG, 1 STG, 175MW)

2 x Alstom 8C2 - 164.1 MW

Date: 24-Sep-01

Currency: CDN $

WBS	DESCRIPTION	MATERIAL DOLLARS	LABOR DOLLARS	TOTAL DOLLARS	TRADE HOURS
2212	CHEMICAL FEED SYSTEM	56,343	16,720	73,063	350
2215	CONDENSATE SYSTEM	721,192	498,465	1,219,657	11,000
2240	DEMINERALIZED WATER SYSTEM	597,237	193,325	790,562	4,100
2312	BOILER FEED & CONDENSATE SYSTEM	2,039,476	304,095	2,343,571	6,460
2750	SAMPLING SYSTEM	67,612	37,620	105,232	800
3005	CONTINUOUS EMISSIONS MONITORING SYSTEM	450,745	118,085	568,830	2,500
3410	COMPONENT COOLING SYSTEM	1,333,078	252,890	1,585,968	5,370
5700	CONTROLS AND INSTRUMENTATION	219,738	68,970	288,708	1,470
5720	LOCAL CONTROL BOARDS & PANELS	47,328	22,990	70,318	490
5750	TRANSMITTERS, TUBING & RELAY RACKS	693,020	241,395	934,415	5,140
1200	**HEAT RECOVERY STEAM GENERATOR**	**33,035,000**	**7,970,000**	**41,000,000**	**108,310**
1300	**STEAM TURBINE GENERATOR**				
1272	STEAM TURBINE GENERATOR FOUNDATION	852,223	300,960	1,153,183	6,400
1600	MISCELLANEOUS STRUCTURAL STEEL	57,102	35,530	92,632	800
1610	PAINTING	3,232	4,180	7,412	100
3100	STEAM TURBINE GENERATOR	11,862,000	470,250	12,332,250	10,000
3700	CRANES, HOISTS & MONORAILS	907,124	24,035	931,159	500
1300	**STEAM TURBINE GENERATOR**	**13,680,000**	**830,000**	**14,520,000**	**17,800**
1301	**CONDENSER**				
3210	CONDENSING SYSTEM	1,618,050	221,540	1,839,590	4,700
3400	AUXILIARY COOLING WATER SYSTEM	281,716	94,050	375,766	2,000
1301	**CONDENSER**	**1,900,000**	**320,000**	**2,220,000**	**6,700**
3200	**WATER TREATMENT SYSTEMS**				
2230	CONDENSATE MAKEUP & DRAWOFF	18,030	4,180	22,210	100
2243	DEMINERALIZED WATER STORAGE	56,343	20,900	77,243	440
3200	**WATER TREATMENT SYSTEMS**	**70,000**	**25,000**	**100,000**	**540**
3311	**INTAKE STRUCTURE**				
3300	CIRCULATING WATER SYSTEM	1,968,556	422,180	2,390,736	9,000
5000	ELECTRICAL	115,927	11,495	127,422	240
3311	**INTAKE STRUCTURE**	**2,080,000**	**430,000**	**2,520,000**	**9,240**
3770	**TRANSFORMERS**				
1149	MAIN TRANSFORMER FOUNDATION	19,393	14,630	34,023	300
5415	STEP-UP TRANSFORMERS	3,010,000	74,195	3,084,195	1,580
9009	PRE-OPERATIONAL TESTING	0	31,350	31,350	300
3770	**TRANSFORMERS**	**3,030,000**	**120,000**	**3,150,000**	**2,180**
6010	**FUEL OIL STORAGE**				
1125	MAJOR EQUIPMENT FOUNDATIONS	0	0	0	
4620	NO.2 FUEL OIL DELIVERY & STORAGE SYSTEM	2,293,785	821,370	3,115,155	17,500
5000	ELECTRICAL	107,740	24,035	131,775	500
6750	FIRE PROTECTION SYSTEM _ FOAM	161,610	94,050	255,660	2,000
6010	**FUEL OIL STORAGE**	**2,563,000**	**940,000**	**3,500,000**	**20,000**

ACRES International

CAPITAL COST ESTIMATE

NEWFOUNDLAND & LABRADOR HYDRO

HOLYROOD GENERATING STATION

COMBINED CYCLE PLANT - (2 CGTG, 2 HRSG, 1 STG, 175MW)

2 x Alstom 8C2 - 164.1 MW

Date: 24-Sep-01

Currency: CDN $

WBS	DESCRIPTION	MATERIAL DOLLARS	LABOR DOLLARS	TOTAL DOLLARS	TRADE HOURS
9001	**START UP**				
9001	SPARES FOR START UP	140,858	0	140,858	0
9002	VENDOR REP FOR START UP	728,000	0	728,000	0
9004	TRADE SUPPORT DURING START UP	0	407,550	407,550	6,500
9005	ENGINEERING CHECKOUT - COMMISSIONING	985,600	0	985,600	
9006	PLANT OPERATORS - COMMISSIONING	840,000	0	840,000	
9007	INITIAL FILL LUBRICANTS & FUEL TO SYNC IDLE	146,492	0	146,492	
9001	**START UP**	**2,840,000**	**410,000**	**3,250,000**	**6,500**
9101	**PROVINCIAL / FEDERAL TAXES (NIC)**				
9101	PROVINCIAL / FEDERAL TAXES (NIC)	0	0	0	0
9101	**PROVINCIAL / FEDERAL TAXES (NIC)**	**0**	**0**	**0**	**0**
9105	**COST OF MONEY**				
9105	INTEREST DURING CONSTRUCTION	0	0	0	0
9105	**COST OF MONEY**	**0**	**0**	**0**	**0**
9200	**INSURANCE AND BONDS**				
9200	INSURANCE AND BONDS	700,000	0	700,000	0
9200	**INSURANCE AND BONDS**	**700,000**	**0**	**700,000**	**0**
9301	**CAPITAL SPARES**				
9301	CAPITAL SPARES	700,000	0	700,000	0
9301	**CAPITAL SPARES**	**700,000**	**0**	**700,000**	**0**
9500	**ENGINEERING - CONSULTANTS**				
9501	ENGINEERING - CONSULTANTS	6,944,000	0	6,944,000	0
9503	SITE ENGINEERING EXPENSES	2,072,000	0	2,072,000	0
9504	ALLOWANCE FOR PLANNED OVERTIME	89,600	0	89,600	0
9500	**ENGINEERING - CONSULTANTS**	**9,110,000**	**0**	**9,110,000**	**0**
9600	**CONSTRUCTION MANAGEMENT**				
9501	CONSTRUCTION MANAGEMENT - SERVICES	2,352,000	0	2,352,000	0
9503	CONSTRUCTION MANAGEMENT - EXPENSES	560,000	0	560,000	0
9610	CONSTRUCTION DISTRIBUTABLES	1,122,651	745,085	1,867,736	13,980
9900	ALLOWANCE FOR PLANNED OVERTIME	0	207,000	207,000	4,000
9600	**CONSTRUCTION MANAGEMENT**	**4,030,000**	**950,000**	**4,990,000**	**17,980**
9703	**EXCHANGE RATE US DOLLARS = $1.50**				
9703	EXCHANGE RATE US DOLLARS = $1.50	0	0	0	0
9703	**EXCHANGE RATE US DOLLARS = $1.50**	**0**	**0**	**0**	**0**
9900	**TEMPORARY CONSTRUCTION**				
9900	TEMPORARY CONSTRUCTION	2,013,000	0	2,013,000	0
9900	**TEMPORARY CONSTRUCTION**	**2,013,000**	**0**	**2,013,000**	**0**

ACRES International

CAPITAL COST ESTIMATE
NEWFOUNDLAND & LABRADOR HYDRO
HOLYROOD GENERATING STATION

COMBINED CYCLE PLANT - (2 CGTG, 2 HRSG, 1 STG, 175MW)
2 x Alstom 8C2 - 164.1 MW

Date: 24-Sep-01
Currency: CDN $

WBS	DESCRIPTION	MATERIAL DOLLARS	LABOR DOLLARS	TOTAL DOLLARS	TRADE HOURS
Total Estimate Canadian Dollars - Taxes Excluded		**146,210,000**	**21,660,000**	**167,893,000**	**374,250**

Appendix B
Cash Flow Tables

Prepared by: J. Mallam

CAPITAL BUDGET PROPOSAL

Capital Cost Estimate & Cash Flow Requirements

2001 Fiscal Year : Prepared: 16-Nov-01

Holyrood Combined Cycle Plant

131 MW (1 GT + 1 HRSG + 1 ST GE 7EA)

In-Service: 30-Nov-05

I.D.C.= 8.00% Annual 0.64% Mthly 1.94% Qtrly

Escalation %		2001/2002	2.20%	2002/2003	2.10%	2003/2004	2.00%	2004/2005=	2.00%	2005/2006	2.00%	2006/2007	2.20%	2007/2008	2.10%	(Est. Base:	Jan-02
Period		Constr. Servcs	Equip. Purch.	Trans & Term		External E&M	Environ-ment	Hydro Internal			O/H @ 0.33%	Cont @ 10%	Sub Total	Escln	I.D.C.	Total Project	Cash Flow (Excl IDC)
2002	Jan										0	0	0	0	0	0	0
	Feb										0	0	0	0	0	0	0
	Mar										0	0	0	0	0	0	0
	Apr										0	0	0	0	0	0	0
	May										0	0	0	0	0	0	0
	Jun										0	0	0	0	0	0	0
	Jul										0	0	0	0	0	0	0
	Aug										0	0	0	0	0	0	0
	Sep										0	0	0	0	0	0	0
	Oct							15			0	0	15	0	0	15	15
	Nov							70			0	0	70	1	0	71	70
	Dec					150		70			1	0	221	5	1	227	71
Total	2002	0	0	0	0	150	0	155	0	0	1	0	306	6	1	313	156
2003	Jan					350	5	70			1	0	426	10	2	438	231
	Feb		3000			400	35	70			12	0	3517	88	4	3609	467
	Mar		4000			400	40	70			15	0	4525	121	17	4663	3610
	Apr		4000			400	15	80			15	0	4510	129	44	4683	4631
	May		4000			400	10	70			15	0	4495	137	74	4706	4624
	Jun		4000			400	10	80			15	0	4505	145	104	4754	4642
	Jul		4000			400	10	70			15	0	4495	152	135	4782	4640
	Aug		4000			400	10	80			15	0	4505	160	165	4830	4657
	Sep	2000	4000			400	10	70			21	0	6501	242	196	6939	4655
	Oct	2500	5000			600	10	110			27	0	8247	322	235	8804	6784
	Nov	3000	5000			600	10	95			29	0	8734	356	285	9375	8554
	Dec	2500	5500			550	10	90			29	0	8679	368	344	9391	9085
Total	2003	10000	46500	0	0	5300	175	955	0	0	209	0	63139	2230	1605	66974	56580
2004	Jan	200	5000		5	500	10	110			19	0	5844	258	405	6507	9072
	Feb	200	6500		5	500	10	95			24	0	7334	337	456	8127	6087
	Mar	200	6500		5	500	10	100			24	0	7339	349	503	8191	7676
	Apr	250	6500		5	500	10	80			24	0	7369	364	556	8289	7668
	May	600			5	500	10	80			4	0	1199	61	609	1869	7733
	Jun	2500	1000		5	500	10	110			14	0	4139	219	642	5000	1290
	Jul	3000			150	500	10	80			12	0	3752	205	664	4621	4473
	Aug	2500	1500		100	500	5	80			15	0	4700	265	696	5661	3902
	Sep	1500			35	500	10	110			7	0	2162	125	729	3016	4935
	Oct	1500	1000		20	500	5	80			10	0	3115	186	756	4057	2237
	Nov	1500	1000		15	500	5	110			10	0	3140	193	779	4112	3326
	Dec	1200	1000		15	300	5	95			9	0	2624	166	806	3596	3318
Total	2004	15150	30000	0	365	5800	100	1130	0	0	172	0	52717	2728	7601	63046	61717
2005	Jan	300	1000			200		110			5	0	1615	105	830	2550	2785
	Feb	300				225	5	80			2	0	612	41	850	1503	1695
	Mar	300	1000			225		80			5	0	1610	110	863	2583	648
	Apr	300				225	5	80			2	0	612	43	876	1531	1725
	May	100	1000			225		95			5	0	1425	103	890	2418	665
	Jun	50				225	5	85			1	0	366	27	902	1295	1523
	Jul	50				225		90			1	0	366	28	914	1308	393
	Aug	50				225	5	100			1	0	381	29	923	1333	409
	Sep	50				250		105			1	0	406	32	931	1369	410
	Oct	41				250	5	130			1	0	427	35	940	1402	468
	Nov	40	1000			250		130			47	12970	14437	1195	949	16581	457
	Dec		2000			220		100			8	0	2328	197	0	2525	15602
Total	2005	1581	6000	0	0	2745	25	1185	0	0	79	12970	24585	1945	9868	36398	26780
Beyond		80	1889			135		300			8	0	2332	99	0	2431	4854
Total Proj.		26811	84389	0	365	14130	300	3725	0	0	469	12970	143079	7008	19075	**169162**	150087

Prepared by: J. Mallam

CAPITAL BUDGET PROPOSAL

Capital Cost Estimate & Cash Flow Requirements

2001 Fiscal Year : Prepared: 16-Nov-01

Holyrood Combined Cycle Plant

128 MW (2 GT + 2 HRSG + 1 ST GE 6B)

In-Service: 30-Nov-05

I.D.C.= 8.00% Annual 0.64% Mthly 1.94% Qtrly

Escalation %	2001/2002	2.20%	2002/2003	2.10%	2003/2004	2.00%	2004/2005=	2.00%	2005/2006	2.00%	2006/2007	2.20%	2007/2008	2.10%	(Est. Base:	Jan-02

Period	Constr. Servcs	Equip. Purch.	Trans & Term	External E&M	Environ-ment	Hydro Internal	O/H @ 0.33%	Cont @ 10%	Sub Total	Escln	I.D.C.	Total Project	Cash Flow (Excl IDC)
2002 Jan							0	0	0	0	0	0	0
Feb							0	0	0	0	0	0	0
Mar							0	0	0	0	0	0	0
Apr							0	0	0	0	0	0	0
May							0	0	0	0	0	0	0
Jun							0	0	0	0	0	0	0
Jul							0	0	0	0	0	0	0
Aug							0	0	0	0	0	0	0
Sep							0	0	0	0	0	0	0
Oct						15	0	0	15	0	0	15	15
Nov						70	0	0	70	1	0	71	70
Dec				150		70	1	0	221	5	1	227	71
Total 2002	0	0	0	150	0	155	1	0	306	6	1	313	156
2003 Jan				350	5	70	1	0	426	10	2	438	231
Feb		4000		400	35	70	15	0	4520	113	4	4637	467
Mar		4000		400	40	70	15	0	4525	121	20	4666	4638
Apr		4000		400	15	80	15	0	4510	129	50	4689	4631
May		4000		400	10	70	15	0	4495	137	81	4713	4624
Jun	1000	5000		400	10	80	21	0	6511	209	111	6831	4642
Jul	2000	5000		400	10	70	25	0	7505	254	148	7907	6710
Aug	2000	5000		400	10	80	25	0	7515	267	196	7978	7769
Sep	3000	5000		400	10	70	28	0	8508	317	247	9072	7772
Oct	3000	5000		600	10	110	29	0	8749	341	302	9392	8865
Nov	1000	5000		600	10	95	22	0	6727	274	362	7363	9075
Dec	275	5000		550	10	90	20	0	5945	252	416	6613	6996
Total 2003	12275	51000	0	5300	175	955	231	0	69936	2424	1939	74299	66420
2004 Jan	250	6500	5	500	10	110	24	0	7399	327	461	8187	6222
Feb	250	6500	5	500	10	95	24	0	7384	339	509	8232	7711
Mar	1800	6500	5	500	10	100	29	0	8944	426	562	9932	7728
Apr	1800	6500	5	500	10	80	29	0	8924	440	620	9984	9350
May	3000		5	500	10	80	12	0	3607	184	684	4475	9364
Jun	3000	3000	5	500	10	110	22	0	6647	351	731	7729	3821
Jul	1500		300	500	10	80	8	0	2398	131	772	3301	7264
Aug	1700	3000	385	500	5	80	19	0	5689	320	808	6817	2609
Sep	1800	2000	35	500	10	110	15	0	4470	259	840	5569	5693
Oct	1900	2000	20	500	5	80	15	0	4520	270	879	5669	4679
Nov	2000	1000	15	500	5	110	12	0	3642	224	915	4781	4815
Dec	1400	2000	15	300	5	95	13	0	3828	242	949	5019	3851
Total 2004	20400	39000	0 800	0 5800	100	1130	222	0	67452	3513	8730	79695	73107
2005 Jan	500	3000		200		110	13	0	3823	249	980	5052	4065
Feb	400			225	5	80	2	0	712	48	1013	1773	4046
Mar	300	1000		225		80	5	0	1610	110	1035	2755	755
Apr	325			225	5	80	2	0	637	45	1049	1731	1725
May	150	1000		275		95	5	0	1525	110	1064	2699	692
Jun	75			350	5	85	2	0	517	38	1078	1633	1630
Jul	75			400		90	2	0	567	43	1092	1702	555
Aug	75			400	5	100	2	0	582	45	1103	1730	625
Sep	50			500		105	2	0	657	52	1114	1823	627
Oct	40			500	5	130	2	0	677	55	1126	1858	739
Nov	40	1000		450		130	57	15740	17417	1442	1138	19997	727
Dec		2000		200		100	8	0	2308	195	0	2503	18829
Total 2005	2030	7000	0	0	0	3950	25	1185	0	0	102	15740	31032	2432	11792	45256	35015
Beyond	100	5448		131		300	20	0	5899	250	0	6149	8552
Total Proj.	34805	102448	0	800	0	15331	300	3725	0	0	576	15740	174625	8625	22462	**205712**	183250

Prepared by: J. Mallam

CAPITAL BUDGET PROPOSAL

Capital Cost Estimate & Cash Flow Requirements

2001 Fiscal Year : Prepared 16-Nov-01

Holyrood Combined Cycle Plant

141 MW (2 GT + 2 HRSG + 1 ST RR Trent)

In-Service: 30-Nov-05

I.D.C.= 8.00% Annual 0.64% Mthly 1.94% Qtrly

Escalation %	2001/2002=	2.20%	2002/2003=	2.10%	2003/2004=	2.00%	2004/2005=	2.00%	2005/2006=	2.00%	2006/2007=	2.20%	2007/2008=	2.10%	(Est. Base:	Jan-02

Period	Constr. Servcs	Equip. Purch.	Trans & Term	External E&M	Environ-ment	Hydro Internal	O/H @ 0.33%	Cont @ 10%	Sub Total	Escln	I.D.C.	Total Project	Cash Flow (Excl IDC)
2002 Jan							0	0	0	0	0	0	0
Feb							0	0	0	0	0	0	0
Mar							0	0	0	0	0	0	0
Apr							0	0	0	0	0	0	0
May							0	0	0	0	0	0	0
Jun							0	0	0	0	0	0	0
Jul							0	0	0	0	0	0	0
Aug							0	0	0	0	0	0	0
Sep							0	0	0	0	0	0	0
Oct						15	0	0	15	0	0	15	15
Nov						70	0	0	70	1	0	71	70
Dec				150		70	1	0	221	5	1	227	71
Total 2002	0	0	0 0	150	0	155	0	0	1	0	306	6	1	313	156
2003 Jan				350	5	70	1	0	426	10	2	438	231
Feb		4000		400	35	70	15	0	4520	113	4	4637	467
Mar		5000		400	40	70	18	0	5528	148	20	5696	4638
Apr		5000		400	15	80	18	0	5513	158	54	5725	5661
May		5000		400	10	70	18	0	5498	167	90	5755	5656
Jun	1000	5000		400	10	80	21	0	6511	209	128	6848	5675
Jul	2000	5000		400	10	70	25	0	7505	254	168	7927	6710
Aug	2000	5000		400	10	80	25	0	7515	267	216	7998	7769
Sep	3000	5000		400	10	70	28	0	8508	317	267	9092	7772
Oct	3000	6000		600	10	110	32	0	9752	380	322	10454	8865
Nov	1000	6000		600	10	95	25	0	7730	315	386	8431	10117
Dec	275	6000		550	10	90	23	0	6948	295	446	7689	8040
Total 2003	12275	57000	0 0	5300	175	955	0	0	249	0	75954	2633	2103	80690	71601
2004 Jan	250	6000	5	500	10	110	23	0	6898	305	499	7702	7268
Feb	250	6500	5	500	10	95	24	0	7384	339	548	8271	7188
Mar	1800	6500	5	500	10	100	29	0	8944	426	600	9970	7728
Apr	1800	6500	5	500	10	80	29	0	8924	440	659	10023	9350
May	3000		5	500	10	80	12	0	3607	184	723	4514	9364
Jun	3000	3000	5	500	10	110	22	0	6647	351	770	7768	3821
Jul	1500		300	500	10	80	8	0	2398	131	811	3340	7264
Aug	1700	3000	385	500	5	80	19	0	5689	320	848	6857	2609
Sep	1800	3000	35	500	10	110	18	0	5473	318	880	6671	5693
Oct	1900	3000	20	500	5	80	18	0	5523	330	922	6775	5741
Nov	2000	1000	15	500	5	110	12	0	3642	224	966	4832	5878
Dec	1400	3000	15	300	5	95	16	0	4831	306	1003	6140	3851
Total 2004	20400	41500	0 800	5800	100	1130	0	0	230	0	69960	3674	9229	82863	75755
2005 Jan	500	3000		200		110	13	0	3823	249	1039	5111	5132
Feb	400			225	5	80	2	0	712	48	1075	1835	4046
Mar	300	1000		225		80	5	0	1610	110	1097	2817	755
Apr	325			225	5	80	2	0	637	45	1112	1794	1725
May	150	1000		225		95	5	0	1475	106	1127	2708	692
Jun	75			300	5	85	2	0	467	34	1142	1643	1576
Jul	75			400		90	2	0	567	43	1156	1766	501
Aug	75			400	5	100	2	0	582	45	1167	1794	625
Sep	50			500		105	2	0	657	52	1178	1887	627
Oct	41			500	5	130	2	0	678	55	1190	1923	739
Nov	40	1000		450		130	61	16730	18411	1524	1203	21138	728
Dec		2000		200		100	8	0	2308	195	0	2503	19904
Total 2005	2031	8000	0 0	3850	25	1185	0	0	106	16730	31927	2506	12486	46919	37050
Beyond	100	5848		231		300	21	0	6400	272	0	6672	9076
Total Proj.	34806	112348	0 800	15331	300	3725	0	0	607	16730	184547	9091	23819	217457	193638

Prepared by: J. Mallam

CAPITAL BUDGET PROPOSAL

Capital Cost Estimate & Cash Flow Requirements

2001 Fiscal Year : Prepared: 16-Nov-01

Holyrood Combined Cycle Plant

174 MW (1 GT + 1 HRSG + 1 ST SW 501D5A)

In-Service: 30-Nov-05

I.D.C.= 8.00% Annual 0.64% Mthly 1.94% Qtrly

Escalation %		2001/2002	2.20%	2002/2003	2.10%	2003/2004	2.00%	2004/2005=	2.00%	2005/2006	2.00%	2006/2007	2.20%	2007/2008	2.10%	(Est. Base:	Jan-02
Period		Constr. Servcs	Equip. Purch.	Trans & Term		External E&M	Environ-ment	Hydro Internal			O/H @ 0.33%	Cont @ 10%	Sub Total	Escln	I.D.C.	Total Project	Cash Flow (Excl IDC)
2002	Jan										0	0	0	0	0	0	0
	Feb										0	0	0	0	0	0	0
	Mar										0	0	0	0	0	0	0
	Apr										0	0	0	0	0	0	0
	May										0	0	0	0	0	0	0
	Jun										0	0	0	0	0	0	0
	Jul										0	0	0	0	0	0	0
	Aug										0	0	0	0	0	0	0
	Sep										0	0	0	0	0	0	0
	Oct							15			0	0	15	0	0	15	15
	Nov							70			0	0	70	1	0	71	70
	Dec					200		70			1	0	271	6	1	278	71
Total	2002	0	0	0	0	200	0	155	0	0	1	0	356	7	1	364	156
2003	Jan					400	5	70			2	0	477	11	2	490	282
	Feb		3000			400	35	70			12	0	3517	88	5	3610	518
	Mar		5000			400	40	70			18	0	5528	148	18	5694	3610
	Apr		5000			400	25	80			18	0	5523	158	48	5729	5671
	May		5000			400	10	70			18	0	5498	167	85	5750	5656
	Jun		5000			400	10	80			18	0	5508	177	122	5807	5675
	Jul		5000			400	10	70			18	0	5498	186	159	5843	5675
	Aug		5000			400	10	80			18	0	5508	196	196	5900	5694
	Sep	2000	5000			400	25	70			25	0	7520	280	234	8034	5709
	Oct	2500	6000			600	25	110			30	0	9265	361	279	9905	7840
	Nov	3000	7000			600	25	95			35	0	10755	438	337	11530	9611
	Dec	2500	6000			600	25	90			30	0	9245	392	406	10043	11188
Total	2003	10000	57000	0	0	5400	245	955	0	0	242	0	73842	2602	1891	78335	67129
2004	Jan	200	5000		5	500	25	110			19	0	5859	259	476	6594	9662
	Feb	200	6500		5	500	25	95			24	0	7349	337	530	8216	6103
	Mar	200	6500		5	500	25	100			24	0	7354	350	578	8282	7691
	Apr	250	6500		5	500	25	80			24	0	7384	364	631	8379	7684
	May	600			5	500	25	80			4	0	1214	62	685	1961	7748
	Jun	2500	1000		5	500	25	110			14	0	4154	219	718	5091	1306
	Jul	3000			150	500	25	80			12	0	3767	205	741	4713	4488
	Aug	2500	1500		100	500	25	80			16	0	4721	266	773	5760	3922
	Sep	1500			35	500	25	110			7	0	2177	126	807	3110	4951
	Oct	1500	1000		20	500	25	80			10	0	3135	187	835	4157	2258
	Nov	1500	1000		15	500	25	110			10	0	3160	194	859	4213	3347
	Dec	1200	1000		15	200	25	95			8	0	2543	161	886	3590	3339
Total	2004	15150	30000	0	365	5700	300	1130	0	0	172	0	52817	2730	8519	64066	62499
2005	Jan	300	1000			225	5	110			5	0	1645	107	911	2663	2684
	Feb	300				225	5	80			2	0	612	41	931	1584	1722
	Mar	300	1000			229	5	80			5	0	1619	111	944	2674	653
	Apr	300				225	5	80			2	0	612	43	958	1613	1730
	May	100	1000			225	5	95			5	0	1430	103	972	2505	670
	Jun	50				225	5	85			1	0	366	27	985	1378	1523
	Jul	50				225	5	90			1	0	371	28	998	1397	398
	Aug	50				225	5	100			1	0	381	29	1007	1417	409
	Sep	50				250	5	105			1	0	411	33	1016	1460	415
	Oct	50				250	5	130			1	0	436	35	1025	1496	469
	Nov	50	1000			250	5	130			51	14060	15546	1287	1035	17868	471
	Dec		2000			200	5	100			8	0	2313	196	0	2509	16803
Total	2005	1600	6000	0	0	2754	60	1185	0	0	83	14060	25742	2040	10782	38564	27947
Beyond		78	1927			136		300			8	0	2371	101	0	2472	4877
Total Proj.		26828	94927	0	365	14190	605	3725	0	0	506	14060	155128	7480	21193	**183801**	162608

Prepared by: J. Mallam

CAPITAL BUDGET PROPOSAL

Capital Cost Estimate & Cash Flow Requirements

2001 Fiscal Year : Prepared: 16-Nov-01

Holyrood Combined Cycle Plant

167 MW (1 GT + 1 HRSG + 1 ST Alstom 11N2)

In-Service: 30-Nov-05

I.D.C.= 8.00% Annual 0.64% Mthly 1.94% Qtrly

Escalation %	2001/2002	2.20%	2002/2003	2.10%	2003/2004	2.00%	2004/2005=	2.00%	2005/2006	2.00%	2006/2007	2.20%	2007/2008	2.10%	(Est. Base:	Jan-02

Period	Constr. Servcs	Equip. Purch.	Trans & Term	External E&M	Environ-ment	Hydro Internal	O/H @ 0.33%	Cont @ 10%	Sub Total	Escln	I.D.C.	Total Project	Cash Flow (Excl IDC)
2002 Jan							0	0	0	0	0	0	0
Feb							0	0	0	0	0	0	0
Mar							0	0	0	0	0	0	0
Apr							0	0	0	0	0	0	0
May							0	0	0	0	0	0	0
Jun							0	0	0	0	0	0	0
Jul							0	0	0	0	0	0	0
Aug							0	0	0	0	0	0	0
Sep							0	0	0	0	0	0	0
Oct						15	0	0	15	0	0	15	15
Nov						70	0	0	70	1	0	71	70
Dec				200		70	1	0	271	6	1	278	71
Total 2002	0	0	0	200	0	155	1	0	356	7	1	364	156
2003 Jan				400	5	70	2	0	477	11	2	490	282
Feb		2500		400	35	70	10	0	3015	76	5	3096	518
Mar		5000		400	40	70	18	0	5528	148	16	5692	3096
Apr		5000		400	15	80	18	0	5513	158	44	5715	5661
May		5000		400	10	70	18	0	5498	167	81	5746	5656
Jun		5000		400	10	80	18	0	5508	177	118	5803	5675
Jul		5000		400	10	70	18	0	5498	186	155	5839	5675
Aug		5000		400	10	80	18	0	5508	196	193	5897	5694
Sep	2000	5000		400	10	70	25	0	7505	280	231	8016	5694
Oct	2500	6000		600	10	110	30	0	9250	361	276	9887	7825
Nov	3000	7000		600	10	95	35	0	10740	437	334	11511	9596
Dec	2500	5500		600	10	90	29	0	8729	370	403	9502	11172
Total 2003	10000	56000	0	5400	175	955	239	0	72769	2567	1858	77194	66544
2004 Jan	200	5000	5	500	10	110	19	0	5844	258	470	6572	9124
Feb	200	6500	5	500	10	95	24	0	7334	337	522	8193	6087
Mar	200	6500	5	500	10	100	24	0	7339	349	570	8258	7676
Apr	250	6500	5	500	10	80	24	0	7369	364	623	8356	7668
May	600		5	500	10	80	4	0	1199	61	677	1937	7733
Jun	2500	1000	5	500	10	110	14	0	4139	219	710	5068	1290
Jul	3000		150	500	10	80	12	0	3752	205	733	4690	4473
Aug	2500	1500	100	500	5	80	15	0	4700	265	765	5730	3902
Sep	1500		35	500	10	110	7	0	2162	125	798	3085	4935
Oct	1500	1000	20	500	5	80	10	0	3115	186	826	4127	2237
Nov	1500	1000	15	500	5	110	10	0	3140	193	850	4183	3326
Dec	1200	1000	15	200	5	95	8	0	2523	160	876	3559	3318
Total 2004	15150	30000	0 365	0 5700	100	1130	0 171	0	52616	2722	8420	63758	61769
2005 Jan	300	1000		225		110	5	0	1640	107	901	2648	2678
Feb	300			225	5	80	2	0	612	41	921	1574	1722
Mar	300	1000		229		80	5	0	1614	111	935	2660	648
Apr	300			225	5	80	2	0	612	43	948	1603	1730
May	100	1000		225		95	5	0	1425	103	962	2490	665
Jun	50			225	5	85	1	0	366	27	976	1369	1523
Jul	50			225		90	1	0	366	28	988	1382	393
Aug	50			225	5	100	1	0	381	29	997	1407	409
Sep	50			250		105	1	0	406	32	1006	1444	410
Oct	50			250	5	130	1	0	436	35	1015	1486	468
Nov	40	1000		250		130	51	13920	15391	1274	1025	17690	466
Dec		2000		200		100	8	0	2308	195	0	2503	16635
Total 2005	1590	6000	0 0	0 2754	25	1185	0 83	13920	25557	2025	10674	38256	27747
Beyond	80	1832		136		300	8	0	2276	97	0	2373	4776
Total Proj.	26820	93832	0 365	0 14190	300	3725	0 502	13920	153574	7418	20953	**181945**	160992

Prepared by: J. Mallam

CAPITAL BUDGET PROPOSAL

Capital Cost Estimate & Cash Flow Requirements

2001 Fiscal Year : Prepared: 16-Nov-01

Holyrood Combined Cycle Plant

164 MW (2 GT + 2 HRSG + 1 ST Alstom 8C2)

In-Service: 30-Nov-05

I.D.C.= 8.00% Annual 0.64% Mthly 1.94% Qtrly

Escalation %	2001/2002	2.20%	2002/2003	2.10%	2003/2004	2.00%	2004/2005=	2.00%	2005/2006	2.00%	2006/2007	2.20%	2007/2008	2.10%	(Est. Base:	Jan-02

Period	Constr. Servcs	Equip. Purch.	Trans & Term	External E&M	Environ-ment	Hydro Internal	O/H @ 0.33%	Cont @ 10%	Sub Total	Escln	I.D.C.	Total Project	Cash Flow (Excl IDC)
2002 Jan							0	0	0	0	0	0	0
Feb							0	0	0	0	0	0	0
Mar							0	0	0	0	0	0	0
Apr							0	0	0	0	0	0	0
May							0	0	0	0	0	0	0
Jun							0	0	0	0	0	0	0
Jul							0	0	0	0	0	0	0
Aug							0	0	0	0	0	0	0
Sep							0	0	0	0	0	0	0
Oct						15	0	0	15	0	0	15	15
Nov						70	0	0	70	1	0	71	70
Dec				200		70	1	0	271	6	1	278	71
Total 2002	0	0	0	200	0	155	1	0	356	7	1	364	156
2003 Jan				400	5	70	2	0	477	11	2	490	282
Feb		3000		400	35	70	12	0	3517	88	5	3610	518
Mar		5000		400	40	70	18	0	5528	148	18	5694	3610
Apr		5000		400	15	80	18	0	5513	158	48	5719	5661
May		5000		400	10	70	18	0	5498	167	84	5749	5656
Jun	1000	5000		400	10	80	21	0	6511	209	121	6841	5675
Jul	2000	6000		400	10	70	28	0	8508	288	162	8958	6710
Aug	2000	6000		600	10	80	29	0	8719	310	213	9242	8806
Sep	3000	6000		600	10	70	32	0	9712	362	272	10346	9019
Oct	3000	6000		600	10	110	32	0	9752	380	335	10467	10114
Nov	1000	7000		600	10	95	29	0	8734	356	402	9492	10117
Dec	275	8000		600	10	90	30	0	9005	382	467	9854	9085
Total 2003	12275	62000	0	5800	175	955	269	0	81474	2859	2129	86462	75253
2004 Jan	250	5000	5	500	10	110	19	0	5894	260	529	6683	9412
Feb	250	7000	5	500	10	95	26	0	7886	362	583	8831	6139
Mar	1800	7000	5	500	10	100	31	0	9446	450	633	10529	8253
Apr	1800	7000	5	500	10	80	31	0	9426	465	695	10586	9876
May	3000	7000	5	600	10	80	35	0	10730	548	763	12041	9891
Jun	3000	6000	5	600	10	110	32	0	9757	515	836	11108	11308
Jul	1500		300	600	10	80	8	0	2498	136	912	3546	10538
Aug	1700	1500	385	600	5	80	14	0	4284	241	960	5485	2714
Sep	1800		35	600	10	110	8	0	2563	149	989	3701	4209
Oct	1900	1000	20	600	5	80	12	0	3617	216	1017	4850	2662
Nov	2000	1000	15	600	5	110	12	0	3742	230	1045	5017	3858
Dec	1400	1000	15	300	5	95	9	0	2824	179	1077	4080	3957
Total 2004	20400	43500	0	800	0	6500	100	1130	0	0	237	0	72667	3751	10039	86457	82817
2005 Jan	500	1000		225		110	6	0	1841	120	1106	3067	2998
Feb	300			225	5	80	2	0	612	41	1129	1782	1936
Mar	300	1000		229		80	5	0	1614	111	1145	2870	648
Apr	325			250	5	80	2	0	662	47	1160	1869	1730
May	250	1000		250		95	5	0	1600	115	1175	2890	719
Jun	100			250	5	85	1	0	441	33	1190	1664	1710
Jul	75			250		90	1	0	416	31	1205	1652	474
Aug	50			250	5	100	1	0	406	31	1216	1653	462
Sep	50			250		105	1	0	406	32	1226	1664	437
Oct	50			250	5	130	1	0	436	35	1237	1708	468
Nov	50	4000		225		130	72	17270	21747	1800	1248	24795	466
Dec		3000		200		100	11	0	3311	280	0	3591	23516
Total 2005	2050	10000	0	2854	25	1185	108	17270	33492	2676	13037	49205	35564
Beyond	84	2071		136		300	9	0	2516	107	0	2623	6115
Total Proj.	34809	117571	0	800	0	15490	300	3725	0	0	624	17270	190505	9400	25206	**225111**	199905

Appendix C
Vendor Data

Siemens Westinghouse - Orlando

Bambrick, Shelley M.

From: Cuyler Chris [Chris.Cuyler@swpc.siemens.com]
Sent: Tuesday, September 04, 2001 3:16 PM
To: 'GMorrison@Acres.com'
Subject: FW: Holyrood Generation Station


Holyrood Performance Sheet.xls...


Holyrood Scope of Supply.doc

> -----Original Message-----
> From: Cuyler Chris
> Sent: Tuesday, August 21, 2001 2:12 PM
> To: 'GMorrison@Acres.com'
> Cc: Bhatia Sujith; 'Peter>schurmann@siemens.com'; Baldock John
> Subject: Holyrood Generation Station
>
> George,
>
> Please find attached the plant performance for the above referenced
> project. We have also included a scope of supply document for our
supply
> of a SWPC 501D5A Econpac. We have made some assumptions on the STG
> performance as we do not have a STG for this 1X1 configuration from
the
> Power Group. I am forwarding this info on to John Baldock. As I
> understand it John is trying to get some information on a STG from our
> Industrial Group.
>
> Based on a dollars per kilowatt bases this plant would be $550.00
USD/KW
> at ISO conditions. The pricing is subject to change as it does not
> account for a any options that would normally be specified in a plant
of
> this type. The price is based on a standard construction site with
> nothing unusual accounted for.
>
> John if this project starts to get real let's talk. With the market
> conditions as they are we are very busy all the with standard 2X1 501F
> turnkeys we can handle However I am willing to try and get our
> organization to consider this project should it move forward.
>
> If you have any questions please let me know.
>
> Regards
> Chris
>
> <<Holyrood Performance Sheet.xls>> <<Holyrood Scope of Supply.doc>>

Customer	**Acres International Limited**
Project Name	Holyrood Generation Station
Location	New Foundland, Canada
Plant Configuration	501D5A - 1 X 1
Fuel Type	Fuel Oil per Siemens Westinghouse fuel specification
Combustor Type	Conventional
Fluid Injection	Water

CT Load Level	100%	
Ambient Temperature	25deg C	
Relative Humidity		90%
Barometric Pressure	3.35m	
ISO CT Inlet Loss (mmH_20)		101.6
ISO CT Exhaust Loss (mmH_20)		254
Injection Ratio		0.45

Estimated Plant Performance

(Assumptions have been made on the Steam Turbine to calculate the Plant Performance ACRES Intl. needs to apply the suitable Steam Turbine based on the Steam Turbine they will be procuring for this project)

Gross CT Power	KW	113190
Gross ST Power	KW	51240
Gross Plant Power	KW	164440
Plant Aux Load (Est.)	KW	4470
Net Plant Power	KW	159960
CT Heat Input	GJ/h	1237
Net Plant HR (LHV)	KJ/kwh	7736
Nox @ 15% O2	ppmvd	75

Scope of Supply and Division of Responsibility

Scope of Supply and Division of Responsibility

ITEM	DESCRIPTION	Quantity	Design	Supply	Erection	REMARKS
	W501D5/W501D5A ECONOPAC **CONVENTIONAL COMBUSTOR; NO. 2 FUEL OIL WITH WATER INJECTION**					
1.	**Combustion Turbine Package**	1	W	W	P	
	Engine Assembly					
	Inlet Manifold					
	Exhaust Manifold					
	Insulation Blankets					
	Exhaust Bearing Tunnel, Fire Protection					Dry chemical
	Thermal Detector					
	Dry Chemical Storage					Located outside of turbine enclosure
	Manual Pull Stations					Located on exhaust end of CT enclosure at exits
	Turbine-Generator Coupling Cover					
2.	**Generator Package**	1	W	W	P	60 Hz, 13.8 kV
	Totally Enclosed Water-to-Air Cooled Generator					Stator class F insulation system Rotor class F insulation system (B temperature rise)
	Generator Inlet Filter Assembly					Single stage pad; weather louvers
	Brushless Exciter Assembly					
	Neutral Cubicle					
	Current Transformer					
	Neutral Tie					
	Grounding Transformer					
	Secondary Resistor					
	Line Side Cubicle					
	Transition Bus					
	Current Transformers					
	Voltage Transformers					
	Surge Arresters					
	Surge Capacitors					
3.	**Walk-in Turbine Enclosure**	1	W	W	P	
	Enclosure Ventilation System					
	Emergency Lighting					Self-contained, 12 V DC
	Fire Protection System					FM-200 with alarm and strobe
	Thermal Detectors					
	Manual Pull Stations					One at each exit
	FM-200 Storage					Bottles or spheres

Scope of Supply and Division of Responsibility

ITEM	DESCRIPTION	Quantity	Design	Supply	Erection	REMARKS
	Alarm Horn					
4.	**Mechanical Package**	1	W	W	P	
	Bedplate					
	Enclosure					
	Heating/Ventilation					
	Emergency Lighting					Self-contained, 12 V DC
	Pressure Switch & Gage Cabinet (PS&G)					
	Lube Oil System					
	Main Lube Oil Pump (AC)					
	Emergency Lube Oil Pump (DC) with Starter					
	Auxiliary L.O. Pump (AC)					
	Bearing Pressure Regulating Valve					
	Lube Oil Temp Control Valve					
	Vapor Extractor/Mist Eliminator					
	Lube Oil Immersion Heater					
	Lube Oil Filter					Dual full capacity filters with transfer valve
	Accumulators					
	Lube Oil Reservoir					Carbon steel with oil resistant aluminum paint
	Fire Protection System					FM-200
	Thermal Detectors					
	Manual Pull Stations					One at each exit
	FM-200 Storage					Bottles or spheres
	Alarm Horn					
5.	**Electrical/Control Package**	1	W	W	P	
	Bedplate					
	Removable Floorplate Assembly					
	Enclosure					
	Motor Control Center, AC					
	Motor Control Center, DC					
	Voltage Regulating Cabinet					
	CT Gen. Protective Relay Panel					Includes meters and automatic synchronizer.
	DC Power System					125 V DC
	DC Panelboard					
	Batteries/Rack					Lead calcium; in isolated compartment
	Battery Charger					

W = Siemens Westinghouse
P = Purchaser

Scope of Supply and Division of Responsibility

ITEM	DESCRIPTION	Quantity	Design	Supply	Erection	REMARKS
	Microprocessor Based Digital Control System:					Includes non-redundant, non-extended DPU.
	Control Function					
	Sequence Function					
	Alarm Function					
	Temperature Monitoring Function					
	Vibration Monitoring System					Bentley Nevada
	Power Supplies					Redundant
	Local Control Panel					Includes CRT, Keyboard and Printer.
	Data Logger & Sequence Of Events					16 point SOE
	Air Conditioner					2 Per Electrical Package
	Emergency Lighting					Self Contained, 12 V DC
	Fire Protection System					FM-200 with outdoor alarm and strobe
	Thermal Detectors					
	Smoke Detectors					
	Manual Pull Stations					One at each exit
	FM-200 Storage					Bottles or Spheres
	Alarm Horn					
	Control Panel					Monitors detection systems, initiates discharge of agent, and controls alarms
6.	**Fuel Oil and Water Injection Systems**	1	W	W	P	
	Fuel Oil Pump Skid					
	Pump & Motor					
	Suction Filter					5 micron dual filter with transfer valve
	Valves					
	Relief					
	Bypass					
	Overspeed Trip					
	Water Injection Pump Skid					
	Pump and Motor					
	Suction Filter					Simplex filter
	Return Valve					
	Fuel Oil/Water Injection (FO/WI) Skid					Located within Turbine Enclosure
	Control Panel					
	Flow Divider					

W = Siemens Westinghouse
P = Purchaser

ITEM	DESCRIPTION	Quantity	Design	Supply	Erection	REMARKS
	Valves					
	FO Starting Throttle					
	FO Main Throttle					
	FO Isolation Throttle					
	FO Flow Divider Check					
	WI Throttle					
	WI Isolation					
7.	**Starting Package**	1	W	W	P	
	Bedplate					
	Enclosure					
	Starting Motor (AC Electric Motor)					4000 Volt motor
	Turning Gear & Clutch Assy.					DC motor
	Starting Clutch					
	Torque Converter					
	Charging Pump (Shaft Driven)					
	Magnetic Speed Pick-up					
	Atomizing Air Blower					
8.	**Pre Engineered Pipe Rack and Interconnecting Piping**	1	W	W	P	
	Atomizing Air Piping					
	Cooling Air Piping					
	Lube Oil Supply and Drain Piping					Stainless steel supply piping downstream of filters. Balance of lube oil piping - carbon steel
	Compressor Water Wash Piping					Within enclosure
	Liquid Fuel Piping					Between FO pump skid and CT
	Water Injection Piping					Between WI pump skid and CT
	Compressor Bleed Piping					
	HP Compressor Bleed Valve					
	LP Compressor Bleed Valve					
	Fire Protection Piping					
	Waste Drain Piping					
	Pressure Switch & Gage Tubing					
	Pipe Insulation & Lagging					
9.	**Turbine & Generator Accessory Equipment**	1	W	W	P	
	Rotor Air Cooler (Air to Air)					1 x 100% fan, 105°F max. ambient
	Turbine Lube Oil Cooler					Oil to air, 2 x 50% fin-fan

Scope of Supply and Division of Responsibility

ITEM	DESCRIPTION	Quantity	Design	Supply	Erection	REMARKS
	CT Exhaust Expansion Joint					
	Exhaust Transition					
	Exhaust Stack with Exhaust Silencer					50 feet high
	Turbine Inlet Filter					2-Stage pad
	Inlet Duct and Silencer Assembly					
	Foundation Leveling Wedges					
	Foundation Anchor Bolts		P	P	P	Siemens Westinghouse will provide the design criteria.
	Compressor Water Wash Skid		P	P	P	
	Water Wash Pump					
	Detergent Tank					
10.	**Fuel Oil Forwarding (No. 2 Oil) System**		P	P	P	Heat tracing and insulation may be required to maintain 45 SSU for starting on distillate oil
	Fuel Forwarding Pumps					
	Interconnecting Piping and Wiring					
	Strainer					
11.	**Power Electrics**					
	Medium Voltage Motor Controller		P	P	P	For electric motor starting package; design must be coordinated with Westinghouse.
	Generator Isolated Phase Bus Assembly		P	P	P	From line side cubicle to Purchaser's supplied equipment
	Starting Motor Transformer		P	P	P	4160 V Secondary
	Aux. Transformer		P	P	P	480 V Secondary
	Generator Breaker		P	P	P	
	Generator Step Up Transformer		P	P	P	
12.	**Electrical Interconnecting Material**					
	Cable and Conduit within Siemens Westinghouse Supplied Packages/Skids		W	W	-	Control, instrumentation and power; pre-wired
	Cable between Siemens Westinghouse Supplied Packages/Skids/ Enclosures		P	P	P	Control, instrumentation and low voltage power
	Above Grade Conduit System between Siemens Westinghouse Supplied Packages		P	P	P	
	Cable, Conduit, and Trays for Power Electrics		P	P	P	All medium voltage power from source to motor terminal
	Cable, Conduit and Trays for Power Electrics		P	P	P	Control, instrumentation, and low voltage power

W = Siemens Westinghouse
P = Purchaser

Scope of Supply and Division of Responsibility

ITEM	DESCRIPTION	Quantity	Design	Supply	Erection	REMARKS
	Underground Conduit		P	P	P	Stub-up locations by Siemens Westinghouse
13.	**Tools & Maintenance Equipment**					
	Start-up Equipment Package: Fuel & Lube Oil Filter Cartridges Spare Plugs (1) & Cable Cross Flame Tube (1) Scanner Flame Detector (1) Thermocouple Elements (15) Vibration Probe Misc. Nuts, Bolts, Fittings and Balancing Plug	1	W	W	-	
	Maintenance Tools Package: Exhaust End Bearing Removal Tool Inlet End Bearing Removal Tool Blade Ring Removal Assembly Spring Compressor - Inlet Guide Vane Guide Studs, Bolts and Nuts Spindle Guides Transition Alignment Tool Bolt Heaters, Measuring Rods and Sleeves Balance Plug Tools Fuel Nozzle Maintenance Kit (Except on DLN) Lifting Beam Assembly	1	W	W	-	One per site For removal of journal bearing. For removal of journal bearing. For disassembly and rollout of blade rings with rotor (spindle) in place. For installation of inlet guide vanes. For removal and installation of cylinder covers, seal housings, and blade ring assemblies. For rotor (spindle) removal. For positioning combustor transition during alignment. For prestressing vertical and horizontal joint bolts. For installation and removal of balance plugs in various balance planes. For fuel nozzle servicing. For lifting various covers and rotor assembly.

Scope of Supply and Division of Responsibility

ITEM	DESCRIPTION	Quantity	Design	Supply	Erection	REMARKS
14.	**Civil Work**		P	P	P	
	Site Survey					
	Sub-Soil Investigation					
	Site Leveling					
	Excavation for Foundations, Pipes, Roads, Cabling & Grounding Grid					
	Backfill					
	Finish Grading					
	Foundations for all Equipment					
	Surface Drainage to & including any Collection Pond					
	Sanitary Waste Disposal					
	Cathodic Protection					If required
	Below Grade Electrical Raceway					Includes Conduit, Duct Bank, Trenches, etc.
15.	**Additional Plant Items**		P	P	P	As required by purchaser
	Service Piping Systems:					
	Liquid Fuel					To fuel oil pump skid adjacent to turbine enclosure
	Liquid Fuel Metering					
	Instrument Air					
	Service Air					
	Raw Water					
	Demineralized Water					
	Vents					
	Drains					
	Potable Water					
	BOP Motor Control Centers					For Purchaser supplied systems
	Demineralizer System and Local Control Panels					Raw water by Purchaser
	Instrument & Service Air Systems and Control Panels					
	BOP and Plant Fire Protection Systems-Hydrants Panels and Extinguishers					
	Fuel Oil Unloading and Storage					
	Demineralized, Potable, Raw and Fire Water Storage					As required
	Plant Lighting					
	Gauges, Controls and Panels					For Purchaser supplied systems
	Intra-communication System					

Scope of Supply and Division of Responsibility

ITEM	DESCRIPTION	Quantity	Design	Supply	Erection	REMARKS
	Cable, Conduit and Tray Systems					Between Purchaser-supplied equipment. Also between Purchaser-supplied equipment and Siemens Westinghouse supplied equipment.
	Electrical Consumables					Tie-wraps, tape, misc. bolts, nuts, washers, unistrut clamps and related bolts and nuts.
16.	**Other Services**					
a.	Plant Engineering			P		
b.	Transportation to site			P		Equipment delivered FOB carrier at the manufacturing plant.
c.	Complete off loading, storage, erection and installation of all Westinghouse supplied equipment and material			P		
d.	Provision of Field Office Furnished with Electricity, Drinking & Sanitary Water, Desks, Chairs, Lockers & others which are necessary for Field Works, Services & Sanitary Facilities for Office Personnel			P		For Siemens Westinghouse Field Representative
e.	Provision of First Aid & Medical Services - OSHA Approved			P		
f.	Provisions of Local Communication Facilities including Radio, Telephone, Cable & Telex, if possible			P		
g.	Provision and Distribution of Electric Power for Lighting, Heating and others required			P		
h.	Water Facility for Drinking, Sanitary & other required			P		
i.	Maintaining & Guarding all Facilities Equipment & Materials			P		
j.	Mobile Crane(s)			P		

W = Siemens Westinghouse
P = Purchaser

Scope of Supply and Division of Responsibility

ITEM	DESCRIPTION	Quantity	Design	Supply	Erection	REMARKS
k.	Technical Field Assistance for Installation, Start-up and Check-up			P		Available from Siemens Westinghouse on a per diem basis
l.	Site Organization					
	Resident Field Construction Manager			P		
	Supervision & Manpower for Erection Works & Commissioning			P		
	Test Operation & Trial Operation			P		
	Plant Start-up Engineering			P		
	Plant Operators			P		
m.	Overall Progress & Construction Schedule; overall Planning, Coordination & Schedule Control			P		
n.	Worker's Compensation, Employer's Liability, or any other Local Insurance Required			P		
o.	Permanent Facility Permits and Licensing			P		Licensing support available from Siemens Westinghouse on a per diem basis
p.	Consumable Material for Erection Works: Flushing Oil, Oxygen, Acetylene, Propane, & Argon Gas with Cylinder for Welding & Annealing, as required			P		
q.	First Fill Material, Oils, Greases, Etc.			P		
r.	Finish & Touch up Paint & Painting for all Equipment			P		
s.	Instruction Manuals and Plant Documentation			W		4 Copies in English (Siemens Westinghouse to integrate and issue)
t.	Operation & Maintenance			P		Available as an option
u.	Training					Available as an option
	CT Familiarization			P		
	CT Operation			P		
	Basic Power Plant Control Room Simulator			P		
	DCS Technician Training			P		

W = Siemens Westinghouse
P = Purchaser

Scope of Supply and Division of Responsibility

ITEM	DESCRIPTION	Quantity	Design	Supply	Erection	REMARKS
v.	Construction Equipment, Tools & Aids including the following: Cement Mixers, Loaders, Trucks, Cranes of varying capacities, Trenchers, Pipe Wrapping & Laying Equipment, Power Generators, Air Compressors, Welders, Drilling Equipment, Pipe Working Facilities & all Hand Tools required for expeditiously and competently completing all phases of the work under the Contract			P		
w.	Performance Testing			P		Siemens Westinghouse assistance to perform calculations
x.	Emission Testing			P		
y.	All Risk Builder's Risk Insurance			P		
z.	Construction Permits			P		
aa.	Temporary Construction Power			P		
bb.	Construction Water			P		
cc.	Fire Water			P		
dd.	Access Road(s)			P		
ee.	Temporary Construction Staging Area			P		

Bambrick, Shelley M.

From: Cuyler Chris [Chris.Cuyler@swpc.siemens.com]
Sent: Monday, August 06, 2001 11:37 AM
To: 'GMorrison@acres.com'
Cc: Bhatia Sujith; Schuermann Peter
Subject: Holyrood GS Combined Cycle Addition

Holyrood GS Combined Cycle Pro...

George,

I have reviewed your request for the above project and I have attached a matrix as to what we are able to provide to you. This combined cycle configuration is to small for our steam turbine group. We do not have a single cylinder machine. All we build to day are three pressure, reheat type steam turbines large combined cycle application. If this project was actually to move forward and there was concern about a performance wrap for the power block there are a number of ways we could approach the guarantees but for right now we can only provide information on the turbine. Please review the attached matrix and let me know if this works for you.

Regards
Chris

<<Holyrood GS Combined Cycle Project.doc>>

Holyrood GS Combined Cycle Project

Project Details:-

	Description	Customer Requirement	SW Scope of Supply
1]	Plant Requirement	125 – 175MW	
2]	Plant Configuration	1X1 Combined Cycle	
3]	Scope of Supply	CT, ST, HRSG, DCS, Spares, Warranty, Delivery	1 – 501D5A Econopac Only, DCS, Spares, Warranty, Delivery
		Bypass Stack – 58m	Bypass Stack – 58m
		Modulating Damper/Diverter Unit	Modulating Damper/Diverter Unit
		Compressor Water Wash	Compressor Water Wash – Automatic
		TEWAC Generator	TEWAC Generator
		Brushless Exciter	Brushless Exciter
		Spare Parts for 24,000 hrs	Spare Parts for 24,000 hrs
		Erection & Commissioning Supervision	Econopac TFA
4]	NOx Control	Dry Low NOx	Dry Low NOx
5]	Fuel	No. 2 distillate oil	No. 2 distillate oil
6]	Emissions	75ppm	75ppm @ 15% O2
7]	Delivery	To Site	To Site
8]	Guaranty	Net Power Output Net Heat Rate Emission – NOx Noise – Far Field	Net Power Output Net Power Heat Rate Emission – NOx Noise – Near Field
9]	Noise	Far Field = 60dB(A) @ 120m Near Field = None Specified	No Far Field Near Field = 85dB(A) @ 3m
10]	Site Conditions	• Indoor Type • Elevation = 3.35m a.m.s.l • Relative Humidity = 90% • Ambient Air Temp. = 0 deg C • CW In/Out = 5/30 deg C • Corrosive Environment, close to ocean, seawater cooling	• Indoor Type
11]	Deliverables	• Expected Performance • Budgetary Price • G. A. Drawing • Controls Schematic	• SWPC to provide • SWPC to provide • SWPC to provide

Bambrick, Shelley M.

From: Cuyler Chris [Chris.Cuyler@swpc.siemens.com]
Sent: Monday, October 01, 2001 12:38 PM
To: 'Morrison, George D.'
Cc: Schuermann Peter
Subject: RE: O&M Information for Holyrood

HolyroodLTMPAcres.xls

George,

Please see the attached spreadsheet. If you have any questions please let
me know. The information is based on your requirements below.

Regards
Chris

-----Original Message-----
From: Morrison, George D. [mailto:GMorrison@Acres.com]
Sent: Thursday, September 20, 2001 3:55 PM
To: 'Chris Cuyler, Westinghouse'
Subject: O&M Information for Holyrood

Chris,
Please provide information on operating and maintenance of combustion turbine plant (model 501D5A). Specifically the following would be appreciated:

1. Recommended Maintenance Intervals (in terms of fired hours and
starts)covering combustion, turbine (hot section) and major overhauls.

2. Factor for 1. above for clean distillate fuel oil.
3. Expected downtimes and manhours for inspections and overhauls.
4. Expected cost of parts and labour for complete overhaul cycle.
5. Factor for 4. above for clean distillate fuel oil.
Looking forward to your input
Regards,
George

George D. Morrison, P.Eng.
Acres International
4342 Queen Street, P.O. Box 1001
Niagara Falls, Ontario, Canada L2E 6W1
Phone : 905 374-0701 extension 5239
Fax : 905 374-1157
E-mail:gmorrison@acres.com
Web Site: www.acres.com
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Program Period:	0	1	2	3	4
Equivalent Base Load Hours	0	8000	16000	24000	32000
Scheduled Outages	None	Combustor	Combustor	HotPath	Combustor
CT Program Part: Repairs	$0	$342,250	$342,250	$1,092,780	$342,250
CT Program Parts: Replacement	$3,425,065	$0	$0	$2,430,002	$0
Misc. Inspection & Maint. Hdwr.	$126,500	$253,000	$253,000	$310,500	$253,000
CT Parts & Repair Sub-Total:	$3,551,565	$595,250	$595,250	$3,833,282	$595,250
Program Management:	$0	$360,000	$360,000	$360,000	$360,000
Scheduled Outage Services:	$0	$233,851	$233,851	$463,931	$233,851
Maintenance Program Sub-Total:	$0	$593,851	$593,851	$823,931	$593,851
Annual Total:	$3,551,565	$1,189,101	$1,189,101	$4,657,213	$1,189,101
Cumulative Total:	$3,551,565	$4,740,666	$5,929,767	$10,586,980	$11,776,081

Outage duration (2/12/7 schedule):	
Combustor	4
Hot Gas Path	10
Major	21

5	6	7	8	9	10	11	12
40000	48000	56000	64000	72000	80000	88000	96000
Combustor	Major	Combustor	Combustor	HotPath	Combustor	Combustor	Major
$327,250	$1,423,115	$327,250	$342,250	$778,080	$342,250	$111,450	$1,423,115
$50,932	$3,713,161	$50,932	$0	$1,768,717	$0	$1,281,840	$506,496
$253,000	$517,500	$253,000	$253,000	$310,500	$253,000	$253,000	$517,500
$631,182	$5,653,776	$631,182	$595,250	$2,857,297	$595,250	$1,646,290	$2,447,111
$360,000	$360,000	$360,000	$360,000	$360,000	$360,000	$360,000	$360,000
$233,851	$1,361,886	$233,851	$233,851	$463,931	$233,851	$233,851	$1,361,886
$593,851	$1,721,886	$593,851	$593,851	$823,931	$593,851	$593,851	$1,721,886
$1,225,033	$7,375,662	$1,225,033	$1,189,101	$3,681,228	$1,189,101	$2,240,141	$4,168,997
$13,001,114	$20,376,776	$21,601,809	$22,790,910	$26,472,138	$27,661,239	$29,901,380	$34,070,377

$7,194,290
$13,227,145
$3,806,500
$24,227,935
$4,320,000
$5,522,442
$9,842,442

$34,070,377

Rolls Royce

Bambrick, Shelley M.

From: PETER HEFFERNAN [p.heffernan@home.com]
Sent: Friday, September 28, 2001 7:36 PM
To: Morrison, George D.
Cc: peter.heffernan@rolls-royce.com; neil.tyrrell@rolls-royce.com
Subject: Re: O&M Information for Holyrood

George:

As per our discussion and as a follow up to your questions, please find the information below.

9/27/01

1.) Hot section overhaul (minor)occurs at 25,000 hours of operation and a complete overhaul (major) occurs at 50,000 hours of operation. This will occur with 250 or less starts per year or about 1500 starts or less per 50,000 hours of operation.

2.) TBD.

3.) Rolls-Royce is prepared to enter into a long term maintenance agreement offering an availability guarantee of 95% of 8760 hours. Rolls-Royce is targeting 1 annual shutdown and inspection lasting approximately 96 hours and breaker to breaker engine changeouts in 72 hours.

4.) Current pricing (US$) is as follows for a comprehensive maintenenace agreement through 50,000 hours of baseload operation which includes minor and major overhauls and all scheduled and unscheduled maintenance and spare parts with the exception of consumables:

Annual Fee $360,000
Fired Hour charge $133

The above maintenance agreement with an availability guarantee is:

Annual Fee $510,000
Fired Hour Charge $142
Initial Spares $388,000

5.) TBD

9/05/01

1.) Rolls-royce is not developing an oil fired DLE combustor but is developing an oil fired water injected combustor.

2.) Rolls-Royce is unable to provide unctrolled NOx information at this point in time. The cost impact to the Genset is probably negligible. the big savings would be in not having to build a water treatment facility.

3.) See #2 above.

8/24/01

1.) See #2 and #3 from 9/05/01.

2.) The standard design is 85dB @ 1m, 65 dB @ 100m, which should result

in 53dB @ 400m.

As per our discussion, Rolls-Royce is not developing a dry liquid fuel
system. The water injection for both naturlal gas and liquid fule results in a power increase in warm weather. The Trent essentially would flatline at about 58MW net power from -40 deg C to about +20 deg C at iso conditions.

Please let us know when you plan to issue a RFP for a firm proposal and
Rolls-royce would be pleased to update you on product development at that time.

thanks

Peter Heffernan
905-201-0724
> "Morrison, George D." wrote:
>
> Peter,
> Please provide information on operating and maintenance of combustion
> turbine plant (model Trent/60). Specifically the following would be
> appreciated:
>
> 1. Recommended Maintenance Intervals (in terms of fired hours
> and starts)covering combustion, turbine (hot section) and major
> overhauls.
>
> 2. Factor for 1. above for clean distillate fuel oil.
> 3. Expected downtimes and manhours for inspections and
> overhauls.
> 4. Expected cost of parts and labour for complete overhaul
> cycle.
> 5. Factor for 4. above for clean distillate fuel oil.
> Looking forward to your input
> Regards,
> George
>
> George D. Morrison, P.Eng.
> Acres International
> 4342 Queen Street, P.O. Box 1001
> Niagara Falls, Ontario, Canada L2E 6W1
> Phone : 905 374-0701 extension 5239
> Fax : 905 374-1157
> E-mail:gmorrison@acres.com
> Web Site: www.acres.com
> ==========

Bambrick, Shelley M.

From: Morrison, George D.
Sent: Wednesday, November 07, 2001 10:38 AM
To: Bambrick, Shelley M.
Subject: FW: Holyrood GS Combined Cycle Addition


Section 03 - Scope of Supply.d...


Trent Performance.xls


Trent X 2 in CC.doc

Shelley,

As requested
George

> -----Original Message-----
> From: PETER HEFFERNAN [mailto:p.heffernan@home.com]
> Sent: Thursday, August 23, 2001 4:42 PM
> To: Morrison, George D.
> Cc: Gill, Bob J.
> Subject: Re: Holyrood GS Combined Cycle Addition
>
>
> George/Bob:
> Please excuse the delay. Please find attached
> performance information,
> GT Pro run with 2 Trents in CC, scope of supply and a general
> arrangement drawing.
> Please note that Trents are water injected to control
> NOx to 40 vppm.
> The water consumption is higher than would be expected to
> control NOx to
> 75 vppm. This information is preliminary and will be refined when the
> RFP is issued.
> A budgetary price for a Trent Genset Exworks is $16M
> US$. This does not
> include Marine Filters, silencing (since no sound attenutation was
> specified), bypass stack and damper/diverter or generator switchgear.
> A budgetary estimate of spare parts for 25,000 hours of
> operation
> (just prior to a minor overhaul) is $400,000 US$.
> Erection and commissioning supervision is included in
> the price and is
> expected to take 12-14 weeks.
> Delivery is about 12 months from order and we are
> unable to include an
> estimate of delivery at this point in time.
> The warranty is a standard 12 months, although RR would
> be pleased to
> discuss a long term maintenance agreement, which would cover
> spare parts
> and provide an availability guarantee.
> If you have any questions, then please do not hesitate to call.
>
> Thanks
>
> Peter Heffernan
> 905-201-0724
>
>

> > "Morrison, George D." wrote:
> >
> > Peter,
> >
> > Acres have been engaged by Newfoundland and Labrador Hydro
> to update a
> > Feasibility Study completed in 1997.
> > Towards this objective we ask that you provide us with
> budgetary cost
> > and other information for power block equipment supply for combined
> > cycle modules based on the following combustion turbine:
> >
> > Model Trent in a 2:1 configuration
> >
> >
> > The project scope along with other pertinent project
> > information is included in the attached file.
> > We would appreciate receiving this information before August
> > 15, 2001. If you have any questions, please contact me in
> the first
> > instance. In my absence, Bob Gill at rgill@acres.com or Tel
> > 709-754-1710.
> >
> >
> > Regards,
> > George
> >
> > <<W40930RFBQAug02.doc>>
> >
> > George D. Morrison, P.Eng.
> > Acres International
> > 4342 Queen Street, P.O. Box 1001
> > Niagara Falls, Ontario, Canada L2E 6W1
> > Phone : 905 374-0701 extension 5239
> > Fax : 905 374-1157
> > E-mail:gmorrison@acres.com
> > Web Site: www.acres.com
> > ==========
> >
> > Name: W40930RFBQAug02.doc
> > W40930RFBQAug02.doc Type: Winword File (application/msword)
> > Encoding: base64
>

3 SCOPE OF SUPPLY, TERMINATION POINTS AND EXCLUSIONS

3.1 SCOPE OF SUPPLY

3.1.1 Standard Trent GenSet Scope of Supply

Standard GenSet Package scope of supply, per each Rolls-Royce Trent DLE based generator set comprises:

3.1.1.1 Trent DLE Gas Turbine

- Rolls-Royce Trent Gas Turbine with DLE combustion system.

3.1.1.2 Trent GenSet Gas Turbine Module

- Fabricated weatherproof painted carbon steel free standing acoustic enclosure with wall seal plates for housing the Gas Turbine, inlet scroll, exhaust duct and volute, and ventilation air systems. Access doors, hatches, internal platforms and walkways for maintenance. The enclosure houses main and emergency lighting, junction boxes, fire and gas detection and CO_2 fire protection systems.
- Radial air intake plenum and intake scroll with compressor water wash supply rings.
- Gas turbine exhaust duct, volute and an expansion joint, exhausting horizontally (right or left) or vertically (upwards) of the package enclosure.
- Dry diaphragm flexible coupling shaft.
- Fire extinguishing system and gas detection system with thermal detectors.
- Two shot CO_2 extinguishing system with pipework to nozzles within the gas turbine compartment
- Externally mounted CO_2 bottle rack and bottles.

3.1.1.2.1 Gas Turbine Combustion Air Intake System

- Self-cleaning combustion air intake filter with steel support structure, including access door, ladder and internal lighting.
- Combustion air inlet silencer and ducting with flexible joints to accommodate thermal movement.

3.1.1.2.2 Gas Turbine Enclosure Ventilation System

- Inlet filtration system, ducting, silencers and fire dampers.
- Two (2) 100% duty AC motor driven induced draft exhaust fans.
- Ventilation air exhaust fire dampers, silencer, ducting and weather hood.

3.1.1.2.3 Gas Turbine Bleed Air

- Bleed air exhaust ducting and silencer.

3.1.1.2.4 *Internal Auxiliary Gearbox Cooling Air and Bearing Pressurization Air System*

- Cooling air pipework.
- Three way temperature control valve for air-cooled air-cooler bypass.
- Horizontally mounted, induced draft, air-cooled air-cooler (mounted in GT enclosure ventilation exhaust).

3.1.1.3 *Trent GenSet Mechanical Auxiliaries Module*

- Gas fuel forwarding system comprising metering valves, high speed shutoff valves, staged combustion fuel metering, debris filtration, stainless steel pipework and fittings, associated valves and instrumentation.
- Gas turbine lube oil system comprising lube oil tank with duplex water cooled oil cooler, thermostatically controlled electric heater, air/oil separator, fan cooled mist eliminator, oil mist eliminator and vent, engine driven supply pumps, duplex oil filter, stainless steel pipework and fittings, associated valves and instrumentation.
- Gas turbine hydraulic start system comprising an AC motor driving two variable displacement hydraulic pumps in tandem, stainless steel pipework and fittings, associated filters, valves and instrumentation.
- Gas turbine hydraulic control oil system comprising two (2) 100% duty AC motor driven variable displacement pumps, two (2) 100% duty bladder type accumulators, duplex oil filter, stainless steel pipework and fittings, associated valves and instrumentation.
- Common hydraulic start oil and hydraulic control oil tank with common duplex water cooled oil cooler, oil mist separator and vent.
- Gas turbine compressor cleaning system suitable for or unfired washing with one (1) 100% duty AC driven water wash pump.
- Fire detection system with thermal detectors.
- Gas detection system.
- Single shot CO_2 extinguishing system with pipework to nozzles within the auxiliary compartments.

3.1.1.4 *Trent GenSet Control Module*

- Fabricated weatherproof steel cabin, with spreader beam for positioning, carrying the PCS (Plant Control System), EMS (Engine Management System), GCP/GPP (Generator Control Panel / Generator Protection Panel), MCC (Motor Control Center), 24V battery system and fire and gas panel, and including climate control, lighting and domestic electrical services.
- Package control system comprising a two bay cubicle with PC driven control and display.
- Engine management system comprising a two bay cubicle with Woodward controller.
- AC generator control/protection panel comprising a two bay cubicle with automatic voltage regulator, generator metering and protective relays, automatic and manual synchronizing facility, with synchroscope and check synchronizer.
- GT GenSet 480V MCC's comprising Form 4 Type 5 motor controls for all GenSet drives.
- Fire and gas control panel.
- Unit desk with one (1) off interface screen, keyboard, mouse and printer.

- Modbus serial data link for data transmission to the purchaser's overall control system.
- 24V battery system and chargers (UPS) to support the operation of the controls system.
- Continuous emissions monitoring system.
- Gas chromatograph.

3.1.1.5 *Trent GenSet AC Generator Module*

- Fabricated weatherproof carbon steel skid and acoustic enclosure carrying the AC generator, lube oil system, cooling air system, exciter and line and neutral cubicle. Access doors and hatches for maintenance, main and emergency lighting, junction boxes, fire detection and CO_2 fire protection systems are included.
- Two pole, open air cooled AC generator, 13.8 kV, 3 phase, 60 Hz, 0.85 power factor in accordance with IEC 34.3, fitted with class "F" insulation and designed for class "B" temperature rises with a brushless exciter.
- Integral lube oil system comprising one (1) shaft driven oil pump, one (1) AC motor driven oil pump, one (1) gravity fed run down tank, water cooled oil cooler, duplex oil filter, oil reservoir with mist eliminator, vent and thermostatically controlled electric heater, associated pipework, fittings, valves and instrumentation.
- AC generator cooling air system comprising air filter media, ducting and silencer, fire dampers and two (2) shaft mounted axial flow fans.
- Combined line and neutral cubicle.

3.1.1.6 *Interconnecting Services*

- Complete interconnecting cabling installation between packages in Rolls-Royce scope of supply.
- Complete interconnecting pipework installation between packages in Rolls-Royce scope of supply.

3.1.1.7 *Installation & Commissioning*

- Supervision of installation and commissioning.
- One (1) set of commissioning spares.
- One (1) fuel gas block and bleed assembly.

3.1.1.8 *Special Tools*

- GT lifting beam and sling.
- Coupling alignment tool.
- One (1) set GT special tools.
- Rotor withdrawal gear and rotor lifting beam.

3.1.1.9 *Equipment Testing*

- Gas turbine generating set performance and functional test.
- Auxiliaries and control module final functional test.

- AC generator factory test.

3.1.1.10 *Documentation*

- Three (3) paper sets of technical documents and manuals in English.
- One (1) electronic (CD) version of technical documents and manuals in English.
- Project drawings and document list.

3.1.1.11 *Training*

- Familiarization training, for RR scope of supply, up to 10 operators, based at site.

3.1.1.12 *Customer Services*

- One (1) set of operational and insurance spare parts, in conjunction with a comprehensive maintenance or comprehensive plus maintenance contract.

3.1.2 *Optional Items – Trent GenSet*

None

3.1.3 *Optional Items – Extended Scope*

None

3.2 EXCLUSIONS

- Fin Fan Coolers.
- Air Compressor
- Chiller system
- Unloading
- Installation & Commissioning
- Transformers
- Switchgear
- Civils

3.3 TERMINATION POINTS

Note: The termination points detailed in the following section are subject to review after scope of supply finalized.

3.3.1 *Standard Trent GenSet Scope of Supply*

Interface Description	Terminal Points	Interface Responsibility
Combustion Air	Air intake filter house.	From atmosphere at ambient conditions. No Purchaser interface.
Exhaust Gas	Outlet flange from Package.	Purchaser to provide expansion joint / transistion duct onwards.
Ventilation	Gas turbine enclosure vent air intake and outlet.	From and to atmosphere at ambient conditions. No Purchaser interface.
Mountings	Locations on skid baseplates and all other structural members.	Civil work to be provided by Purchaser based upon loading data provided by Rolls-Royce. Purchaser to provided grouting.
Fuel Gas	Inlet flange on gas turbine skid. Vent pipe outlet flange on turbine skid.	Purchaser to provide fuel gas per Rolls-Royce specification and all field interconnect piping and fixings.
Lubricating Oils	Inlet and outlet connections at generator skid and at cooler.	Purchaser to provide all field piping.
Compressor Cleaning	Filling point of washing tank.	Purchaser to provide water & cleaning fluids per Rolls-Royce specification, including first fill.
Instrument Air	Inlet connection at turbine skid.	Purchaser to provide all field piping.
Lubricants	Filling points at lubricating oil tanks. Drains connections at oil tanks.	Purchaser to provide dispensing system and oils to Rolls-Royce specification, including flush & first fill. Purchaser to provide drainage and disposal system.
Drains	Drains system flanges on all skids as necessary.	Purchaser to provide drainage and disposal system.
Earthing	Earthing terminals on skids.	Purchaser to provide suitable arrangements and connections to terminals.

Interface Description	Terminal Points	Interface Responsibility
HV Electrical Power	Lineside terminals of AC generator. Neutral terminal of AC generator.	Purchaser to provide all HV cabling or bus and termination accessories. Purchaser to provide connection to earth.
480V AC Auxiliary Power	Outgoing terminals at MCC and incoming terminals at all AC motors.	Purchaser to provide field cabling and termination accessories.
220V AC Auxiliary Power	Outgoing terminals at MCC and incoming terminals at all users.	Purchaser to provide field cabling and termination accessories.
Control and Instrumentation	Terminals at UCP and field junction boxes.	Purchaser to provide interconnecting cabling and termination accessories.

3.3.2 *Optional Items – Trent GenSet Options Scope of Supply*

None

3.3.3 *Optional Items – Extended Scope of Supply*

None

eTrent v1
ST400 Model

Customer Name
Newfoundland Hydro

Project Name
Holyrood

Engine Name
Industrial Trent

Combustion System
Dual Fuel

Units System
S.I. units

Application
Power Generation
Gen. efficiency = 98.35 %
Auxiliary power = 150 kW
Frequency = 60 Hz

Fuel Type
Kerosene
Fuel Temp. = 288.15 K
Water Temp. = 288.15 K

Design Point Losses

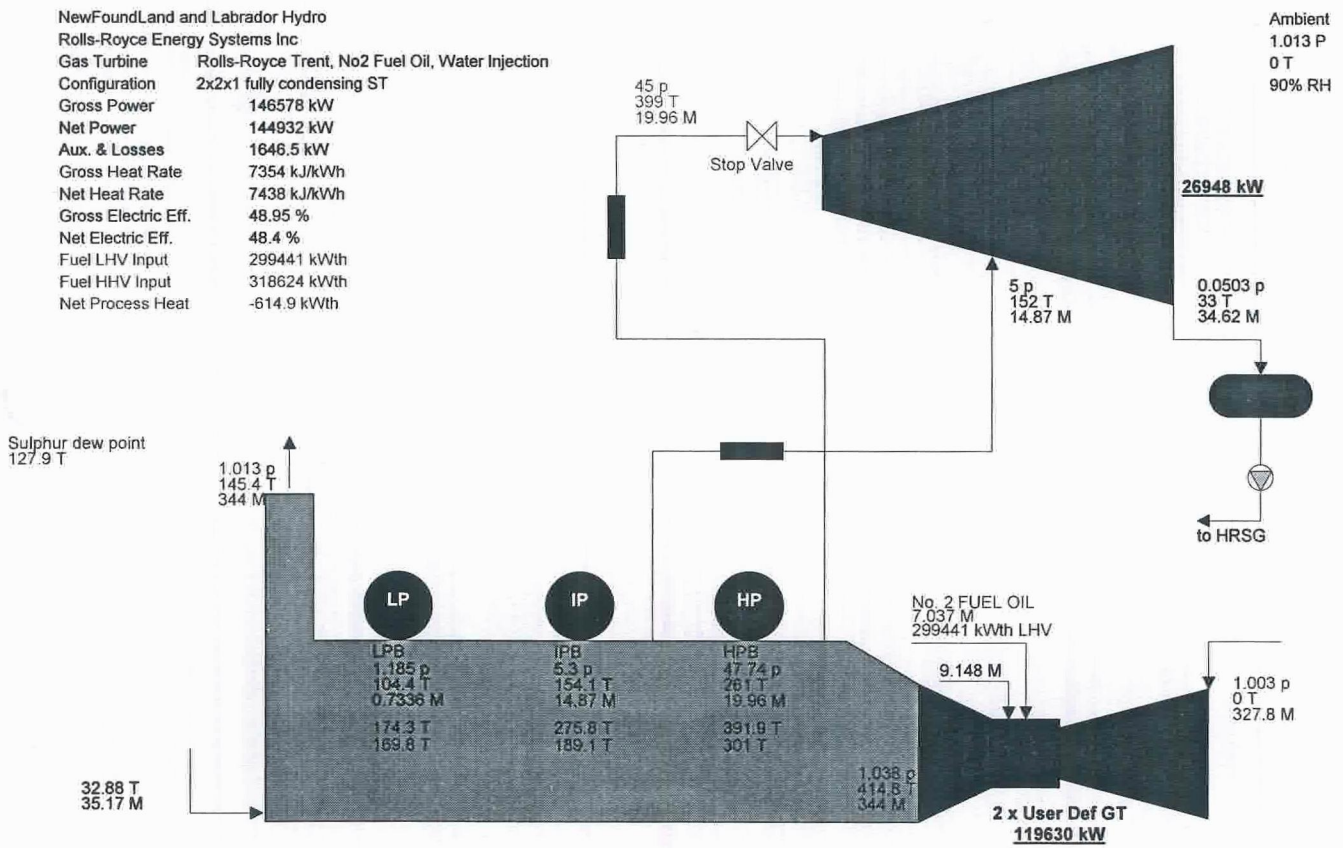
Ambient Temperature	288.15 K
Altitude	3 m
Relative Humidity	60%
Inlet Losses	102 mmH2O
Exhaust Losses	254 mmH2O

Name	Unit						
Ambient Temp.	K	273.15	288.15	273.15	283.15	293.15	303.15
Altitude	m	3	3	3	3	3	3
RH	%	90	60	60	60	60	60
Rating	-	Baseload	Baseload	Baseload	Baseload	Baseload	Baseload
Fuel LHV	kJ/kg	42915	42915	42915	42915	42915	42915
Fuel Temp.	K	288.15	288.15	288.15	288.15	288.15	288.15
Water Temp.	K	288.15	288.15	288.15	288.15	288.15	288.15
Inlet Loss	mmH2O	109	102	109	104	98	89
Exhaust Loss	mmH2O	281	254	281	263	242	217
Turbine speed	RPM	3600	3600	3600	3600	3600	3600
Shaft Power	kW	60971	55316	60970	57538	52842	47917
Shaft Heat Rate	kJ/kWhr	8840.3	9084.6	8838.8	8987.3	9194.5	9442.5
Generator Effic.	%	98.35	98.35	98.35	98.35	98.35	98.35
Auxiliary Power	kW	150	150	150	150	150	150
Nett Power	kW	59815	54254	59814	56438	51820	46976
Nett Heat Rate	kJ/kWhr	9011.2	9262.5	9009.6	9162.4	9375.9	9631.6
Engine mass flow	kg/s	165	154.7	165.1	158	150.3	140.5
Fuel Flow	kg/hr	12559.9	11709.9	12557.6	12049.8	11321.6	10543.2
Water Flow	kg/hr	16329.1	15223	16327.1	15657.3	14706.1	13703.5
Exhaust Flow	kg/s	172	161	172	164	156	146
Exhaust Temp.	K	688.62	706.68	688.64	702.62	711.82	724.13
Exh. Nitrogen	%	72.871	72.558	73.006	72.729	72.313	71.512
Exh. Oxygen	%	13.421	13.377	13.458	13.374	13.349	13.181
Exh. Carbon Dioxide	%	4.165	4.138	4.164	4.171	4.112	4.081
Exh. Water	%	8.668	9.057	8.496	8.853	9.358	10.369
Exh. Argon	%	0.872	0.868	0.873	0.87	0.865	0.855
Exh. Neon	%	0.003	0.003	0.003	0.003	0.003	0.003
NOx	mg/m3	51.33	51.33	51.33	51.33	51.33	51.33
NOx	kg/hr	25	23.5	25	23.9	22.8	21.4
CO	mg/m3	102.67	102.67	102.67	102.67	102.67	102.67
CO	kg/hr	13.8	13	13.8	13.2	12.6	11.8

TRENT 2X2X1 CONFIGURATION, NO STEAM EXTRACTION

NewFoundLand and Labrador Hydro
Rolls-Royce Energy Systems Inc

Gas Turbine	Rolls-Royce Trent, No2 Fuel Oil, Water Injection
Configuration	2x2x1 fully condensing ST
Gross Power	146578 kW
Net Power	144932 kW
Aux. & Losses	1646.5 kW
Gross Heat Rate	7354 kJ/kWh
Net Heat Rate	7438 kJ/kWh
Gross Electric Eff.	48.95 %
Net Electric Eff.	48.4 %
Fuel LHV Input	299441 kWth
Fuel HHV Input	318624 kWth
Net Process Heat	-614.9 kWth



p [bar] T [°C] M [kg/s], Steam Properties: Thermoflow - STQUIK
1076 08-21-2001 10:25:02 file=C:\My Documents\Perf...rent-2x2x1Hollrood.gtp

GT PRO 10.1 Neil Peter Tyrrell

Bambrick, Shelley M.

From: Baldock John [John.Baldock@swpc.siemens.com]
Sent: Thursday, September 20, 2001 11:48 AM
To: 'Morrison, George D.'; Baldock John
Subject: RE: Holyrood STG pricing

Dear George,

Re your fax of Sept.19th. My sizing for the steam turbine generator sets for
both gas turbines is the same Siemens NK 63/3.5 as I selected on Sept.5th
and described in my E mail.

Re the Alstom 8C2 the steam turbine output is 49.7 MW
Re the Alstom 11N2 the steam turbine output is 48.3 MW

Please contact me if you need more information.

Regards

-----Original Message-----
From: Morrison, George D. [mailto:GMorrison@Acres.com]
Sent: Wednesday, September 19, 2001 3:29 PM
To: 'John Baldock, Siemens-Westinghouse'
Subject: Holyrood STG pricing

John,
I am faxing, this pm, two more heat balance diagrams for combined
cycle configurations based on Alstom gas turbine models 8C2 and 11N2. I realize this is somewhat of an imposition I am causing but would you be so
kind and give me budget pricing in same context as that given to me earlier.
The 11N2 may be same turbine as that for the W501D5A ie Model NK 63/3.5 since they are both close in performance.

Regards,
George

George D. Morrison, P.Eng.
Acres International
4342 Queen Street, P.O. Box 1001
Niagara Falls, Ontario, Canada L2E 6W1
Phone : 905 374-0701 extension 5239
Fax : 905 374-1157
E-mail:gmorrison@acres.com
Web Site: www.acres.com
==========

Other Vendor Correspondence

Bambrick, Shelley M.

From: Baldock John [John.Baldock@swpc.siemens.com]
Sent: Wednesday, September 05, 2001 12:43 PM
To: 'Morrison, George D.'
Subject: RE: Holyrood

1. W501D5A
Steam turbine is a Siemens NK 63/3.5 axial exhaust unit.
Output 51,500 kw
Budgetary price. C$8,000,000
Freight to site. C$400,000
Supervision of installation. C$200,000
Spare parts for first three years operation. C$150,000
Delivery. 14 months ex works

2. Avons
Steam turbine is a Siemens NK 50/90 vertical exhaust, upwards or downwards
Output 27,500 kw
Budgetary price. C$6,500,000
Freight to site. C$250,000
Supervision of installation. C$175,000
Spare parts for first three years operation. C150,000
Delivery. 13 months ex works

Regards

-----Original Message-----
From: Morrison, George D. [mailto:GMorrison@Acres.com]
Sent: Wednesday, September 05, 2001 9:14 AM
To: 'John Baldock, Siemens-Westinghouse'
Subject: Holyrood

John,
I have just faxed you two heat balances - one for the W501D5A and
one for 2xRolls Royce Trents. Im hoping you will give me budget pricing on
both. Let me know if not clear.

George

George D. Morrison, P.Eng.
Acres International
4342 Queen Street, P.O. Box 1001
Niagara Falls, Ontario, Canada L2E 6W1
Phone : 905 374-0701 extension 5239
Fax : 905 374-1157
E-mail:gmorrison@acres.com
Web Site: www.acres.com
==========

Bambrick, Shelley M.

From: Baldock John [John.Baldock@swpc.siemens.com]
Sent: Wednesday, September 05, 2001 5:22 PM
To: 'Morrison, George D.'
Subject: RE: Holyrood

Yes a downward exhaust is available at the same price
Regards

-----Original Message-----
From: Morrison, George D. [mailto:GMorrison@Acres.com]
Sent: Wednesday, September 05, 2001 3:33 PM
To: 'Baldock John'
Subject: RE: Holyrood

Thanks John.
Our original (97) concept was based on a vertical down exhaust. I take
it
such a beast not available
from Siemens to match the D5A. If it were would we be talking about same
cost range?
George
> -----Original Message-----
> From: Baldock John [mailto:John.Baldock@swpc.siemens.com
<mailto:John.Baldock@swpc.siemens.com>]
> Sent: Wednesday, September 05, 2001 11:13 AM
> To: 'Morrison, George D.'
> Subject: RE: Holyrood
>
>
> 1. W501D5A
> Steam turbine is a Siemens NK 63/3.5 axial exhaust unit.
> Output 51,500 kw
> Budgetary price. C$8,000,000
> Freight to site. C$400,000
> Supervision of installation. C$200,000
> Spare parts for first three years operation. C$150,000
> Delivery. 14 months ex works
>
> 2. Avons
> Steam turbine is a Siemens NK 50/90 vertical exhaust, upwards
> or downwards
> Output 27,500 kw
> Budgetary price. C$6,500,000
> Freight to site. C$250,000
> Supervision of installation. C$175,000
> Spare parts for first three years operation. C150,000
> Delivery. 13 months ex works
>
> Regards
>
> -----Original Message-----
> From: Morrison, George D. [mailto:GMorrison@Acres.com
<mailto:GMorrison@Acres.com>]
> Sent: Wednesday, September 05, 2001 9:14 AM
> To: 'John Baldock, Siemens-Westinghouse'
> Subject: Holyrood
>
>
>
>

> John,
> I have just faxed you two heat balances - one for the
> W501D5A and
> one for 2xRolls Royce Trents. Im hoping you will give me
> budget pricing on
> both. Let me know if not clear.
>
> George
>
> George D. Morrison, P.Eng.
> Acres International
> 4342 Queen Street, P.O. Box 1001
> Niagara Falls, Ontario, Canada L2E 6W1
> Phone : 905 374-0701 extension 5239
> Fax : 905 374-1157
> E-mail:gmorrison@acres.com
> Web Site: www.acres.com
> ==========
>

Bambrick, Shelley M.

From: Pozzobon, Ed [Ed_Pozzobon@fwc.com]
Sent: Tuesday, August 21, 2001 9:33 AM
To: "Morrison; George D."
Subject: RE: Holyrood HRSGs, Condenser

George,
The pricing below includes freight to jobsite.
Best Regards,
Ed Pozzobon
Foster Wheeler Limited

_____ Reply Separator
_____
Subject: RE: Holyrood HRSGs, Condenser
Author: "Morrison; George D." <SMTP:GMorrison@Acres.com> at Corp_NJ
Date: 08/16/2001 3:30 PM

Ed,
Thanks for this. I would like if you could confirm that the pricing
would include delivery to jobsite and scope as described under 2) below.

George

> -----Original Message-----
> From: Pozzobon, Ed [mailto:Ed_Pozzobon@fwc.com]
> Sent: Thursday, August 16, 2001 10:37 AM
> To: "Morrison; George D."
> Subject: RE: Holyrood HRSGs, Condenser
>
>
> George,
> Indicative pricing for the HRSGs requested below are as follows:
>
> 1 HRSG mated to a 7EA
> $7,000,000
> 1 HRSG mated to a W501D5A
> $10,000,000
> 2 HRSGs mated to 6Bs
> $5,500,000 each (Total $11,000,000)
> 2 HRSGs mated to GT8C2s
> $6,000,000 each (Total $12,000,000)
> 2 HRSGs mated to Trents
> $5,500,000 each (Total $11,000,000)
>
> All prices are in US dollars. The erection of these units will
> typically cost 30% to 40% of the supply price. These
> prices assume
>
> that the flue gas has relatively low sulphur. Carbon steel LP
> economizer tubing material is asssumed for these applications.
>
> I hope this is sufficient for your needs.
>
> Best Regards,
> Ed Pozzobon
> Foster Wheeler Limited
>
>
> _____ Reply Separator

> _____
> Subject: Holyrood HRSGs, Condenser
> Author: "Morrison; George D." <SMTP:GMorrison@Acres.com> at Corp_NJ
> Date: 08/14/2001 3:56 PM
>
>
> Ed,
> As discussed Acres are in the process of updating a
> feasibility
> study of adding an middle distillate, low sulfur oil-fired 125/175MW
> combined
> cycle module at NLH's Holyrood plant. This is a request for budgetary
> pricing
> for HRSGs and for surface condensers. Some background information
> including
> design conditions for the project is attached.
>
> 1.For the HRSGs we are looking at the following configurations:
>
> 1:1 Configurations using GE Frame 7EA, Siemens-Westinghouse
> W501D5A and
> Alstom GT11N2
> 2:1 Configurations using GE Frame 6B, Alstom GT8C2 and
> RollsRoyce Trent
>
> 2 HRSG Scope should include two pressure levels (1500 and 125psig),
> blowdown
> system, integral deaerator, ducting, 60m AGL stack, 24k
> spares, delivery
> to
> site, erection & commissioning supervisor, other typical scope items.
>
> 3. For the Surface Condenser we are looking at nominal steam turbine
> capacities
> as follows:
>
> 46.7MW (Fr 6B
> 48.7MW (Fr 7EA)
> 58.5MW (D5A)
> 31.7MW (Trent)
>
> We will shortly have more information on steam flows if you need it.
>
> 4. We are looking for the following:
>
> 1.Budget Pricing
> 2.Scope of Supply
> 3.Opinion on current level of supply pricing accuracy.
> 4.Estimated erection labour manhours.
> 5.Performance Data
> 6.Delivery Schedule based on order 2nd Qtr 2002.
> 7.Outline Diagram for largest unit in both configurations.
>
> Please call me if you need further information. Based on my
> understanding of our
> phone talk you will be able to give us most of this
> information within a
> week.
>
> Regards,
> George
>
>
> <<W40930RFBQAug02.doc>>
>
>
> George D. Morrison, P.Eng.

> Acres International
> 4342 Queen Street, P.O. Box 1001
> Niagara Falls, Ontario, Canada L2E 6W1
> Phone : 905 374-0701 extension 5239
> Fax : 905 374-1157
> E-mail:gmorrison@acres.com
> Web Site: www.acres.com
> ==========
>

Bambrick, Shelley M.

From: ed.yost@power.alstom.com
Sent: Thursday, October 18, 2001 12:54 PM
To: gmorrison@acres.com
Subject: Holyrood Study

Following are budgetary prices per your request of 10/17/01 to Brent Jones. The scope of each unit includes tubes/tubesheets, rubberbelt expansion joint, and SJAE. No other materials or equipment are included. Pricing is present day subject to escalation and supplier increases. Alstom standard terms and conditions including self-financing progress terms of payment shall apply. Prices are FOB factory. Pricing is in US currency. Current lead times is approximately 50-52 weeks after receipt of order with release to procure/fabricate.

Turbine	Condenser Surface (square feet)	Budget Price
RR/Trent	14,874	$470,125.00
Alstom GT8C2	22,190	$665,700.00
Alstom GT11N2	22,348	$670,440.00
GE GS6B	18,045	$559,395.00
GE FS7EA	17,580	$544,980.00
W501DA	22,303	$669,090.00

We hope the above information meets with your needs.

Regards,

Bambrick, Shelley M.

From: ed.yost@power.alstom.com
Sent: Thursday, October 18, 2001 3:33 PM
To: GMorrison@Acres.com
Subject: RE: Holyrood Study

Tubes are 7/8" 25 BWG B338/2 (titanium). The tubesheets are B265/2 (solid titanium).

Regards,

Bambrick, Shelley M.

From: ed.yost@power.alstom.com
Sent: Thursday, October 18, 2001 4:48 PM
To: GMorrison@Acres.com
Subject: RE: Holyrood Study

Without looking at the budget you reference, not sure I can comment on differences. Generally the 2-3% escalation would track our equipment. Did
we do budget? If so, what is reference number?

Regards,

Bambrick, Shelley M.

From: IMilligan@aol.com
Sent: Friday, October 19, 2001 4:09 PM
To: gmorrison@acres.com
Subject: Newfoundland Light & Power - HRSG Budget Request from Aalborg Industries

Hi George,

Per your request, we are pleased to provide you with a preliminary budgetary proposal per the details outlined in your OCt 12, 2001 fax. I hope this helps with your study. We would appreciate if you could keep us informed of the status of this project if and when it shoud move forward.

All the best.....Ian Milligan
THERMAL & HYDRAULIC EQUIPMENT LIMITED

AALBORG
INDUSTRIES

October 19, 2001

Acres International
4342 Queen Street
Niagra Falls, ON L2E6W1

Attention: Mr. George Morrison

Reference: Acres International for
Newfoundland Light & Power
Holyrood Expansion
8389 AAL-IM

Subject: Aalborg Preliminary Budget Proposal No. 20010487

Dear Mr. Morrison

Aalborg Industries, Inc. is pleased to offer a "preliminary" budget price for the supply of two (2) optional Heat Recovery Steam Generator systems for the referenced project. The first option is based on a 1x1x1 HRSG configuration using a GE 7EA turbine. The second option is based on a 2x2x1 HRSG configuration using a GE 6B turbine. The scope listing below is not intended to cover all the scope items, but at least the major scope items.

I. Thermal Performance

HRSG thermal performance data sheets are not available for this level of pricing. A two pressure level system (800 / 125 psig) was considered for the purpose of this proposal.

II. HRSG System Scope of Supply

The HRSG system shall include the following equipment and services:

- HRSG inlet duct expansion joint (by others).
- HRSG inlet duct with internal insulation and stainless steel liner panels.

- High pressure superheater assembly.
- High pressure evaporator assembly.
- High pressure economizer assembly.

- Low pressure superheater assembly.
- Low pressure evaporator assembly.

- Feedwater heater assembly.

AALBORG INDUSTRIES

- High pressure steam drum with shop installed steam purification equipment to provide a steam purity of 0.05 ppm TDS based on maintaining the minimum recommended ABMA drum water concentrations.

- Low pressure steam drum with shop installed steam purification equipment to provide a steam purity of 0.2 ppm TDS based on maintaining the minimum recommended ABMA drum water concentrations.

- Integral deaerator assembly sized to maintain the oxygen level at the discharge outlet at 7 ppb oxygen or less.

- Field mounted instrumentation to include safety valves with silencers, steam drum water columns, pressure gages, high pressure superheater and reheater attemperators, main steam stop and non-return valves, feedwater stop and check valves, thermocouples with wells and small bore trim.

- Main stack, with platform.

- EPA ports platform and ladder.

- Platforms and ladders to provide access to instrumentation located on the steam drums and stack EPA ports.

- Interconnecting piping between heat transfer sections.

- Blowdown tank.

III. Customer Supplied Equipment and Services

- Flash tank and drains.

- External thermal insulation and lagging for piping, steam drums, stacks and weather enclosures.

- Sampling panel for sample coolers.

- Start-up, testing and commissioning of the units, except as noted as extras below.

- Piping and sampling system for nitrogen blanketing, chemical dosing, alkaline boil-out and chemical cleaning. Code isolation valves are supplied by Aalborg Industries,

AALBORG INDUSTRIES

Inc., per ASME Section I.

- Foundation design and installation, including anchor bolts, nuts and grout.
- Heat tracing.
- Steam/water analyzers.
- Lightning system.
- All utilities required during installation and commissioning of the boiler.
- Hydrostatic test of the boiler after erection.
- Boilout, acid cleaning and steam blow of the HRSG systems.
- Feedwater and condensate pumps and motors.
- Cooling water distribution piping.
- Instrument piping and tubing.
- Instrument service air.
- All other necessary controls and field instruments, as required to complete the system, not supplied as part of the Aalborg Industries, Inc. HRSG scope of supply and system.
- All electrical wiring, conduit and cable trays, etc. required to complete the system.
- Steam and water piping outside the terminal points.
- Motor starters and disconnects for all motors, including power wiring to motors.
- Chemical feed system.
- Final field paint.

IV. Pricing Summary & Schedule

AALBORG INDUSTRIES

- The preliminary budget price for the supply of one (1) HRSG system for use with a GE Frame 7EA frame turbine and as described within Section II, HRSG System Scope of Supply, is: ***$ 5,000,000 US Dollars***,

- The preliminary budget price for the supply of two (2) HRSG systems for use with a GE Frame 6B frame turbine and as described within Section II, HRSG System Scope of Supply, is: ***$ 7,000,000 US Dollars***,

Basis:. FOB jobsite, nearest commercial rail siding. We would need to review the final jobsite location to verify our freight assumptions. This offer is based on prior sale, Aalborg's Engineering commitments and the commitments of Aalborg's subsuppliers including availability of manufacturing capacity, availability of rail cars and railroad clearance availability.

The above pricing does not include local, state, sales or federal taxes, or taxes of similar nature, but does include import duties on the globally sourced materials, such as the tube bundle assemblies.

Individual component delivery schedules may be varied as required to meet construction requirements. Anticipated delivery of the first unit is such that items are delivered with-in a 12 – 15 month window after receiving the final notice to proceed. Shipment of the second unit will lag first unit deliveries by one month.

V. Option Pricing

Options have not been included for this level of pricing.

AALBORG
INDUSTRIES

VI. Emission Guarantees

Scope is based on uncontrolled emissions

We would like to thank you for allowing us to offer our service, and we look forward to the opportunity of working with you. Should you have any questions concerning this budget proposal as submitted, please do not hesitate to call me or our local representative.

Very truly yours,
AALBORG INDUSTRIES, INC.

Charles Bauschard
Engineer, Sales & Marketing
Direct Dial: 814/897-7094
Fax: 814/897-1092
Email: cbausch@ai-eri.com

Bambrick, Shelley M.

From: Luan, Tao [Tao_Luan@fwc.com]
Sent: Friday, September 07, 2001 6:06 PM
To: gmorrison@acres.com
Cc: Argentino, Chris
Subject: Steam Condenser for Holyrood Generating Station


prop118.doc


cover118.doc

Dear George D. Morrison

Please find enclosed Foster Wheeler Limited's proposal for the above referenced project. The enclosed files are in Microsoft Word format.

If you have any problems to open the files, please let me know.

Regards

Tao Luan
Proposal/Project Engineer, Special Products
FOSTER WHEELER LIMITED

FOSTER WHEELER

FOSTER WHEELER LIMITED
509 GLENDALE AVENUE EAST, BOX #1
NIAGARA-ON-THE-LAKE, ONTARIO L0S 1J0

TELEPHONE: (905) 688-4434
FAX: (905) 688-4588

September 07, 2001

Acres International
4342 Queen Street, P. O. Box 1001
Niagara Falls, Ontario, Canada L2E 6W1

Attention: George D. Morrison, P. Eng.

Reference: Holyrood Generating Station
Steam Surface Condenser
FWL Reference No. 401-118

Dear Sir:

Please find enclosed Foster Wheeler Limited's proposal for the above referenced project covering the supply of the condenser and vacuum pumps. Our proposal is based on using titanium tubes and tubesheets in the condenser.

We trust this proposal will satisfy your current requirements, however should you require any additional data or clarifications, please contact the undersigned.

We look forward to further discussions regarding this most valued order.

Yours truly,

FOSTER WHEELER LIMITED

Tao Luan
Proposal/Project Engineer, Special Products

FOSTER WHEELER

SURFACE CONDENSER PROPOSAL
For:
Acres International

FOR

Holyrood Generating Station

Customer RFQ No.
Foster Wheeler Reference No. 401-118
September 07, 2001

FOSTER WHEELER LIMITED
P.O. BOX 3007, ST. CATHARINES, ONTARIO L2R 7B7
COURIER ADDRESS: 509 GLENDALE AVE., NIAGARA-ON-THE-LAKE, ONTARIO LOS 1J0
Phone: (905) 688-4434 Fax (905) 688-4588

No: 401-118 Rev. 0

September 7, 2001

To: Acres International
(herein called the Purchaser)

Foster Wheeler (herein called the Company) proposes to furnish the Purchaser the following equipment upon the terms and conditions and in accordance with the specifications hereinafter set forth.

One (1)	Single shell, single pressure, two tube pass steam surface condenser complete with titanium tubesheets, bonnet type undivided waterboxes designed for bolting to the tubesheets, integral hotwell, rubber belt type exhaust neck expansion joint, and shop installed titanium tubes. The tube-to-tubesheet joint is rolled and welded.
One (1) set	Vacuum pump (10 SCFM Holding and 200 SCFM Hogging Capacity).

PREDICTED PERFORMANCE SUMMARY
SINGLE PRESSURE DESIGN

Customer: Acres International

The performance of the condenser is guaranteed for the design condition only. The information noted below is for one unit

		CASE 1	CASE 2	CASE 3	CASE 4	CASE 5	CASE 6	
1.	Turbine Rating							MW
2.	No. of Pressure Zones	1	1	1	1	1	1	
3.	Surface	13,594	20,345	20,483	16,545	16,089	20,405	Sq. Ft.
4.	Design Turbine Flow	288,893	423,816	428,578	345,243	337,307	428,578	Lb/hr
5.	Total Heat Load	262.3E+6	392.6E+6	395.3E+6	319.3E+6	311.0E+6	394.0E+6	Btu/hr
6.	*Exhaust Pressure	2.038	2.038	2.038	2.038	2.038	2.038	In.HgA
7.	Tube Cleanliness	0.85	0.85	0.85	0.85	0.85	0.85	%
8.	Heat Transfer Rate	525.1	525.1	525.1	525.1	525.1	525.1	Btu/hr/ft^2/^{0}F
9.	Cooling Water Qty.	20,218	30,254	30,477	24,607	24,061	30,405	GPM
10.	Cooling Water Temp.							
	Entering	50	50	50	50	50	50	^{0}F
	Rise	26.65	26.65	26.64	26.65	26.55	26.61	^{0}F
	Leaving	76.65	76.65	76.64	76.65	76.55	76.61	^{0}F
11.	*Condensate Temp.	101.7	101.7	101.7	101.7	101.7	101.7	^{0}F
12.	Water Vel. In Tubes	9	9	9	9	9	9	Ft/sec
13.	*Friction Loss, Tubes and Waterboxes	21.2	21.1	21.0	20.6	20.5	21.0	Ft H_2O
14.	*Max. Free Oxygen in Condensate	7	7	7	7	7	7	ppb

PERFORMANCE GUARANTEE POINTS

Provided that the equipment supplied is operated in accordance with accepted industry practice and any specific Company recommendations, the items marked with an asterisk (*) on the above performance summary are the performance guarantee points, and are offered subject to the design criteria established by the Standards for Steam Surface Condensers of the Heat Exchange Institute, Ninth Edition (HEI Standard).

SCHEDULE AND DELIVERY

Customer **ACRES INTERNATIONAL**

Station **HOLYWOOD GENERATING STATION** **No. of Units** **1**

GENERAL

Foster Wheeler proposes to furnish the equipment outlined for shipment to the site and will provide project management, design engineering, and scheduling facilities which will permit custom designing of the equipment in accordance with the specifications in an economically effective manufacturing cycle.

SCHEDULE AND DELIVERY

FW have tentatively reserved shop space and have prepared a schedule for this equipment. This schedule is submitted for the Purchaser's use in planning for engineering and design cycle for this project. The schedule noted below will be covered into fixed calendar dates if FW are favored with an order for this equipment.

1.	Foundation loading information	2 weeks after order
2.	First issue of outline drawing	4 weeks after order
3.	Engineering drawing turn around	2 weeks
4.	Design freeze date	2 - 3 wks ARO for critical materials
5.	Critical material purchase	2 - 3 weeks after order
6.	Design freeze for connections	10 weeks after order
7.	Manufacturing cycle begins	30 weeks prior to shipment
8.	Final Shipment	41-43 weeks after order (first unit)

Foundation loading information date is the number of weeks FW will require to prepare the "not to exceed" loading information typically required for Purchaser to begin the civil works analysis.

First issue of outline drawing date is the number of weeks FW will require to prepare the initial outline drawing showing the overall condenser arrangement including foundation locations, exhaust neck arrangement and major connection locations for approval purposes.

The engineering drawing turn around cycle is the number of weeks allowed for the Purchaser to review and return drawings in order to provide an orderly process toward final drawing approval.

The design freeze date is the date that FW will proceed with the complete material ordering and begin to

prepare detailed shop manufacturing drawings. Purchaser related changes that effect the basic condenser configuration after this date will result in pricing and schedule changes.

The critical material date is the date when material critical to manufacture cycle is ordered, such as tubes, tubesheets and support plates. This date may coincide with the design freeze date or occur prior to the freeze date depending upon the nature of the material to be provided.

The design freeze for connections date is the latest date that FW will accept thermal design data and/or connection location information from the Purchaser. Changes of this nature that occur after the "design freeze date", may in some instances, effect the delivery schedule or not be incorporated into the condenser at the time of shipment and could result in connections being shipped loose for field installation.

The manufacturing cycle beginning is self-explanatory. At this point, FW expect to provide an uninterrupted flow of materials and labor towards the final product. Allowance will be made for inspection of the product in cycle as required by specification.

The final shipment date is the date that all "major" components will be loaded and ready for transportation. Truck shipments will be transported to the site or the Purchaser's requested FOB point. Components shipped by rail will be transported to the site or nearest rail siding if there is no rail spur directly to the site.

Schedule interruptions by Foster Wheeler. Should FW fall to provide the Purchaser with an orderly "on time" process of drawing approval and prevent the Purchaser from achieving final approval in a timely manner, FW will reschedule internally in order to meet Purchaser's delivery date at FW's expense.

Schedular interruptions by Purchaser. Should the Purchaser or his consultant fall to provide an "on time" process of drawing review and/or approval or fall to achieve final approval in a timely manner, the Company reserves the right to choose one of the following alternatives.

1. Delay shipment by rescheduling to extend the freeze date subject to Purchaser's approval. Additional engineering and labor escalation costs will be charged to Purchaser's account.

2. If shipment cannot be delayed, proceed with drawing details and material purchase while accommodating further revisions until final approval but not later than the manufacturing cycle beginning date. All costs of engineering, drawing revision, scheduling and material changes to Purchaser's account.

3. If shipment cannot be delayed and drawing beginning date approval extends beyond manufacturing cycle, the cost of all changes will be Purchaser's account, in addition, FW reserves the right to ship the parts affected loose for field installation and reimburse the Purchaser for the shop labor that would have been expended had the cycle run smoothly. All changes in this case means all engineering design material and manufacturing costs including overtime, if required to meet the shipping date.

FOSTER WHEELER

SUMMARY OF CONTRACTUAL PRINCIPLES

Seller's proposal is based upon the understanding that any order awarded shall be governed by Purchaser's General Conditions as modified by Seller's comments and exceptions which shall be incorporated into the purchase order.

Such comments and exceptions shall incorporate recognition of the following contractual principles:

- Recognition by both Purchaser and Owner (either directly or through Owner's Purchase Order to Purchaser) of Seller's absolute disclaimer of liability for consequential damages, whether such liability is based in contract or tort.
- Limitation of Seller's overall liabilities to a specific dollar amount.
- Limitation of Seller's liability for physical damage to Owner's property to a specific dollar amount and recognition by Owner of such limitation.
- Waiver of subrogation rights by Owner's insurers in Owner's direct damage and business interruption insurance.
- A disclaimer of implied warranties as to fitness for a particular purpose and merchantability.
- A stipulation that where the Purchaser has a remedy in the contract, it shall be exclusive.
- Adequate force majeure protection including reference to strikes.
- Agreement either that time is not of the essence of the agreement, or a limitation of liability for lateness when time is of the essence.
- Reasonable limits on any Seller indemnification obligations with respect to third party claims, commensurate with Seller's fault.

FOSTER WHEELER
ST. CATHARINES, ONTARIO

BASIS FOR SUPERVISORY SERVICES

To serve the best interests of the Purchaser and to facilitate installation or start-up in accordance with Manufacturer's recommendation for warranty purposes, Purchasers are urged to use available field supervisory services:

1. Upon receipt of order 30 days in advance of the date required, Foster Wheeler will furnish Construction Superintendent(s) to assist the Purchaser in the installation of equipment. Fourteen days written notice confirming starting date is required. The superintendent will act as a consultant or an advisor in the interpretation of drawings and specifications, will make recommendations, when requested, on methods of installation of the equipment. He will not be responsible for the procurement and direction of labour or quality of mechanical work performed by others.

2. Upon similar notice, Foster Wheeler will furnish Service Engineer(s) to advise and consult with the Purchaser or his representatives in the boiling out, starting up or operation of the equipment. Representatives of Foster Wheeler shall not be deemed licensed to operate the equipment, and shall not be expected to take the place of operators.

3. The Construction Superintendent or Service Engineer shall not be called upon to supervise the installation of brickwork, refractory setting or specialty equipment, but if required by similar notice in writing, Foster Wheeler shall provide the services and such Superintendent(s) who shall act as a consultant and advisor in the installation of same.

4. For the services of each Superintendent and/or Engineer as defined above, the Purchaser will pay to Foster Wheeler a per diem rate per working day and hourly rates for overtime in effect when service is rendered.

Personnel of Vendors shall be charged at actual Vendor's billing to Foster Wheeler plus a 10% handling fee.

The Purchaser shall also pay for all time consumed in travel from and to home office at a straight time hourly rate (i.e. daily rate divided by regular work hours per day as defined herein). Where travel and working time occur on the same day, overtime charges shall apply only where working time is beyond the normal working day. In addition to these rates, the Purchaser shall pay to Foster Wheeler all living and travelling expenses incurred by such personnel from the time of departure until return to home office, including all long distance communications. Such travel expenses shall include periodic return trips to Representative's home as permitted by prevailing policies. The working days and hours of above personnel shall be regular hours, and days per week in accordance with Foster Wheeler's current Field Union contract. No overtime shall be worked without written authority from the Purchaser, in which event overtime shall be paid for by the Purchaser at the hourly overtime rate shown herein. All rates are exclusive of sales, use or other tax on such services.

For guidance current rates are:	PER DIEM (Per working day)	OVERTIME (per hour)
	$1000.00	$187.00

Above rates are in US funds

5. The Purchaser is requested, when placing orders for services, to indicate to Foster Wheeler any special tools he may require Foster Wheeler to supply on a rental basis for the erection of the equipment. The rental for such tools will include the following:

a. All crating and shipping (including insurance where not covered by carrier) charges to and from the Purchaser's site.

b. Prevailing rental rate based on replacement value of all Foster Wheeler tools.

c. Total cost of any tools not returned in a usable condition.

d. Rental charges paid by Foster Wheeler on any local equipment plus 10%.

e. Any taxes or duties applicable to such rentals.

6. Foster Wheeler shall maintain, during performance of its work, General Liability Insurance with limits of $1,000,000 per occurrence/aggregate for bodily injury and property damage, combined single limit. Such General Liability Insurance shall include premises, operations, contractual liability, independent contractors and one year products/complete operation coverages.

In no event shall Foster Wheeler or its subcontractors be liable for any special, indirect, incidental or consequential damages, such as, but not limited to, loss of anticipated profits or revenue, loss of use of power system, non-operation or increased expense of operation of other equipment, cost of capital, cost of purchased or replacement power, or claims of customers of Purchaser for service interruptions, or for any expense not specifically enumerated in this contract, whether or not such damages or expenses are alleged to be due, in whole or in part, to negligence attributable to Foster Wheeler or its subcontractors.

If the Purchaser is not the Owner, Purchaser shall obtain Owner's agreement in favour of Foster Wheeler regarding such limits of remedies and liabilities or in lieu thereof indemnify Foster Wheeler for any claims in excess of such limits.

The remedies of the Purchaser set forth in this contract are exclusive.

7. Payment shall be made on presentation of invoices. Minimum charge shall be for one day's service.

BUDGET PRICE SUMMARY

Subject to the provisions of this Proposal, this Price Schedule applies to the equipment and/or services detailed in this Proposal which are offered on the following basis:

PRICE: EXW Point of manufacture

	CASE 1	CASE 2	CASE 3	CASE 4	CASE 5	CASE 6	
1. Condenser Price:	**$420,000**	**$470,000**	**$470,000**	**$440,000**	**$440,000**	**$470,000**	**$USD**
2. One set of Vacuum Pumps (Extra):		**$92,000**	**USD**				
3. Freight (Extra):		**$25,000**	**USD**				

Taxes and Duties: ALL taxes are EXTRA.

SPECIAL QUALIFICATIONS:

Price offered herein is based on full unqualified order release within the validity of this offer and there being no Purchaser related delays (such as substantial changes, late engineering decisions, late drawing approvals or inspections) or other delays beyond Foster Wheeler's control and acceptance of shipment when ready. In the event of any such delays, resultant added costs shall be for the Purchaser's account and scheduled shipment adjusted accordingly.

TERMS OF PAYMENT: Progress for zero financing

SCHEDULE: Shipment: 10 to 11 months after an award of order.

Dates offered are based on award within the validity date herein and are subject to prior sale of shop capacity and availability of regular mill materials and suitable railcar or transit vehicle.

VALIDITY: To be advised later with submittal of firm price proposal

EXECUTION OF CONTRACT:

This Proposal constitutes an offer to sell, and all previous promises, representations or understandings, whether oral or written, relative to the subject matter of this Proposal, are hereby abrogated. No terms and conditions other than those stated herein, and no agreement or understanding, oral or written, in any way purporting to modify these terms and conditions shall be binding on Foster Wheeler unless hereafter made in writing and signed by an officer of Foster Wheeler. Acceptance of the equipment sold hereunder shall constitute acceptance of these conditions.

This Proposal and any contract resulting therefrom will be construed in accordance with the laws of New Jersey. The Purchaser may not assign any of the rights or obligations under the resulting contract without Foster Wheeler's prior written consent. Any acceptance of the offer to sell contained herein is limited to acceptance of the express terms of such offer contained in this Proposal.

Submitted By: **FOSTER WHEELER LIMITED**

Tao Luan Proposal / Project Engineer

Bambrick, Shelley M.

From: tom.j.corscadden@power.alstom.com
Sent: Friday, October 05, 2001 6:38 PM
To: gmorrison@acres.com
Subject: Address

Importance: High

Hi George,

my e-mail is tom.j.corscadden@power.alstom.com, Telephone no. (403) 225-5540, cel (403) 862-3315, Fax (403) 278-9483,

Tom C

Bambrick, Shelley M.

From: tom.j.corscadden@power.alstom.com
Sent: Friday, October 05, 2001 7:23 PM
To: gmorrison@acres.com
Subject: Availability

George,

I have checked the current manufacturing scheudule for GT8C2, GT11N2, and
GT11NM. The next available engines for the 8C2 and 11NM are ex-works 15 months. The 11N2 is ex-works 4th quarter 2002 - roughly 15 months as well. This is of course, subject to prior sales.

Tom C

Bambrick, Shelley M.

From: tom.j.corscadden@power.alstom.com
Sent: Friday, October 05, 2001 7:59 PM
To: gmorrison@acres.com
Subject: GT 11NM Inspection recommendation

HTCT 690 476 Rev G Inspect. Re...

George,

attached below is the 11NM inspection recommendation:

(See attached file: HTCT 690 476 Rev G Inspect. Recommendation.pdf)

Regards,

Tom C

INSPECTION RECOMMENDATION

Service Intervals and Maintenance of Gas Turbine GT 11N / 11N1

Table of Contents

Chapter	Subject	Page	Rev.
1	**Recommended Inspection Procedure**	2	
1.1	Introduction	2	
1.1.1	Definitions	3	
1.2	Types of Inspections	3	
1.2.1	Short Inspection Type A	3	
1.2.2	Short Inspection Type B	4	
1.2.3	Large Inspection and Overhaul Type C	4	
1.3	Scheduling and Duration of Inspections	4	
1.3.1	Scheduling	4	
1.3.2	Duration	4	
1.4	Recommended Planning Procedure	5	
1.4.1	Inspections	5	
1.4.2	Rectification/Corrective Action	5	
1.4.3	Tools, Consumable- and Replacement Parts	6	
1.4.4	Performance Measurement	6	
1.4.5	Recommended Scheduling and Types of Inspections	6	
2	**Determination of Service Intervals Based on Actual Operation**	8	
2.1	Definitions of Expressions	8	
2.2	Equivalent Operating Hours Calculation	9	
3	**Attachments**		
	Attachment 1 : EOH Formular	10	
	Figure 1	11	
	Attachment 2 : Table 1	12	
	Table 2	13	
	Table 3	14	

1 RECOMMENDED INSPECTION PROCEDURE

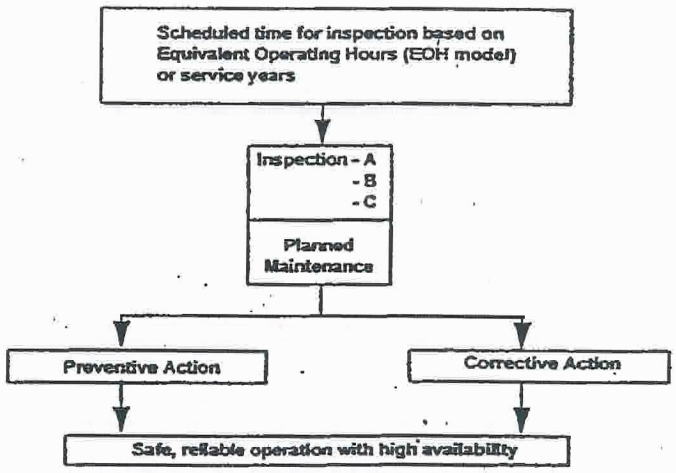
1.1 Introduction

The economy of operation of a gas turbine power plant is determined essentially not only by its thermal efficiency but also by the availability of the plant as a whole. Availability depends to a large extent on planned maintenance and on the amount of time required for that purpose.

Unplanned outages may give rise to corrective action thus reducing the available time of the power plant. Planned preventive maintenance reduces the risk, the frequency and duration of such unplanned outages.

The entire process of preventive maintenance has been optimized such that both, the work and the costs for planned maintenance and the risk of unplanned outages are kept at a minimum.

Inspection Methodology



Maintenance work can be optimised only if the following conditions are met:

Inspections are performed at the proper time
Inspections are performed on the right components

Inspections are therefore scheduled checks on the gas turbine set aimed at preventing, wherever possible, unplanned outages and assuring a long-term high availability of the plant.

Done at regular intervals they allow:

Accurate prediction of the rectification work required at overhaul
Prompt delivery of required material and replacement parts.

Arrangements for inspections and maintenance should be made sufficiently far in advance and in close cooperation between customer and ABB to enable proper planning of details, professional performance of inspection and corrective action, and thus a short down-time for the gas turbine set.

1.1.1 Definitions

Rectification

Any kind of rearrangement, recalibration, adjustment, replacement or repair of parts and settings of instrumentations. It may, as extended interpretation, also include improvements.

Inspection

In the first place it is the assessment of a condition that is found on parts and settings. It also includes decisions on further actions and rectification work. Some of the inspections may include tests and measurements.

1.2 Types of Inspections

There are three different types of inspections:

Short Inspection	Type A
Short Inspection	Type B
Large Inspection + Overhaul	Type C

The results of these inspections will be the basis for all planned maintenance and rectification jobs.

The types and the corresponding preventive work have been carefully selected on basis of experience gained to allow safe but extensive usage of all parts with limited service life.

The inspections are roughly defined as follows:

1.2.1 Short Inspection Type A
(see also Attachment 2 Table 1)

Short inspections type A are regularly scheduled checks on the gas turbine set, involving mainly the hot gas path parts in the gas turbine included boroscope inspection.

They are used for:

- early identification of changes in the condition of parts in the hot gas path
- initiation of rectification action as may be required
- checking on operation settings important for availability.
- obtaining an overall impression of the condition of the gas turbine unit

The unit is not disassembled for this purpose. Visual access to the blading is possible by boroscope openings and through the combustor and the exhaust gas diffuser inspection hatches.

1.2.2 Short Inspection Type B
(see also Attachment 2 Table 1)

This inspection is a check of the gas turbine set planned for intervals of an intermediate length. They include the same type of checks on more components than the type A inspection. It includes checking of:

- the safety equipment of the gas turbine set
- hydraulic and electronic closed-loop control systems and
- the open-loop controls and annunciation systems

1.2.3 Large Inspection and Overhaul Type C
(see also Attachment 2 Table 1)

The large inspection is planned well in advance and checks on all important components and all safety, control, and monitoring equipment of the gas turbine set. Subsequently, preventive rectification work (identified in previous inspections of types A and B) and corrective rectification work (based on the findings of these inspections) are carried out. The latter may require additional downtime. The casings are removed and the turbine rotor is exposed.

1.3 Scheduling and Duration of Inspections

1.3.1 Scheduling

The time frame for performing the next inspection is based on equivalent operating hours.

The intervals established between inspections are valid for normal operating conditions. If there are special situations with regard to ambient conditions,

mode of operation (i.e.: peak load, operation with VIGV), fuel, etc., it is essential to consider these factors in the determination of the inspection intervals.

1.3.2 Duration

(see also Attachment 2, Table 2)

The Duration of a gas turbine and generator inspection depends essentially on the following factors:

- type of machine
- type of inspection
- capacity of inspection staff
- crew qualification
- Inspection planning
- availability of tools, consumables, repair parts and crane

Duration is fixed during the planning of the inspections, in consultation with the user.

1.4 Recommended Planning Procedure

1.4.1 Inspections

Short inspections type A and type B are to be planned reasonably far in advance. It is, however, best to do them at times when there is a possibility to shut down the unit for other reasons than the gas turbo set. The time of such a shut-down, of course, should coincide fairly well with the time indicated in the inspection schedule.

To enable ABB to have the inspection staff ready, the client shall notify ABB's service department at least 4 weeks prior to a type A inspection, and 8 weeks prior to a type B inspection.

The large inspection type C has to be planned and prepared far in advance. For a type C inspection, the user shall contact the responsible ABB service department at least 8 months prior the aimed start of work.

1.4.2 Rectification/Corrective action

The scope and duration of this work is based on the findings from previous inspection and the most recent operating experience. The planned rectification work has to be done in coordination with the inspection work. During the inspection, additional repair work may also be carried out.

For the major inspection type C, we strongly recommend to:

Draw up a time/work program (system plan, bar diagram) for the entire inspection and work procedure. Remember that completing disassembly as soon as possible will allow maximum time for inspection and corrective actions. ABB can assist you with this planning.

Determine number of staff for such work based on the scheduled time/work program. This schedule should establish who supplies personnel (ABB, the power plant operating company or outside workers), what professional skills are required at what time and the working hours per day.

1.4.3 Tools, Consumables Parts and Spare Parts

During the inspection planning stage the required tools and consumables will be identified. ABB can also recommend what repair or replacement material is generally required for each individual inspection. Some of these materials are long lead items that should be ordered sufficiently far in advance to ensure they are on site before the inspection commences.

1.4.4 Performance Measurement

Determine the current condition of the gas turbine set immediately prior to the type C inspection by taking reference performance measurements (power output, heat rate, exhaust gas temperature, operating characteristics, etc.) Compare the measurements with the measurements in original condition. The results and the necessary actions should be discussed jointly by the user and ABB.

The same measurements shall be taken after completion of the overhaul work and will be compared with the measurements taken at commissioning. These results will form the reference point for the next type C inspection.

Bambrick, Shelley M.

From: tom.j.corscadden@power.alstom.com
Sent: Wednesday, October 31, 2001 8:24 PM
To: Morrison, George D.
Subject: Re: GT8C2

Hello George!

I have finally managed to pry some oil fired information for the GT 8C2 and basically for a 2 on 1 configuration indicative pricing would run about
105 Million US. The power island would run abour 65 Million US.

0 deg C, 35m asl performance,
net output = 183 MW
net Heatrate = 7224 BTU/kW-hr (LHV)

I apologise for the time that this took - currently the 8C2 is not released
for oil firing but, with the successful full load testing of the oil firing
system in Birr, we anticipate that the unit will be released for oil operation sometime in the second quarter of next year.

Regards,

Tom C

Bambrick, Shelley M.

From: tom.j.corscadden@power.alstom.com
Sent: Monday, October 29, 2001 2:24 PM
To: Morrison, George D.
Subject: Re: GT8C2 and 11N2

Hello George,

We generally quote US for North America since all of our basket of currencies are indexed to the US - we can quote in Euros if you would prefer. The 11N2 parts are supplied from europe, the US, and Japan. The
units are currently assembled in Japan at JGT. The 8C2 is generally supplied out of Europe and assembled in Germany.

Tom C

To: "'tom.j.corscadden@power.alstom.com'"
<tom.j.corscadden@power.alstom.com>
cc:
Subject: GT8C2 and 11N2

Tom, you have been quoting me US$ costs for both cases but for reasons of
future currency fluctuations would the Euro be more indicative of such trends than the US$? We dont have to be too exact here but client will from
time to time update the costs we present so rather than use US$ as the FOREX factor I thought that for the 8C2 the Euro would be more indicative.
Is 11N2 built in the US?

george

George D. Morrison, P.Eng.
Acres International
4342 Queen Street, P.O. Box 1001
Niagara Falls, Ontario, Canada L2E 6W1
Phone : 905 374-0701 extension 5239
Fax : 905 374-1157
E-mail:gmorrison@acres.com
Web Site: www.acres.com
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Bambrick, Shelley M.

From: tom.j.corscadden@power.alstom.com
Sent: Wednesday, October 17, 2001 2:16 PM
To: Morrison, George D.
Subject: RE: Holyrood

Hello George,

Regarding the Steam turbine pricing for the 11N2

The pricing for the 55 MW stg of 7.6 to 8.5 milion is based on recent equipment only, firm price offerings.

The estimate for power island pricing $7.3 million U.S. is based upon recent "budget" or "indicative" offerings for power islands.

You ar right in pointing out the spread in these prices. The steam turbine
for the 11N2 will be very close to 55 MW. The only explanations that I can
offer at this time is that the level of accuracy of the two data sources which I have used for this information (the lower was based on firm price
offerings, the higher or indicative offerings), and the inclusion in the steam turbine price of some of the costs for integration of the unit into
the power island. As we progress toward firm price offerings, we should
be able to rationalize these two.

Regards,

Tom C

To: "'tom.j.corscadden@power.alstom.com'"
<tom.j.corscadden@power.alstom.com>
cc:
Subject: RE: Holyrood

Tom,
Im still trying to rationalise the STG pricing you gave me. Your breakdown in your Oct 11 e-mail gave a price of US$7.3m (say Cdn$11m)for the 11N2 STG while other recent pricing for 55MW STGs was Cdn$7.6m and 8.5m
(refer your e-mail below)

Even allowing for scope differences I have difficulty with such a
large differential. Since this large disparity is ocurring with other STG
pricing I have I would greatly appreciate your thoughts on why there is such differences.I appreciate that an STG as part of a power block, will have margins that are higher due to performance risk etc than for an individual condensing steam turbine generator however not to the tune of 25% I would have thought.

What am I missing here?
George

> -----Original Message-----
> From: tom.j.corscadden@power.alstom.com
> [mailto:tom.j.corscadden@power.alstom.com]
> Sent: Friday, October 05, 2001 5:05 PM
> To: gmorrison@acres.com
> Cc: robert.w.haylor@power.alstom.com; martin.m.lenzin@power.alstom.com
> Subject: Holyrood
> Importance: Low
>
>
> Hello George,
>
> Sorry I missed you yesterday - it was not for lack of
> trying... I am not
> clear on the entire scope of information which you require, I
> suspect that
> you have let Alstom know this scope in the past but, if you could be a
> little patient with me I would like a recap so that I can
> check to make
> sure that we give you everything that you need.
>
> For the 11N2 and 11NM and GT8C2x2 on distillate

GT performance info: output, heat rate, water consumption, exhaust characteristics	
Combined cycle performance information: output, heat rate, water consumption, exhaust characteristics	
GT maintenance cycle information: timing and extent of each cycle of inspection, time off line, anticipated manpower, and parts replacement costs	
GT and combined cycle pricing	

>
>
>
> These are hte things that I have been rounding up - is there
> more that you
> need?
>
>
>
> Attached below please find maintenance information for the
> 11N2 and the
> GT8C - this includes the factors for operations on distillate
> fuels (1.5),
> the maintenance interval, manpower requrements. I am still inquiring
> regarding the anticipated costs of parts for each inspection.
>
> (See attached file: 11N2 maintenance.tif)(See attached file: GT8C2
> Maintenance.tif)
>
> I am waiting for the 11NM info.
>
> Also on your other inquiry regarding the pricing for a 55 MW

> steam turbine,
> based on recent qoutes and depending on specific steam turbine
> requirements, the price would be between 7.6 and 8.5 million
> CAD ex-works
> Sweden with transport costs estimated at roughly $250,000 CAD to site.
>
> I will get back to you with more tomorrow
>
> Regards,
>
> Tom
>
>
>
> _____
> _____
> _____
>
> CONFIDENTIALITY : This e-mail and any attachments are
> confidential and
> may be privileged. If you are not a named recipient, please
> notify the
> sender immediately and do not disclose the contents to
> another person, use
> it for any purpose or store or copy the information in any medium.
>

Bambrick, Shelley M.

From: tom.j.corscadden@power.alstom.com
Sent: Friday, October 12, 2001 8:56 PM
To: Morrison, George D.
Subject: Re: Holyrood

Hi George,

Yes, I believe that this is correct.

Tom C

To: "'tom.j.corscadden@power.alstom.com'" <tom.j.corscadden@power.alstom.com>
cc:
Subject: Holyrood

Tom, this maintenance cost info you sent you sent me on your Oct 9 e-mail indicates that cost of HGP parts and Alstom field assistance is US$215 per EOH. Does this cost include the time shown in Attachment 2 of the 11N2 Maintenance Recommendations as "ABB Personnel"?

George

George D. Morrison, P.Eng.
Acres International
4342 Queen Street, P.O. Box 1001
Niagara Falls, Ontario, Canada L2E 6W1
Phone : 905 374-0701 extension 5239
Fax : 905 374-1157
E-mail:gmorrison@acres.com
Web Site: www.acres.com

==========

Bambrick, Shelley M.

From: tom.j.corscadden@power.alstom.com
Sent: Thursday, October 11, 2001 8:28 PM
To: Morrison, George D.
Subject: RE: Holyrood

GT8C2 Maintenance.tif

11N2 maintenance.tif

George, I am attaching the maintenance recommendations again - I hope that
you get more than just the front page this time.

I am also working on the GT8C2 balance of information - hope to get it soon.

Tom C

(See attached file: GT8C2 Maintenance.tif)(See attached file: 11N2 maintenance.tif)

ABB

INSPECTION RECOMMENDATION

Maintenance Intervals for Gas Turbine Type GT8C2

Table of Contents

Chapter	Subject	Page
1.0	Recommended Inspections	2
1.1	Introduction	2
1.2	Types of Inspections	4
1.3	Scheduling of Inspections	5
1.4	Recommended Planning Procedure	5
2.0	Determination of Service Intervals with the EOH Concept	10
2.1	Definitions	10
2.2	Turbine Inlet Temperature	10
2.3	Equivalent Operating Hours Calculation	10
Annex 1	EOH Formula	
Annex 2	Short Description of Inspection Program	
Annex 3	Typical Manpower Requirements for Inspections	

ABB

ALSTOM

INSPECTION RECOMMENDATION

Service Intervals and Maintenance of Gas Turbine TYPE 11N2

Table of Contents

Chapter	Subject		Page	Rev.
1	**Recommended Inspection Procedure**		2	
1.1	Introduction		2	
1.1.1	Definitions		3	
1.2	Types of Inspections		3	
1.2.1	Short Inspection Type A		3	
1.2.2	Short Inspection Type B		4	
1.2.3	Large Inspection and Overhaul Type C		4	
1.3	Scheduling and Duration of Inspections		4	
1.3.1	Scheduling		4	
1.3.2	Duration		4	
1.4	Recommended Planning Procedure		5	
1.4.1	Inspections		5	
1.4.2	Rectification/Corrective Action		5	
1.4.3	Tools, Consumable- and Replacement Parts		6	
1.4.4	Performance Measurement		6	
1.4.5	Recommended Scheduling and Types of Inspections		6	
2	**Determination of Service Intervals Based on Actual Operation**		8	
2.1	Definitions of Expressions		8	
2.2	Equivalent Operating Hours Calculation		8	
	Attachment 1 :	EOH Formular	9	
		Explanation of EOH Formular	10	
		Figure 1 and Figure 2	11	
	Attachment 2 :	Table 1	12	
		Table 2	13	
		Table 3	14	

1.4.5 Recommended Scheduling and Types of Inspections

The scope of the inspection is based upon the number of equivalent operating hours EOH.

Time for Inspection as Function of EOH (Hours)	Type of Inspection		Time for Inspection as Function of In Service Years (Years)
	Fuel	Used	
	Gas	Oil	
4000	2)	A	2
8000	B	B	3
12000	2)	A	4
16000	A	C	5
20000	2)	A	6
24000	C	B	7
* *	*	*	8
* *	*	*	9
* *	*	*	10
* *	*	*	11
* *	*	*	12
* * 1)	* 1)	*	13

1) Repetition of EOH sequence and type of inspection.
2) Inspection of hot gas casing only

The quantitative result of the EOH calculation (see Attachment 1) considers limitations on the lifetime of parts and that there are some operational events that cause more undue stress to components than others.

For gas turbines with longer standstill periods, the recommendation "Protection of gas turbine installations during Periods Standstill" HTCT 690 086 E" should be considered.

Careful planning (spares, manpower, timing) based on the inspection results is recommended and the determination of EOH can help to define the appropriate time frame between inspections. In each case the individual operating conditions must be calculated and considered. For assistance, contact the local ABB office. They will assist your planning personnel in defining the influence of site conditions and the results of prior inspections.

The sequence and type of inspections are valid for normal operating conditions and for the time up to first C-Inspection. After this time the effects of local conditions (ambient conditions, mode of operation, fuel, etc.) are known and the intervals may be adjusted (made longer or shorter) to suit those conditions.

Therefore the times for further inspections (**), their sequence, and the type of Inspection (*) will be determined based on cumulated operating experience after reaching the first C-Inspection.

Phased Inspection. The inspection intervals and downtime to complete the inspections are basic recommendations only. During the course of a year many opportunities present themselves to complete certain inspection tasks. Generally, turbines are shutdown several times in a calendar year to accomplish tasks on other plant equipment or economics justify a shutdown. With proper planning many of the type A and B inspection tasks can be accomplished during these periods. Phased inspections have been very successful with many of our customers and have resulted in inspection downtimes equivalent to one inspection per year regardless of EOH. Phased inspections are generally site and equipment specific. The major inspection tasks are broken down into a series of smaller tasks and accomplished when the unit is available. ABB will be happy to assist the customer with phased inspection planning.

2 Determination of Service Intervals Based on Actual Operation

2.1 Definitions on Expressions

Quick Start

Faster start than a normal start gradient. This is achieved with a stronger starting device.

Fast Loading

Faster loading than a normal loading gradient. The fast load ramp is typically 11% / minute.

Emergency Loading

Faster loading than a normal gradient loading (also quicker than a fast loading). The Emergency loading ramp is typically about 20% / minute.

Protective Load Shedding

Protective load shedding is a fast deloading (about 50% load / minute) for events which do not require an immediate trip for the safety of the unit.

Sudden Load Change

Quick changes in load (MW or % / s) that occur in severe transients such as sudden loadings, load rejections and trips. The counter for sudden load changes therefore includes all faster actions.

All of these parameters are lumped together and referred to as "Quick Starts and Quick Loadings".

2.2 Equivalent Operating Hours Calculation

Definition and calculation procedure of "EOH" acc. to Attachment 1

number of equivalent hours in operation	=	Σ OH * X
number of equivalent hours for starts	=	S * V
number of equivalent hours for quick loadings	=	Σ QL * W

3 ATTACHMENTS

Attachment 1

Not used

(information contained in Scope Book document)

Attachment 1

(cont.)

FACTORS FOR EOH-DETERMINATION OF RECOMMENDED INSPECTION INTERVALS

Not used

(information contained in Scope Book document)

Attachment 2

Table 1: Short Description of Inspection Programme

Inspection Type Object/System		A Specific Checks		B Specific checks in addition to A		C Specific checks in addition to B
Gas turbine						opening turbine
air inlet system	x		x		x	
bleed valve system					x	
compressor	x	inlet	x	inlet	x	blading
burner	x	flame	x	burner/nozzle	x	burner/nozzle
ignition system	x	function	x	igniter	x	igniter
combustion chamber	x		x		x	combustion
turbine	x	hot section	x	hot section	x	blading/vane carrier/cooling
exhaust gas system	x		x	boroscope	x	channels
Generator + accessories						
generator			x		x	
generator aux. system					x	
exitation			x		x	
starting device					x	
Bearings						
gearing/aux. gearing					x	
bearing, thrust bearing					x	
Auxiliary systems						
lube oil	x		x	coolers	x	checking pumps
cooling water	x	leakage	x	system	x	motors
cooling/sealing air	x		x	function check	x	coolers
AC/DC supply					x	
batteries					x	
Fuel systems						
fuel oil	x		x		x	checking
fuel gas	x	leakage	x	system check	x	pumps, motors
additive	x		x		x	actuators
Controls						
temperature control	x		x		x	
other turbine controls			x		x	
Protection/Monitoring						
temperature protection	x		x			
overspeed protection	x		x			
flame monitor	x		x			
turbine protection					x	
generator protection					x	
indicator, meas. instr.					x	
recorder					x	
fire protection systems			x		x	
fire fighting systems					x	

Attachment 2

Table 2: Typical Duration and Work time Requirements for Inspections of Gas Turbine and Generator for 11N / 11N1

Below figures are only valid for:

- no delays
- highly qualified crew
- parts, tools and consumables on site
- no downtime because of crane unavailability
- inspections performed according to ABB recommended intervals

Inspection type	A	B	C	
Duration				
Cool Down Time 1)	10 hours	10 hours	18 hours	
Total Standstill Time approx.. Work Time Model 1 2)	45 hours 1.9 days	70 hours 2.9 days	372 hours 15.5 days	
Standstill Time Model 2 3)	40 hours 1.7 days	60 hours 2.5 days	323 hours 13.5 days	
Work time requirements for personnel according to Table 3			1. C, 3. C-, 5.C-,..... Inspection	2. C-, 4. C-, 6 C- ..... Inspection
Man hours (MH) for ABB-personnel	20	70	585	515
Man hours (MH for non-ABB-personnel	60	140	1830	1730
Typical Total man hours (MH) for ABB and non-ABB-personnel	80	210	2415	2245

1) with forced cooling
2) 6 working days per week; 2 shifts; 10 hours per shift
3) 7 working days per week; 2 shifts; 10 hours per shift

Attachment 2

Table 3: Recommended Qualification and Quantity of Shifts for Inspections of Gas Turbine and Generator for GT11N / 11N1

Inspection type	A	B	1.C-, 3.C-, 5.C, Inspection	2.C-, 4.C-, 6.C-, Inspection
ABB Personnel (Shifts)				
- Chief Mechanical Erector	1*2	1*3	2*13	2*13
- Blade Fitter		—	2*4.5	2*4.5
- Field Mechanic		1*1	1*4.5	1*4.5
- Inspection Engineer GT		—	1*2	1*2
- Commissioning Engineer GT		1*3	1*5	1*5
- Chief Erector Generator		—	1*10	1*5
- Inspection Eng. Generator		—	1*2	—
Customer Personnel (Shifts)				
- Mechanic	1*2	2*3	2*19	2*19
- Helper	2*2	2*3	5*22	5*22
- Welder		1*1	2*4.5	2*4.5
- Electrician		1*1	1*6	1*6
- Fitter for Insulation		—	2*3,5	2*3.5
- Helper for Generator Inspection		—	2*10	2*5
Number of Personnel				
- Total ABB Personnel	1	3	9	8
- Total Customer Personnel	3	6	19	19
Total Personnel	4	9	28	27

Above figures are for:

- inspection
- exchange of parts or repairs as necessary
- cleaning
- reassembly

2*13 means 2 people on 13 shifts each.

Bambrick, Shelley M.

From: tom.j.corscadden@power.alstom.com
Sent: Thursday, October 11, 2001 2:16 PM
To: Morrison, George D.
Subject: RE: Holyrood

Hi George,

The steam turbine generator is roughly $7.3 million U.S. (it is close to
50 MW).
The condenser is estimated at close to $2 million U.S. due to the use of seawater I believe.
The DCS to combine and integrate the control of the GT, HRSG, and ST is roughly $0.5 million U.S.
The MV switchgear, static starting device, and synchronization equipment is
estimated to cost $2.4 million U.S.
Project management and engineering to specify and purchase and integrate the equipment is roughly $3 million U.S.

I hope that this helps to rationalize our numbers. If you have other questions, please call me.

Tom C

To: "'tom.j.corscadden@power.alstom.com'" <tom.j.corscadden@power.alstom.com>
cc: "Gill, Bob J." <rjgill@acres.com>
Subject: RE: Holyrood

Tom,
Thanks for this.
I need your help to rationalise your "power block" costs since the individual costs I have come up with dont come close (enough)to your 11N2
total of US$50.5.

On Sept 13 over the phone you gave me US$25m for the CTG supply. To
that we have the STG US$5m, the HRSG US$10m, the condenser <US$1m. This totals US$41million. Of the other scope items you state as included in your
$50.5 total I reckon that only MV swgr, condensate pumps and transport would be extra to "my numbers". If I add US$2m for transport, US$0.5 to cover the condensate pumps and the MV swgr, this makes my total come to US$43.5 million. Still US$7m short of your figure. I would appreciate Alstom comments to help me sort this out.

Are you going to give me the power block costs for the 8C2 in a 2:1
combined cycle? You gave the 11NM cost but we had not included that option
in this study.

Would greatly appreciate a fast response on this matter.

Regards,
George

> -----Original Message-----
> From: tom.j.corscadden@power.alstom.com
> [mailto:tom.j.corscadden@power.alstom.com]
> Sent: Tuesday, October 09, 2001 3:12 PM
> To: Gmorrison@acres.com
> Subject: Holyrood
>
>
> George,
>
> Attached below is some basic information that I hope will
> help you to fill
> out your feasibility study for Holyrood. Please take a look
> at it and if
> you have questions, please call me back. I expect that you will need
> additional information and if you could identify that quickly
> I will get
> the requests into the pipeline.
>
> Firstly, for the configuration with one GT 11NM:
>
> Indicative pricing for a Power Island = $45.9 million USD.
> Scope includes: Gas Turbine, Generator, Enclosure, Steam Turbine,
> Generator, Enclosure, HRSG, Condenser, Condenser Pumps, MV
> Switchgear,
> Static Starting Device, Gas Turbine and Steam Turbine
> Contrlo systems,
> Stack Monitoring Package, Gas and Steam Turbine fire fighting,
> Transportation, and internal Alstom project managment.
> Specifically this price does not include erection and commissioning
> manpower.
> Combined Cycle Performance for 0C, 3.35 m elevation firing No. 2
> Distillate with water injection for NOX abatement to 42
> ppm based on
> LHV:
> Net Output = 157 MW
> Net Efficiency = 42.5%
> Attached below are correction curves for output and
> efficiency for the
> range of ambient temperatures.
> To estimate the lifecycle maintenance costs, indicative "Equivalent
> Operating Hour Costs" for an 11NM are about $220 US/EOH
> for hot gas path
> parts or, $245 US/EOH for GT hot gas path parts and technical field
> assistance.
>
> Secondly, for the configuration with on GT 11N2:
>
> Indicative pricing for a Power Island = $50.5 million USD.
> Scope includes: Gas Turbine, Generator, Enclosure, Steam Turbine,
> Generator, Enclosure, HRSG, Condenser, Condenser Pumps, MV
> Switchgear,
> Static Starting Device, Gas Turbine and Steam Turbine
> Contrlo systems,
> Stack Monitoring Package, Gas and Steam Turbine fire fighting,
> Transportation, and internal Alstom project managment.
> Specifically this price does not include erection and commissioning
> manpower.
> Combined Cycle Performance for 0C, 3.35 m elevation firing No. 2
> Distillate with water injection for NOX abatement to 42
> ppm based on
> LHV:

> Net Output = 182 MW
> Net Efficiency = 43.9%
> Attached below are correction curves for output and efficiency for the
> range of ambient temperatures. (note the curves are applicable for both
> the 11N@ or 11NM).
> To estimate the lifecycle maintenance costs, indicative "Equivalent Operating Hour Costs" for an 11NM are about $190 US/EOH for hot gas path
> parts or, $215 US/EOH for GT hot gas path parts and technical field assistance.
>
> (See attached file: Perform-characteristic Power.pdf)(See attached file:
> Perform-characteristic Efficiency.pdf)
>
> I hope that this information helps to fill in the gaps in your feasibility
> study.
>
>
> Kind Regards,
>
> Tom Corscadden
> _____
> _____
> _____
>
> CONFIDENTIALITY : This e-mail and any attachments are confidential and
> may be privileged. If you are not a named recipient, please notify the
> sender immediately and do not disclose the contents to another person, use
> it for any purpose or store or copy the information in any medium.
>

Bambrick, Shelley M.

From: tom.j.corscadden@power.alstom.com
Sent: Wednesday, October 10, 2001 4:10 PM
To: Morrison, George D.
Subject: RE: Holyrood

Hi George,

I just checked - the steam turbine price does not include supervision and
spare parts - Supervision of erection and commissioning would run between
300 and 400 thousand and spare parts is difficult to assess because each
operator has a different opinion of what is needed for spare parts so our
historical data varies widley.

Tom C

To: "'tom.j.corscadden@power.alstom.com'" <tom.j.corscadden@power.alstom.com>
cc:
Subject: RE: Holyrood

Tom,
Me again. Would you say that these STG prices included supervision
of erection and spare parts?
George

> -----Original Message-----
> From: tom.j.corscadden@power.alstom.com
> [mailto:tom.j.corscadden@power.alstom.com]
> Sent: Friday, October 05, 2001 5:05 PM
> To: gmorrison@acres.com
> Cc: robert.w.haylor@power.alstom.com; martin.m.lenzin@power.alstom.com
> Subject: Holyrood
> Importance: Low
>
>
> Hello George,
>
> Sorry I missed you yesterday - it was not for lack of
> trying... I am not
> clear on the entire scope of information which you require, I
> suspect that
> you have let Alstom know this scope in the past but, if you could be a
> little patient with me I would like a recap so that I can
> check to make
> sure that we give you everything that you need.
>
> For the 11N2 and 11NM and GT8C2x2 on distillate
> |-------------------------------+-------------------------|
> |GT performance info: output, | |
> |heat rate, water consumption, | |

> |exhaust characteristics | |
> |---|---|
> |Combined cycle performance information: output, heat rate, water consumption, exhaust characteristics | |
> |GT maintenance cycle information: timing and extent of each cycle of inspection, time off line, anticipated manpower, and parts replacement costs | |
> |GT and combined cycle pricing | |
>
>
>
> These are hte things that I have been rounding up - is there
> more that you
> need?
>
>
>
> Attached below please find maintenance information for the
> 11N2 and the
> GT8C - this includes the factors for operations on distillate
> fuels (1.5),
> the maintenance interval, manpower requrements. I am still inquiring
> regarding the anticipated costs of parts for each inspection.
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> (See attached file: 11N2 maintenance.tif)(See attached file: GT8C2
> Maintenance.tif)
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> I am waiting for the 11NM info.
>
> Also on your other inquiry regarding the pricing for a 55 MW
> steam turbine,
> based on recent qoutes and depending on specific steam turbine
> requirements, the price would be between 7.6 and 8.5 million
> CAD ex-works
> Sweden with transport costs estimated at roughly $250,000 CAD to site.
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> I will get back to you with more tomorrow
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> Regards,
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> Tom
>
>
>
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> it for any purpose or store or copy the information in any medium.
>

Bambrick, Shelley M.

From: tom.j.corscadden@power.alstom.com
Sent: Wednesday, October 10, 2001 4:11 PM
To: Morrison, George D.
Subject: RE: Holyrood

Hi George - the entire file is included - if you use adobe and just
print
it, it whould print all of the pages. Call me if you have difficulty.

Tom C

To: "'tom.j.corscadden@power.alstom.com'"
<tom.j.corscadden@power.alstom.com>
cc:
Subject: RE: Holyrood

Tom,
From your message I believe your intention was to send the
entire
file for both machines and not just the Table of Contents which was all
I
found in both files. Please advise.

George

> -----Original Message-----
> From: tom.j.corscadden@power.alstom.com
> [mailto:tom.j.corscadden@power.alstom.com]
> Sent: Friday, October 05, 2001 5:05 PM
> To: gmorrison@acres.com
> Cc: robert.w.haylor@power.alstom.com; martin.m.lenzin@power.alstom.com
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> Importance: Low
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Combined cycle performance information: output, heat rate, water consumption, exhaust characteristics	

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> |GT maintenance cycle | |
> |information: timing and extent | |
> |of each cycle of inspection, | |
> |time off line, anticipated | |
> |manpower, and parts replacement | |
> |costs | |
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> it for any purpose or store or copy the information in any medium.
>

Bambrick, Shelley M.

From: tom.j.corscadden@power.alstom.com
Sent: Tuesday, October 09, 2001 4:42 PM
To: Gmorrison@acres.com
Subject: Holyrood


Perform-characteristic Power.p...


Perform-characteristic Efficie...

George,

Attached below is some basic information that I hope will help you to fill
out your feasibility study for Holyrood. Please take a look at it and if
you have questions, please call me back. I expect that you will need additional information and if you could identify that quickly I will get the requests into the pipeline.

Firstly, for the configuration with one GT 11NM:

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Net Efficiency = 42.5%
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To estimate the lifecycle maintenance costs, indicative "Equivalent Operating Hour Costs" for an 11NM are about $220 US/EOH for hot gas path
parts or, $245 US/EOH for GT hot gas path parts and technical field assistance.

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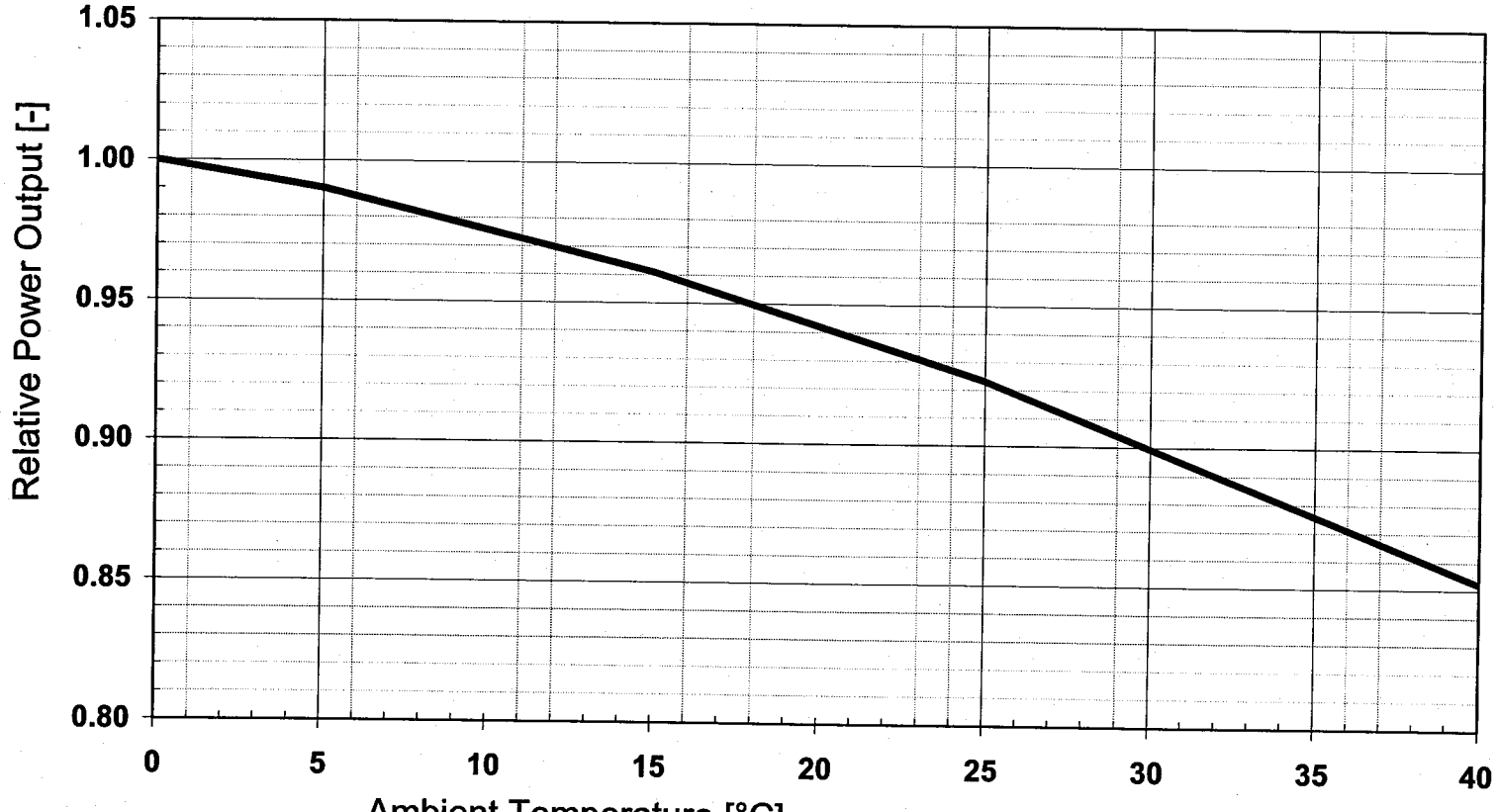
(See attached file: Perform-characteristic Power.pdf)(See attached file: Perform-characteristic Efficiency.pdf)

I hope that this information helps to fill in the gaps in your feasibility study.

Kind Regards,

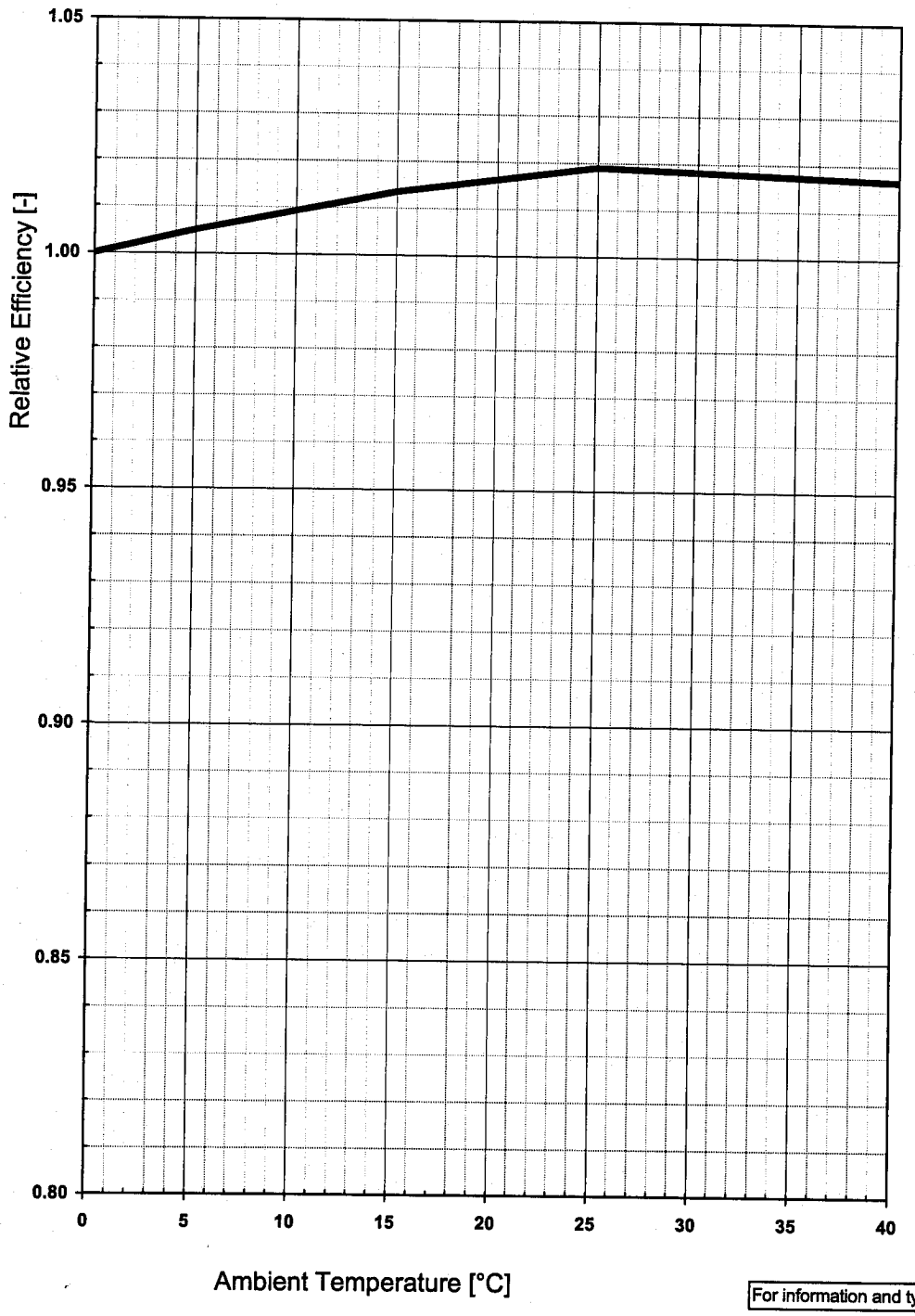
Tom Corscadden

Relative Power Output vs. Ambient Temperature



For information and typical only !

Relative Efficiency vs. Ambient Temperature



For information and typical only !

Bambrick, Shelley M.

From: tom.j.corscadden@power.alstom.com
Sent: Friday, October 05, 2001 6:35 PM
To: gmorrison@acres.com
Cc: robert.w.haylor@power.alstom.com; martin.m.lenzin@power.alstom.com
Subject: Holyrood

Importance: Low

11N2 maintenance.tif

GT8C2 Maintenance.tif

Hello George,

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GT performance info: output, heat rate, water consumption, exhaust characteristics	
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GT maintenance cycle information: timing and extent of each cycle of inspection, time off line, anticipated manpower, and parts replacement costs	
GT and combined cycle pricing	

These are hte things that I have been rounding up - is there more that you need?

Attached below please find maintenance information for the 11N2 and the GT8C - this includes the factors for operations on distillate fuels (1.5), the maintenance interval, manpower requrements. I am still inquiring regarding the anticipated costs of parts for each inspection.

(See attached file: 11N2 maintenance.tif)(See attached file: GT8C2 Maintenance.tif)

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Also on your other inquiry regarding the pricing for a 55 MW steam turbine,
based on recent qoutes and depending on specific steam turbine requirements, the price would be between 7.6 and 8.5 million CAD ex-works
Sweden with transport costs estimated at roughly $250,000 CAD to site.

I will get back to you with more tomorrow

Regards,

Tom

ALSTOM

INSPECTION RECOMMENDATION

Service Intervals and Maintenance of Gas Turbine TYPE 11N2

Table of Contents

Chapter	Subject	Page	Rev.
1	**Recommended Inspection Procedure**	2	
1.1	Introduction	2	
1.1.1	Definitions	3	
1.2	Types of Inspections	3	
1.2.1	Short Inspection Type A	3	
1.2.2	Short Inspection Type B	4	
1.2.3	Large Inspection and Overhaul Type C	4	
1.3	Scheduling and Duration of Inspections	4	
1.3.1	Scheduling	4	
1.3.2	Duration	4	
1.4	Recommended Planning Procedure	5	
1.4.1	Inspections	5	
1.4.2	Rectification/Corrective Action	5	
1.4.3	Tools, Consumable- and Replacement Parts	6	
1.4.4	Performance Measurement	6	
1.4.5	Recommended Scheduling and Types of Inspections	6	
2	**Determination of Service Intervals Based on Actual Operation**	8	
2.1	Definitions of Expressions	8	
2.2	Equivalent Operating Hours Calculation	8	
	Attachment 1 : EOH Formular	9	
	Explanation of EOH Formular	10	
	Figure 1 and Figure 2	11	
	Attachment 2 : Table 1	12	
	Table 2	13	
	Table 3	14	

ABB

INSPECTION RECOMMENDATION

Maintenance Intervals for Gas Turbine Type GT8C2

Table of Contents

Chapter	Subject	Page
1.0	Recommended Inspections	2
1.1	Introduction	2
1.2	Types of Inspections	4
1.3	Scheduling of Inspections	5
1.4	Recommended Planning Procedure	5
2.0	Determination of Service Intervals with the EOH Concept	10
2.1	Definitions	10
2.2	Turbine Inlet Temperature	10
2.3	Equivalent Operating Hours Calculation	10
Annex 1	EOH Formula	
Annex 2	Short Description of Inspection Program	
Annex 3	Typical Manpower Requirements for Inspections	

ABB

GE

Bambrick, Shelley M.

From: john.welch@ps.ge.com
Sent: Wednesday, September 19, 2001 3:55 PM
To: GMorrison@Acres.com
Subject: RE: S206B and S107EA Pricing

Okay. Looks like I've been caught.

You're right that there would be essentially no difference between the SGTs, so I can't justify the price differential. I should have delved into the pricing a little deeper. The prices that I received of $30 million and $31.5 for the S107EA and the S206B reflect averages over several recent transactions. The average for the S206B has a recent high price (for the 6Bs) included which has skewed things a bit, so in trying to bring the 6B pricing in line with my last e-mail; I neglected to adjust the total for the S206B. Since this is budgetary, you would probably be safe in assuming the same price for the S107EA and the S206B - use $30 million each. (US dollars).

John

-----Original Message-----
From: Morrison, George D. [mailto:GMorrison@Acres.com]
Sent: Wednesday, September 19, 2001 11:01 AM
To: Welch, John C (PS, Sales)
Subject: RE: S206B and S107EA Pricing

John,
Another question. Based on what youve said below. The STG for the 6B would be US$6.5. Since the STG capacity in each case, according to our GTPro results, is not significantly different (within about 1MW) can you say why the cost should be so much apart (8 vs 6.5m)? Both are non-reheat. Would 1500psi vs say 700psi at the throttle make that kind of difference? There is no reason that I know of to compare different steam conditions for these two cases. This being a low load factor application there would be less justification for spending more on the turbine to gain the efficiency margin offered by the higher steam conditions.
George

-----Original Message-----
From: john.welch@ps.ge.com [mailto:john.welch@ps.ge.com]
Sent: Monday, September 17, 2001 5:07 PM
To: GMorrison@Acres.com
Cc: BFleming@Acres.com
Subject: RE: S206B and S107EA Pricing

George:

These are equipment only, budgetary prices for the gas turbines and steam turbines. In the case of the 7EA, I have assumed that the gas turbine would have a price of $22 million (US) with $8 million for the STG. For the S206B, each 6B gas turbine would each be approximately $12.5 million with the STG making up the difference. I did not include the HRSG in the GE scope.

John

-----Original Message-----
From: Morrison, George D. [mailto:GMorrison@Acres.com]
Sent: Monday, September 17, 2001 4:19 PM

To: Welch, John C (PS, Sales)
Cc: Fleming, Brian
Subject: RE: S206B and S107EA Pricing

John,

Could you clarify the scope included in these prices. At first glance I assumed it was the major CC equipment (CTG/HRSG/STG) but it does not add up for me. Even CTG alone does not make sense in the 7EA case unless pricing has jumped dramatically recently. Please advise

George

> -----Original Message-----
> From: john.welch@ps.ge.com [mailto:john.welch@ps.ge.com]
> Sent: Tuesday, September 04, 2001 1:52 PM
> To: gmorrison@acres.com
> Subject: S206B and S107EA Pricing
>
>
>
> George:
>
> Sorry for the delay. Budgetary prices for the combined cycle
> facilities are
> as follows:
>
> S206B $31.5 million (US)
> S107EA $30 million (US)
>
> These numbers are included:
> DLN gas only
> Canadian stds
> Std warranty
> delivery to port of import Canada
> duties into Canada
> TA Services
>
> > g_____
> > GE Power Systems
> >
> > John C. Welch
> > Account Manager
> > 2300 Meadowvale Blvd., C12
> > Mississauga, Ontario L5N 5P9
> >
> > *: (905) 858-5314 (DC 250-5314)
> > Fax: (905) 858-5390 (DC 250-5390)
> >
> >
>

Bambrick, Shelley M.

From: john.welch@ps.ge.com
Sent: Monday, September 17, 2001 6:37 PM
To: GMorrison@Acres.com
Cc: BFleming@Acres.com
Subject: RE: S206B and S107EA Pricing

George:

These are equipment only, budgetary prices for the gas turbines and steam turbines. In the case of the 7EA, I have assumed that the gas turbine would have a price of $22 million (US) with $8 million for the STG. For the S206B, each 6B gas turbine would each be approximately $12.5 million with the STG making up the difference. I did not include the HRSG in the GE scope.

John

-----Original Message-----
From: Morrison, George D. [mailto:GMorrison@Acres.com]
Sent: Monday, September 17, 2001 4:19 PM
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>> Fax: (905) 858-5390 (DC 250-5390)
>>
>>
>

Bambrick, Shelley M.

From: john.welch@ps.ge.com
Sent: Thursday, September 06, 2001 5:29 PM
To: GMorrison@Acres.com
Subject: RE: S206B and S107EA Pricing

Sorry, again. If the units are to be fired on distillate, and only distillate, then we would probably use the Multi-Nozzle Quiet Combustors (MNQC) with water injection. When burning distillate we can only guarantee 42 ppm using water injection to meet the NOx levels. This is cheaper than the DLN system (a deduct of approx. $250,000 US per unit)

If the units were to be dual fuel then DLN combustors could be used. The units could meet 25 ppm NOx on natural gas, but when burning distillate we still would have to use water injection to achieve a minimum of 42 ppm NOx. A dual fuel system adds approximately $1.3 million to the price of either engine.

At this point, 6B shipments would occur about 12 months after order. The 7EA has a longer lead time, presently a unit ordered now would have shipment in mid-2003 (July or August) but this is subject to prior sale, so it will definitely be a different picture as of 2Q02. Steam turbine lead time is about 13 months from order to shipment.

I do have layout drawings that I will send to you. I can get the heat balances diagrams pulled together for the site conditions. Let me know the elevation and likely guarantee temp. & rel. humidity and I'll get a CC run pulled together for both cases.

Regards.

John

-----Original Message-----
From: Morrison, George D. [mailto:GMorrison@Acres.com]
Sent: Tuesday, September 04, 2001 2:09 PM
To: Welch, John C (PS, Sales)
Subject: RE: S206B and S107EA Pricing

John,

Thanks.

Holyrood would be distillate oil-fired. What cost impact does that have? We would want proven technology so if that were DLN oil burners fine but if not we would be looking at uncontrolled NOx with oil. What is status of DLN oil combusters?

Other information needed is:

- HB diagrams for 206B and 107EA
- Deliveries (GT & CC) based on order 2nd Qtr 2002.
- Outline diagrams showing footprint for power block.

George

> -----Original Message-----
> From: john.welch@ps.ge.com [mailto:john.welch@ps.ge.com]
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Bambrick, Shelley M.

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Subject: S206B and S107EA Pricing

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S206B $31.5 million (US)
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