

Holyrood Condition Assessment Technical Conference

October 13, 2011

Boundless Energy



Safety – Thermal Generation



Identifying and reporting safe/unsafe observations and taking action is critical to preventing incidents, injuries and fatalities.

THERMAL GENERATION SAFETY SCORECARD				
2011 Actual			Performance	Target
September	YTD		2010	2011
0	1	Lost Time + Medical Treatment Incidents	0	0
0.00	1.31	All Injury Frequency Rate (AIFR)	0.00	≤ 1.0
0.00	0.00	Lost Time Injury Frequency Rate (LTIFR)	0.00	≤ 0.3
32:0	593:1	Leading/Lagging Indicator Ratio	500:0	450:1

Outline

- Context
- HTGS Management
- AMEC terms of reference
- Other related activities
- Asset grouping and key components
- Condition Assessment: Capital Investment

Context

- Holyrood went in service in 1970
 - Unit 1: 1970
 - Unit 2: 1971
 - Unit 3: 1980
- Fossil Power Plant Life Expectancy:
 - 30 Years: Financial
 - 40 years: Technical
 - 210,000 hours
- 490 MW capacity
 - Three steam turbine units

Context

- Uses No. 6 low sulphur fuel oil
 - Latest forecast 2012 fuel consumption of 1,822,819 bbls
- Fuel is burned in boilers to create high pressure, high temperature steam to turn steam turbine generators
- Only major generating source east of Bay d'Espoir

System Map: Island/Avalon



Hydro's Island Demand (MW's)

Year	Total Island	Avalon
2011(actual)	1292	686
2012 (f/cast)	1400	750
2017 (f/cast)	1540	860
2022 (f/cast)	1620	900

Current Avalon Generation (MW's)

Holyrood	466
GT's	60
Wind	27
Total	553



Context

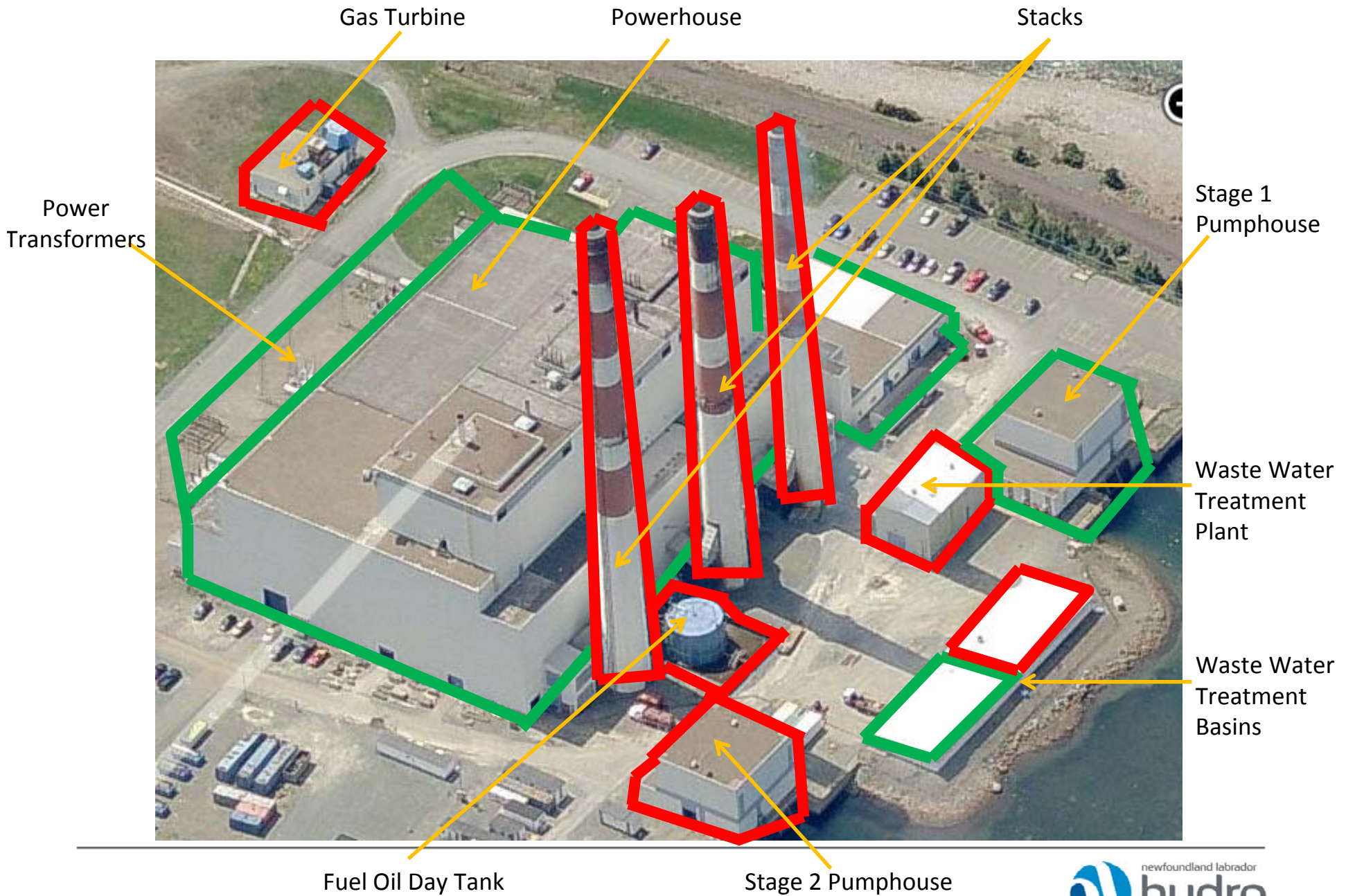
- Align to Hydro's long term asset management strategy
- Holyrood's long term future is highly dependent upon whether Muskrat Falls receives sanction
- If sanctioned, the Labrador Interconnection will result in a change in operating mode for the plant starting in 2017
 - Commencing in 2017, the facility will be a synchronous condenser plant and provide backup generation through 2020
 - Systems required for synchronous condenser will be required for the indefinite future

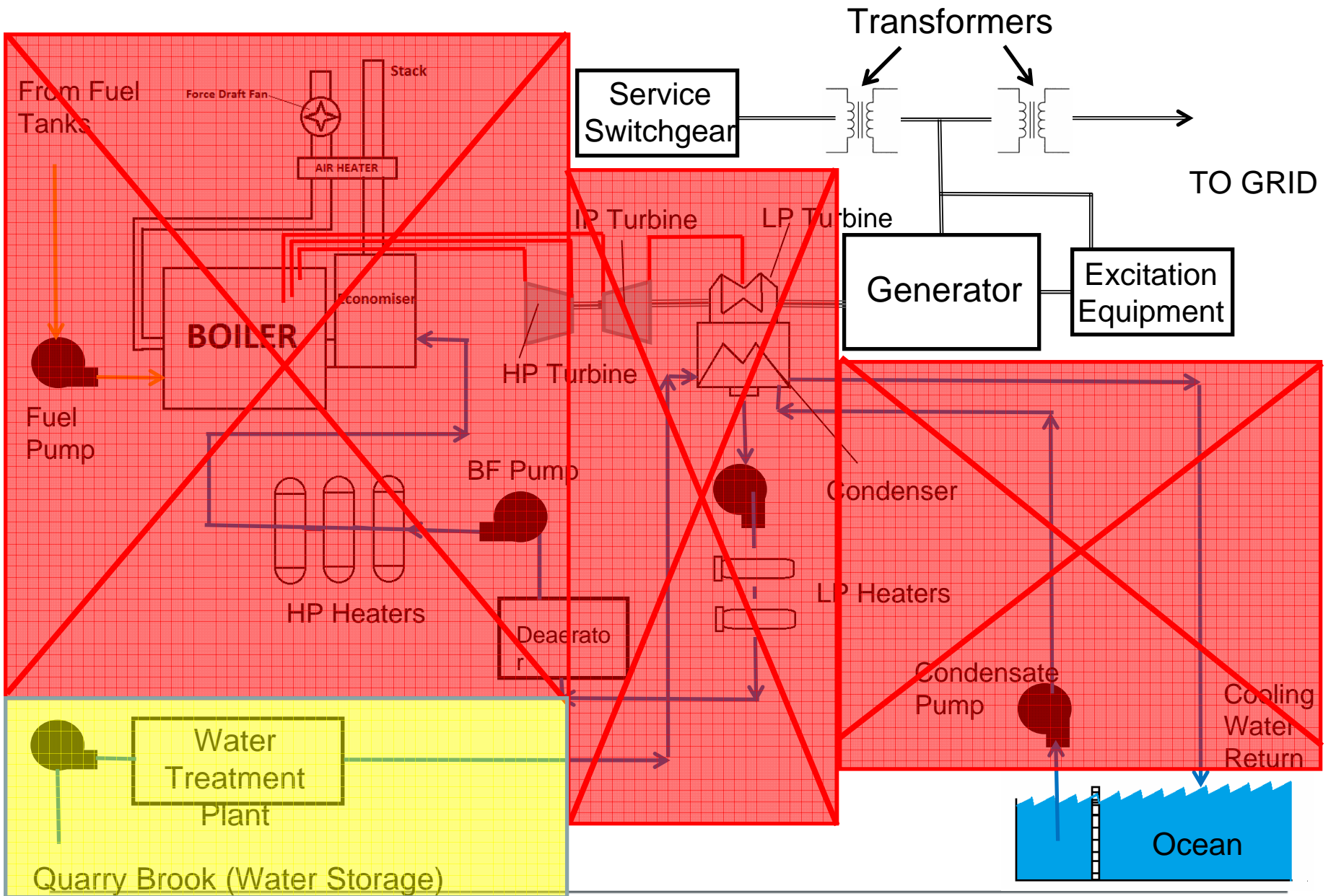
Context

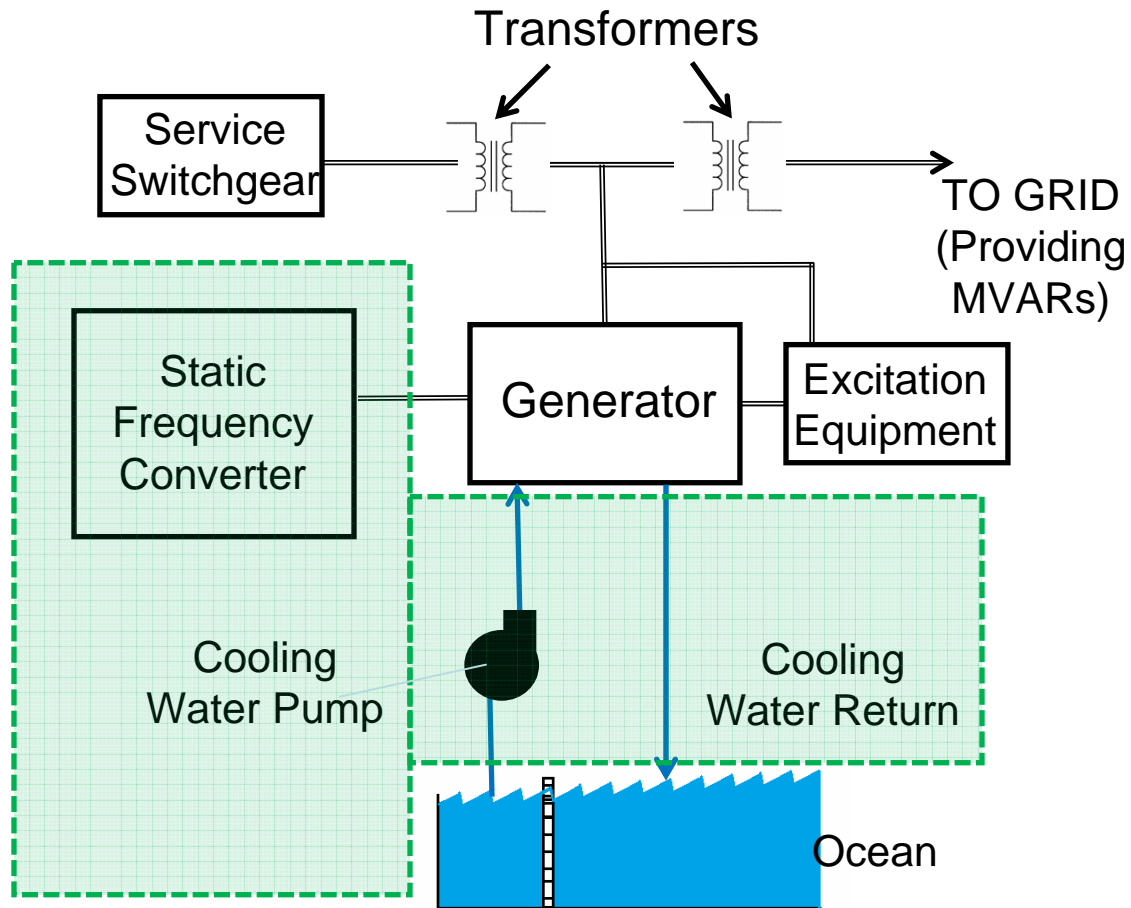
- If Muskrat Falls is not sanctioned, reliance on the plant will continue to increase (Isolated Island scenario)
 - Plant will provide generation and transmission support well into the future
- Under the Labrador Interconnected and Isolated Island scenarios, Holyrood will provide significant generation until at least 2016
- Under both scenarios, Holyrood will have to be able to provide reliable generation until at least 2020



-  Existing through 2020
-  De-commissioned after 2020







Additional Equipment for Synchronous Condenser Operation

Asset Management

	<u>Capital</u>	<u>OM&A</u>	<u>System Equipment</u>	<u>Staff</u>
Existing Through 2016	\$15 - \$20M	\$20M	100%	108
2017-2020	\$12 - \$15M	\$14M*	67%	72*
Beyond 2020	\$8 - \$10M	\$7M	33%	38

* Under Review

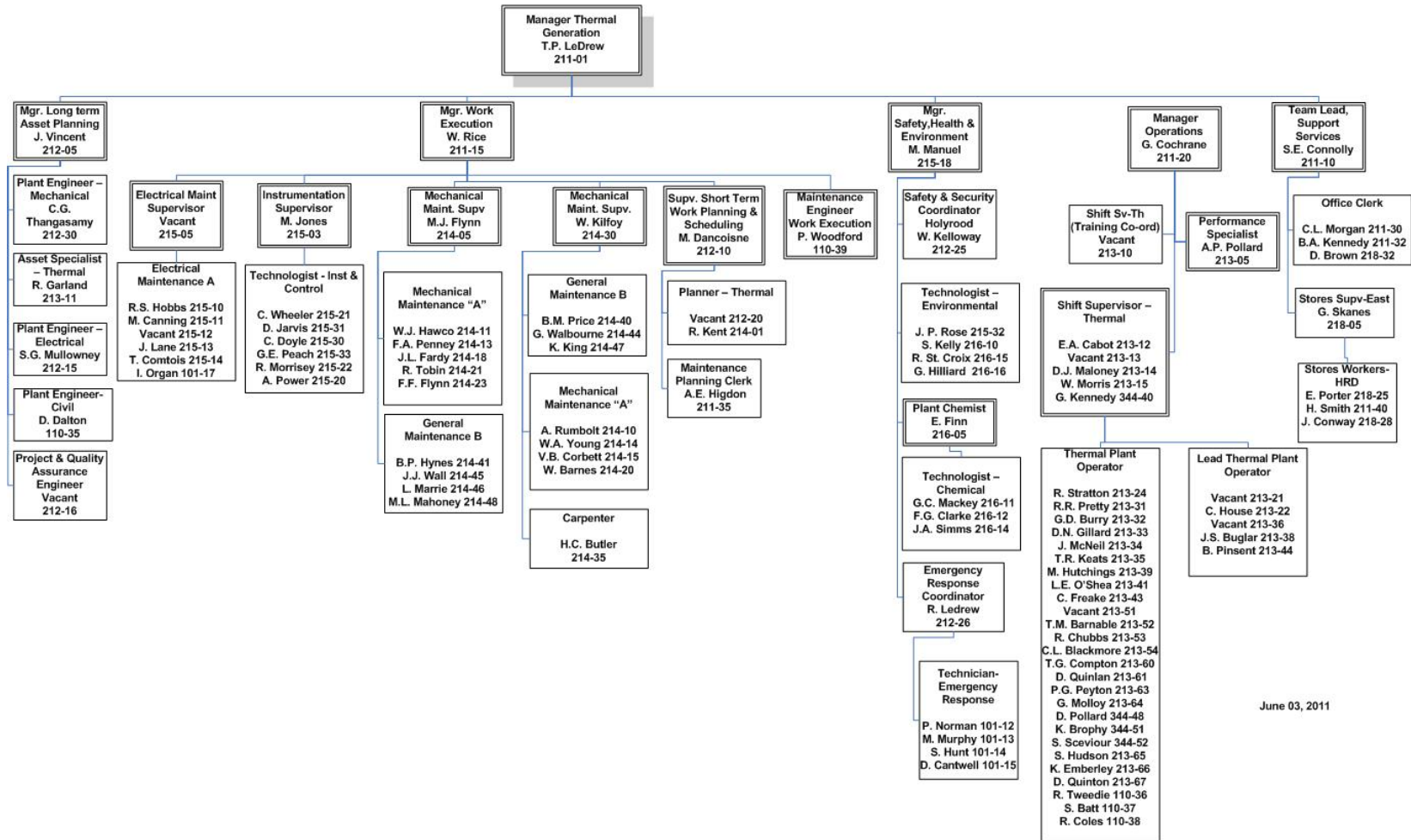
Notes:

1. 2011 Dollars.
2. The five year capital plan is undergoing a substantive review.
3. A substantial engineering review is scheduled for 2014 with a view to re-purposing the station for synchronous condenser operation.

Thermal Organizational Chart

Generation Operations
Thermal Plant Operations

E3



June 03, 2011

HTGS Management

- Terry LeDrew – Manager, Thermal Generation
 - Joined Hydro 1992
 - Professional Engineer; Mechanical (MUN 1988)
 - Experience:
 - 1999 - Present: HTGS Manager
 - 1992 - 1999: HTGS Various Positions
 - 1988 - 1992: Ontario Hydro; Station Engineer (Lambton)

- Jeff Vincent – Manager, Long Term Asset Planning
 - Joined Hydro 1993
 - Professional Engineer; Electrical (MUN 1992)
 - Experience:
 - 2008 – Present: HTGS Manager, Long Term Asset Planning
 - 2005 - 2008: HTGS Labour Manager
 - 1993 - 2005: NL Hydro – Protection & Control Engineer

HTGS Management cont'd

- Wayne Rice – Manager, Work Execution
 - Joined Hydro 1987
 - Professional Engineer; Mechanical (MUN 1981)
 - Masters of Engineering; Environmental (MUN 2000)
 - Experience:
 - 2002 - Present: HTGS Manager, Work Execution
 - 1987- 2002: NL Hydro – Project Engineer
 - 1984 - 1987: Subsea Engineering - Drilling Engineer
 - 1981 - 1984: Nova Pipeline - Project Engineer
- Mike Manuel - Manager, Safety Health & Environment
 - Joined Hydro 2009
 - Bachelor of Science; Chemistry (MUN 1992)
 - Experience:
 - 2009 – Present: HTGS Manager, Safety Health and Environment
 - 1995 - 2009: NARL – Various Positions, Senior Production Planner
 - 1992 - 1995: MUN – Inorganic Research

HTGS Management cont'd

- Gerard Cochrane – Manager, Operations
 - Joined Hydro 1987
 - 1st Class Power Engineer; (CONA 1988)
 - Certificate of Business Administration; (MUN 1993)
 - Experience:
 - 2009 - Present: HTGS Manager, Operations
 - 2002 - 2009: HTGS – Operations Specialist / Training Coordinator
 - 1987 - 2002: HTGS – Plant Operator / Shift Supervisor
 - 1985 - 1987: IOC - Operator

- Steve Connolly – Team Lead, Support Services
 - Joined Hydro 2006
 - Bachelor of Commerce (MUN 2006)
 - Certified Management Accountant / Accounting Diploma (CONA 1989 / 1984)
 - Experience:
 - 2006 – Present: HTGS Team Lead, Support Services
 - 1999 - 2004: XWAVE Solutions – Financial Accountant
 - 1988 - 1999: Paragon Information Systems – Manager, Finance & Administration

AMEC Terms of Reference

- Engaged to conduct Phase 1 of a Condition Assessment & Life Extension Study of HTGS based on EPRI Standard:

Assess the station condition and to identify future work required to meet the service expectations based upon the Labrador Interconnection scenario.

AMEC Terms of Reference

- **Scope:**
 - Review existing maintenance / inspections information;
 - Review equipment maintenance with Operational Staff;
 - Perform independent visual walk-down inspections;
 - Develop assessments for equipment including:
 - equipment condition;
 - action plans;
 - technical & safety risk;
 - life cycle status;
 - level 2 inspection requirements; and
 - capital investment timing

Other Related Activities

- Marine Terminal:
 - Hatch was engaged to conduct the condition assessment exercise because of their past experience and expertise
- Gas Turbine:
 - During the station condition assessment it was recognized that the gas turbine required advanced condition assessment
 - Report being drafted

Asset Groupings/Key Components

- Groupings broken down into two main areas:
 - Facilities required for power production through 2020
 - Facilities required for synchronous condenser operation - indefinite

Asset Groupings/Key Components

Power Production

- Marine Terminal;
- Fuel oil transfer piping and storage;
- Boilers;
- Stacks;
- Steam turbines;
- Water Treatment Plant (partial);
- Waste Water Treatment Plant (partial);
- Gas Turbine;
- Emissions

Asset Groupings/Key Components

Assets for Synchronous Condenser Plant

- Generators
- Hydrogen Cooling Systems;
- Start-up Systems (Static Frequency Converters);
- Excitation Equipment & Electrical Distribution;
- Auxiliary Boiler and Station Heating;
- Emergency Diesels, Batteries, Compressed Air, Fire Protection;
- Lube Oil Systems, Cooling Water Systems;
- Buildings, Site Services, Lighting, HVAC;
- Power Transformers / Switchyard;

AMEC Report: Capital Investment

- Incorporate results into capital plans
 - 2012 Capital Budget
 - Five year plan (under review)

Phase 2 Capital Plan

2012

HRD - Replace Programmable Logic Controllers WWTP
HRD - Upgrade Electrical Equipment
HRD - Replace Steam Seal Regulator Unit 2
HRD - Upgrade Hydrogen System
HRD - Upgrade Synchronous Condenser Unit 3
HRD - Replace Relay Panels Unit 3
HRD - Upgrade Forced Draft Fan Ductwork Unit 2
HRD - Upgrade Stack Breaching Unit 2
HRD - Install Plant Operator Training Simulator
HRD - Upgrade Fuel Oil Heat Tracing
HRD - Upgrade Marine Terminal
HRD - Rewind Generator Units 1 and 2
HRD - Replace Beta Attenuation Monitoring Analyzers
HRD - Complete Condition Assessment - Phase 2
HRD - Unit 1 Major Overhaul
HRD - Upgrade Stack Breaching Unit 1 (2011)
HRD - Refurbish Fuel Storage Facility (Tank #3 - 2011)

Green: Projects for Operation Beyond 2020

Human Resources Challenges

- Employee Liaison Advisory Committee
- Recruitment
- Retention
- Operator Training Simulator

Questions?