

# Hydraulic Plant Life Interest Group

The highly competitive environment in which hydro-electric utilities find themselves places increased emphasis on the need for reduction of both capital investments for equipment and parts replacement, as well as outage time for equipment repair and maintenance.

Return on investment will be protected and enhanced in part by supply side efficiency improvements such as:

- the refurbishment of old, inefficient units resulting in new high efficiency turbines and generators
- the improvement of intake, flow passage and tailrace hydraulics
- the development of better tools and procedures for measuring actual improvements achieved with planned initiatives

Further reduction of capital outlay and the production of low cost energy will require the development of improved maintenance and repair techniques. These techniques will use processes and materials that can extend the life of equipment, procedures that can speed the repair process to reduce outage times and equipment diagnostics and monitoring that can optimize "just in time" maintenance.

## Topics & Issues

Intakes/spillways and all manner of generating facility structures and equipment

Plant modernization guidelines and methods

Diagnostics and monitoring of equipment and structures

O & M cost reduction techniques and experiences

Turbine and generator development studies

Plant personnel policies

Risk management



## Technology Coordinator



**Mr. Alastair Wilson** has over 35 years of experience in the operation and maintenance of hydro-electric generating stations. During his career with Ontario Hydro he was responsible for a wide range of technical and asset management work programs including mechanical maintenance, electrical maintenance, water management, the upgrading of turbine generators, development of diagnostic monitoring, performance tests, a reliability outage system and automation of remote plants. As the director of business support for the hydro-electric group, he took charge of business and life cycle planning, as well as benchmarking performance assessment. In the area of environment, he was responsible for implementing due diligence and compliance reporting and obtaining ISO 14000 for OPGI's hydro-electric stations.



## Projects/Technology Reviews

for a complete listing, please visit: [www.ceati.com/hplig](http://www.ceati.com/hplig)

### Hydropower Technology

- Component Surface Deterioration Performance
- On-Line Cavitation Monitoring
- Detrimental Thermal Cycle
- Vibration Analysis - Force and Amplitude Relationship
- Dissection, Condition Assessment and Analysis of Failed and Unfailed Aged Stator Windings taken from Hydrogenerators
- Head Gate and Spill Gate Bushings Wear Assessment
- Turbine/Generator Shaft Stress Analysis - Methods and Limitations
- ASME PTC 18 Short Converging Flow Project: Kootenay Canal Comparative Flow Tests
- Thermography Criteria - Setting of Temperature Limits
- Remote Condition Monitoring

### Capital and Maintenance Investment

- Life Cycle Management of Hydro Assets
- Inspection and Maintenance of Station Lifting Equipment
- Best Practices – Bushings and Seals
- Brush Gear Maintenance
- Condition Assessment and Removal Techniques for Protective Coatings

### Maintenance Programming

- Hydroelectric Plant Fire Protection Best Practices
- Optimum Timing for Generator Rewinds
- Hydro Plant Debris Management
- Reliability Study: Identification of Hydro Performance and Production Problems including Effects of Start-Stop Operations
- Head Gate and Spill Gate Maintenance and Testing
- Head Gate Testing Protocols
- hydroAMP Program Management

### Work Force Productivity

- Update of the Hydroelectric Turbine Generator Erection and Alignment Guide
- Fire and Fire Protection Lessons Learned and Study of Hydroelectric Fire Probabilities & Fire Risk Assessment
- Best Practices in Hydro Plant Maintenance Safety Management
- Mechanical Overhaul Guide for Hydroelectric Turbine Generators
- Best Practice Guide for Planning and Executing Hydro Overhaul and Retrofit Projects/Optimization of Rehabilitation
- Training for Hydro Plant Staff (Including Web Based Approaches)
- Development of a Learning & Reference Tool to Improve Awareness & Understanding of Hydraulic Phenomena

### Environmental Performance

- Dissolved Oxygen Monitoring - Technologies Applicable to Hydraulic Generating Stations
- Quantifying the Non-Energy Benefits of Hydropower
- Replacement of Petroleum Based Turbine Oils in Hydropower Plants with Water Based Oils

### Regulatory Affairs

- Technical Operating and Test Requirements for Hydro Units Operating in a Deregulated Market

## Workshops

- Vibration and Balancing Workshop (2008)
- Lube Oil Workshop (2009)
- Hydro Governor Training Workshop (2009)
- Hydro Plant and Equipment Reliability Workshop (2009)
- Learning from International Experience-Best Practices, Incidents and Failures - Improving the Operational Reliability of Flow Control Equipment for Dams and Hydropower Stations (2011)



## Annual Activities

2-3 Meetings

1-2 Workshops

5-7 Conference Calls

Weekly Information Exchange

## Participation is open to:

Hydro-Electric Utilities

Independent Power Producers

Agencies that possess hydro-electric generating facilities

## Project Reports

Over the years more than 1500 projects have been completed and published in the fields of:

### Generation; Transmission Distribution; Utilization

For a complete listing, please consult our website.

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