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YUKON ENEF
CORPORATI
P.O. Box 5920
WHITEHORSE
YUKON Y1A 5L
(867) 393-5300

FAXED 4 11 06

April 11, 2006

YUKON UTILITIES BOARD		
EXHIBIT B-25		
DAY	ENTERED BY YEC	DATE Nov 16/06

Ms. Wendy Shanks
Acting Chair
Yukon Utilities Board
19-1114 First Avenue
Whitehorse, Yukon Y1A 1A3

Dear Ms. Shanks,

RE: January 29, 2006 Outage Response and Reliability Plans

In response to the Yukon Utilities Board ("YUB") letter dated March 2, 2006, this submission contains the information as requested regarding the January 29, 2006 power outage on the Whitehorse-Aishihik-Faro (WAF) electrical grid in terms of emergency response and longer-term power reliability plans.

This submission contains the three questions asked by the Board and the utility's response.

1. ***Outline the circumstances that caused the January 29, 2006 outage (a) and how YEC responded to this emergency (b) the likelihood for the event recurring (c) and what emergency plans YEC has in place for such an event (d). Outline what other system vulnerabilities are present and how they are being addressed, such as a potential fire at either the Aishihik plant or Whitehorse diesel plant (e).***

   a. On January 29 at approximately 13:34 the outgoing feeder at the underground Aishihik powerhouse tripped off due to a differential over-current fault on Aishihik outgoing feeder cables. The trip of the outgoing feeder also caused Aishihik unit 2 to trip off on over-speed. This resulted with the loss of both Aishihik units which, at that time, were supplying 49% of the total WAF generation as shown in the table below:

Generating Unit	Output in MW's	Output in %
Whse. Hydro Unit 4	18.2	37.1
Aish. Hydro Unit 1	11.9	24.3
Aish. Hydro Unit 2	11.9	24.3
Whse. Hydro Unit 3	7.0	14.3
WAF grid total	49.0	100.0

The resulting loss of generation resulted with a Whitehorse area blackout within seconds (WH3 remained on line until 14:03, energizing the 138kV system, with

those customers fed directly from the transmission through PT sub's i.e. Mendenhall and Deep Creek). The cause of the fault at the Aishihik Plant was determined to be a short in one of the cables running from the underground powerhouse to the surface substation. There are nine cables, three cables per phase running from the underground powerhouse to the substation. One of the cables on A-phase suffered a catastrophic insulation failure that also damaged one of the B-phase cables that was adjacent to it. There is no alternate route for power from Aishihik station to be delivered to the transmission system other than through these cables.

b. The following sequence of events describes the outage and subsequent restorative and other actions taken by Yukon Energy in response to this emergency. A more complete review of Yukon Energy's secondary sales management during this period has been provided to the Board in Yukon Energy's March 13, 2006 filing in response to the YUB's letter of February 23, 2006 regarding a Utilities Consumers' Group complaint. For any additional information with respect to the restoration of power within the Whitehorse distribution system the Yukon Electrical Company Limited should be consulted as they have the operational responsibility for that system.

- 13:34 Jan. 29- Aishihik Hydro Plant separated from the 138 kV transmission system. AH1 remained on line feeding Haines Junction until 14:06. The plant was generating approximately 49% of the system generation at the time of the event.
- 13:34 - As a result of the lost generation from Aishihik Hydro Plant the remaining system generation (Whitehorse Hydro Units 3 and 4) were unable to carry the load. As a consequence Whitehorse distribution 34 kV primary feeder breakers trip due to under-frequency and under-voltage conditions.
- 13:34 - WH4 tripped due to over-speed.
- 13:40 - The Takhini switching station reactor tripped due to an over-current fault condition.
- 138 kV transmission line to Aishihik and Faro remained in service, being supplied by WH3.
- 13:42 – local Whitehorse system restoration was started. Restoration of Whitehorse was initiated using Whitehorse Hydro units 1 & 2 and local Whitehorse diesel. Aishihik Hydro Units 1 & 2, Takhini reactor and Whitehorse Hydro Unit 4 were unavailable due to trip conditions requiring further investigation. Whitehorse Diesel Units 1, 2, 3, 4, 6, 7 were available. WD5 was unavailable as it was out-of –service for maintenance.
- 13:44 - Faro and Ross River power was restored using local Faro diesel. Carmacks, Ross River, Haines Junction, and Teslin have their own local diesel owned by YECL.
- 14:03 - WH3 tripped and the head-gate closed.
- 14:06 - AH1, feeding Haines Junction, tripped off.
- Restoring the Whitehorse distribution system is slowed down due to the smaller size of available hydro units limiting their ability to pick up larger

blocks of loads. YECL was advised to sectionalize the Whitehorse distribution system into smaller loads of up to 2 MW's. This was acknowledged and done.

- Around 15:00, Yukon Energy contacted YECL specifically to request that they immediately contact all non-SCADA secondary sales customers and notify then that the 24-hour notice period for disconnection was being triggered and also, due to the current grid emergency, that if their secondary power systems were off, requested that they leave them off, or if they had turned them back on, requested that they shut them off. In addition, YECL was requested to contact the one SCADA-customer to remain off. YECL has informed us that these actions did take place that afternoon.
- 16:19 - WH4 was returned to service, which considerably increased the generation capacity and stability of the system.
- 17:13 - Full re-connection from the 138 kV transmission system and the 34 kV Whitehorse distribution was completed. Full restoration of power to all Whitehorse area distribution customers took several more hours by YECL.
- 22:21 - The Takhini reactor was re-energized followed by the transmission line to Faro at 22:26.
- Jan 30 - The cause of the Aishihik breakdown was found to be a faulty cable (1 of 9 cables, 3 per phase) that runs from the switchgear down stairs in the plant to the substation above.
- 7:00 Jan 31- The faulty cable was disconnected and the plant was synchronized to the system. However the plant output was de-rated to 19 MW due to restricted current carrying capacity of the remaining cables.
- 11:00 - Jan 31 – All WAF diesel was shut down.
- At approximately 15:00 on February 6, Yukon Energy notified YECL of the ability to allow reconnection of the one SCADA secondary sales customer (at that point, all WAF diesel generation had been off for 6 days, on-going availability of hydro generation was forecast and consequently Yukon Energy was able to offer limited availability of secondary power).
- At 11:00 on February 8, Yukon Energy notified YECL of the availability of secondary sales for the purpose of reconnecting the remainder of the Secondary Energy customers (by that time the system no longer faced any material risks with respect to the possible need for diesel generation within the next 7 day period.
- Feb 21 – Aishihik cabling was tested for current imbalance and the plant capacity rating was restored to 30 MW.

c. In addressing the likelihood for the event recurring, it is important to note that loss of any one or more generating units on WAF can cause a grid blackout when such individual generating units are supplying between 14 % and 37 % of the total grid generation (as was occurring on January 29, during the winter season). At times of lower grid loads, such as the summertime, often the grid is being supplied by only one or two hydro units. Loss of one or more such units under the

conditions currently applicable on WAF therefore will almost always cause a grid blackout as there is no interconnection with a larger grid thus no potential to import power when it is needed. The probability of an unplanned loss of any one such hydro generating unit is assessed in system capacity planning studies, and (as demonstrated by system experience) is very low; system capacity planning also addresses the availability of other units to restore quickly the grid loads.

The specific event that occurred on January 29th involved failure of a cable connecting the Aishihik generating units with the transmission system. Absent proper remedy to ensure redundancy with regard to this cable connection, the specific event could well occur again. Prior to this event, Yukon Energy had recently adopted revised capacity planning criteria which had noted the need to address Aishihik-related transmission connection reliability, including the need to be able to deal with continuing supply to residential and commercial retail customers in the event of an emergency of this type in future.

The duration of the outage was longer than anticipated due to the loss of multiple generating units that caused the outage and the failure of some generating units to contribute during the restoration. This required modification to the standard blackout restoration plan listed in section d. below. This modification to the plan required utilization of smaller hydro units (WH1,2 instead of AH1, 2 and/or WH4) to bring up load which required more sectionalization of the distribution into smaller loads.

Work is presently underway by Yukon Energy to improve governor response on the Whitehorse Hydro and Diesel units to improve their load pickup capability that will shorten restoration times by reducing the need to sectionalize distribution loads. Discussions are presently underway with YECL to assess what, if any, improvements can be made by both utilities to shorten the restoration periods and to ensure affected customers can obtain more timely information on the extent and expected duration of major disturbances. Improvements under consideration include remote visibility and control of primary distribution breakers from the System Control Center, improved load shedding of distribution load to match loss of generation.

d. The following restoration steps are followed in a normal system disturbance by Yukon Energy's System Control Center (SCC) using its computerized supervisory control and data acquisition (SCADA) system.

- SCC will stabilize the system frequency and voltage if the grid is not in a total blackout situation.
- In a grid blackout SCC will begin restoring power by restarting the larger hydro units, typically Whitehorse Unit 4 and the Aishihik Hydro units.
- Utilizing the SCADA system, SCC will identify which transmission/distribution system breakers have operated and/or the generating unit(s) that have tripped.

- SCC contacts YECL (if the event is on the WAF system) and informs them of the distribution feeders affected and any requirement to sectionalize the load (i.e. breaking up the load into smaller blocks). Sectionalizing the load is dependent on specific feeder loading and the season / temperature i.e. winter.
- SCC contacts the appropriate on-call YEC maintenance staff and prioritizes their activities.
- With the loss of any hydro generation in Whitehorse the operator is also required to spill water to maintain safe operating levels on Schwatka Lake as well as meeting the minimum down stream flow requirements on the Yukon River.
- If the original generation prior to the disturbance remained on line, SCC will, at the direction of YECL, re-close any effected feeder breakers.
- If the cause of the disturbance is a loss of generation SCC will replace the lost output with backup units. Units that have tripped off line may, depending on the cause, be placed back to service and used during the restoration.
- The SCC, in conjunction with YECL service staff (on WAF), restores the system as quickly as possible by utilizing all available generation include diesel. On WAF, YECL prioritizes the order in which distribution customers are restored. The restoration process can and does work around the cause of the disturbances. If there are lines down the other feeders will be restored, if a generator failed others will be used until the repairs have been completed.

e. Loss of multiple generating units or transmission line components remain a vulnerability to the WAF grid, in particular to the Whitehorse area as this is the area of the grid that has had significant growth in both energy sales and local demand since the shutdown of the Faro mine in 1998.

The reasons that the WAF grid is currently vulnerable include the fact that:

- the electrical grid is isolated with no interconnection for backup power,
- it involves (for sound economic reasons) typically radial transmission lines with no alternative transmission routes, and lastly,
- due to small grid loads, it can often be supplied with very few generating units thus making loss of even one generating unit problematic at times and loss of multiple units almost always causing a grid blackout.

The matter of system vulnerabilities and plans to address such capacity planning requirements has been addressed in recent years by various studies. Following these studies, as reviewed below in response to question 2, Yukon Energy has adopted a revised generation capacity planning criteria to address system vulnerabilities (particularly as regards radial transmission connection to the Aishihik generation) and to reduce the duration of major outages and blackouts and the potential for brown-out situations to occur.

With respect to specific vulnerabilities of facilities such as the Whitehorse Diesel Plant, reduction of the vulnerabilities is addressed as part of the Corporation's specific facility corrective action plans listed in Appendix 1 to this letter. See also the response to YUB Question #2. The specific vulnerabilities of the Aishihik plant which led to the January 29th emergency are also addressed in this appendix and the installation of a redundant cabling system from the underground powerhouse to the surface substation has been advanced from 2009 to 2007. The existing 7 cables remaining in the plant are being replaced before the end of June this year with 9 new cables.

With reference to BC Hydro's comments (at page 4-2 of its May 2004 Condition Assessment report) on the low maintenance costs observed on WAF generating units in 2002 and 2003 relative to industry experience, the Corporation notes that major overhauls are amortized in its accounts and thus do not show up in the Corporation's maintenance budgets as reviewed by BC Hydro. Major overhauls are done on hydro units every 10 years. Diesel unit major overhauls are also amortized and thus do not show up as "overhauls" in the Corporation's maintenance budgets. Diesel unit major overhauls are done on the basis of number of hours run and can be run up to 20,000 hours between major overhauls. As all of Yukon Energy's diesel units are now standby units they get very few hours run per year; accordingly, these diesel units currently may get 10 or more years between major overhauls.

With respect to fire vulnerability at the Whitehorse Diesel Plant there is a full dry-pipe sprinkler system throughout the diesel plant and fire shut-off valves are being installed in 2007 on the individual fuel lines to the diesel units.

At the Aishihik Plant there is a sprinkler system in the underground plant, elevator and cable shaft and the above ground service building. In addition there is a sprinkler system surrounding the surface buildings and substation in case of a forest fire. Emergency egress by the plant operator now utilizes both a safe room underground (the surge chamber) and provision for egress out the tailrace tunnel.

2. ***Outline YEC's assessment of system reliability and expand on YEC's response to IR YUB-YEC-1.33.3 in light of the BC Hydro report and the January 29, 2006 power outage.***

Yukon Energy has completed its extensive review of its capacity planning criteria, including the reliability of system supply to the Whitehorse area, and as a result of that review Yukon Energy's Board of Directors in December 2005 adopted new capacity planning criteria applicable to the Whitehorse Aishihik Faro (WAF) grid and Mayo Dawson (MD) grid systems. Yukon Energy has also developed proposals to address near term requirements related to the new capacity planning criteria.

The following new capacity planning criteria have been adopted for the WAF and MD grid systems as a result of its review (no change has been made to the capacity planning criteria for isolated diesel communities):

WAF and MD Systems:

a) **WAF and MD system-wide capacity planning criteria:** Each integrated grid system (WAF and MD) will be planned not to exceed a Loss of Load Expectation (or LOLE) of 2 hours/year.

b) **Emergency (or "N-1") WAF and MD system capacity planning criteria:** Each integrated grid system (WAF and MD) will be planned to be able to carry the forecast peak winter loads (excluding major industrial loads) under the largest single contingency (known as "N-1"). The N-1 criterion determines system capacity assuming the loss of the system's single largest generating or transmission-related generation source. This criterion is not extended to major industrial customer loads which typically maintain sufficient on-site diesel for their own emergency purposes (these customers would be informed that they would not receive full supply should the Aishihik line be out of service during the coldest days of winter).

c) **WAF and MD "community' criteria:** For communities on the WAF or MD grids, any location with a load large enough to justify a diesel unit of about 1 MW or more will be considered as a preferred location for new diesel units if that community does not already have back-up from another source (e.g., having an existing diesel unit). The new diesel units would provide grid support, and in times of line failures would provide local generation for the communities where they are located.

The new criteria is based on the approach used by other Canadian utilities today. It requires that Yukon Energy plan its grid systems so that on average no more than two hours of system outages per year would be expected as a result of the amount of generation and related transmission installed. It also ensures that even if a grid system's single largest winter generating or transmission source is lost, the utility can continue to provide power to residential and commercial customers.

The new two-part capacity planning criteria for each Yukon Energy transmission grid system are essentially the same as the capacity criteria recently approved by the regulator for the Yellowknife system. The approach ensures that two different concerns are addressed on an ongoing basis:

- **Probability-based Criteria**: Most Canadian utilities today apply a probability-based approach to evaluate the maximum loads that a given system can safely carry. The new Yukon Energy criteria require each grid system to be planned so that the long-term average number of hours of system outages per year (including outages to

industrial customer loads) due to inadequate installed generation and transmission does not exceed 2 hours/year.

- **Emergency Criteria**: Each grid system will also be planned under the new criteria to carry the forecast peak winter loads (excluding major industrial loads) under the loss of the system's single largest generating or transmission-related source. These emergency criteria address the potential seriousness in Yukon of a sustained outage of the critical component in winter when there is the least amount of sunlight to effect repairs such as to transmission facilities.

The net effect of the new criteria is a 2006 WAF system capacity shortfall of 700 kW, compared with a WAF capacity surplus of about 11,300 kW under the previous capacity planning criteria. Under the new criteria any further load growth on WAF, as well as all future WAF system diesel unit retirements, will require new generation capacity for peak winter loads. Based on assessment of these factors, Yukon Energy has determined that near term projects (i.e., commitments prior to 2009) are required to increase WAF system capacity by between 15 and 27 MW within the next six years (i.e., by 2012) as load grows and certain diesel units are retired at Whitehorse. Capacity shortfalls begin to arise as soon as 2006, even before any Whitehorse diesel units are retired, and become sufficiently material in 2007 to require overall spending commitments exceeding the $3 million level.

No near term capacity shortfall requirements are currently expected on the MD system.

Yukon Energy has identified three near-term generation or transmission projects of $3 million or more which it is presently considering to commit prior to 2009 to address load growth, the scheduled retirement of certain diesel units at Whitehorse, opportunities to enhance existing facilities, and the adoption of the new capacity planning criteria. Together, these proposed projects along with other system enhancements, will provide over 21 MW of new firm winter capacity, which meets WAF capacity shortfalls by 2012 of 18.7 MW under the current Base Case load forecast as well as 21.5 MW under the Base Case forecast plus the Minto and Carmacks Copper mine loads (assuming new transmission connection for these mines to at least the WAF grid). The major proposals are summarized below along with contingency options to meet WAF loads to 2012.

Aishihik Third Turbine

This is a proposal that was initially reviewed by the Yukon Utilities Board in 1992. A third turbine can be installed at the existing Aishihik generation station at a cost of about $7 million to reduce future costly diesel generation. Yukon Energy received environmental and Water Board approvals for this project under its new Aishihik Water License. If this project proceeds, Yukon Energy expects the turbine to go into production between late 2009 and 2012, depending on electrical needs and what other initiatives are put in place.

Carmacks-Stewart Transmission Line

This project would see a transmission line running from Carmacks to Stewart Crossing, connecting Yukon Energy's two power transmission systems. It will provide long-term benefits to all Yukon ratepayers in that it allows for more efficient use of existing surplus hydroelectric generation and enhances the future development of new least cost power options. The line is forecast to provide the Whitehorse-Aishihik-Faro grid with an additional 5.6 megawatts of firm winter capacity in 2012 at a cost in 2005 dollars of between $30- and $35-million. If the line is built, Yukon Energy is currently planning for it to be in service by late 2008, assuming that all permits and approvals are in place by the end of 2006 and construction commences in early 2007. This project will only go ahead after meaningful consultation occurs with First Nations and all environmental permits are obtained. As well, this project will only proceed if Yukon government infrastructure funding ensures no adverse impact on ratepayers.

Diesel Units Life Extension or Replacement

There are seven diesel generators at the Whitehorse Rapids Generating Station. The three oldest ones are currently scheduled for retirement between 2007 and 2011. Yukon Energy has been looking at whether it is technically feasible to refurbish these units, thus extending their lives by 10 to 20 years at a cost of up to $4.5 million. Refurbishing these units would provide an added 14 megawatts of winter power on the Whitehorse-Aishihik-Faro grid. In order to secure in-service of the first unit by October 2007, planning and commitments for construction/implementation would need to begin by the summer of 2006 of the first unit, plus the plant updating, at an estimated cost of up to $2.5 million.

If it is determined that refurbishing the three units is not technically feasible, Yukon Energy will likely focus on replacing those three units with new and larger diesel generators of at least 8 to 11 megawatts each. The cost in 2005 dollars of new diesel units is expected to be in the range of $0.8 to $0.9 million per megawatt. The first unit would need to be installed in 2007, requiring final planning work on this project by summer 2006, including orders for the necessary engine unit (with cancellation provisions) in order that the unit can be installed by October 2007.

Another option to replacing these three units is to build a second, back-up, transmission line from Aishihik to Whitehorse. The largest single factor affecting the winter reliability on the WAF grid is the Aishihik transmission line: if it goes down the WAF grid loses a large amount of its winter power supply. However, since the option to build a second, back-up, transmission line from Aishihik to Whitehorse appears to be more expensive than diesel-related improvements, it would only be examined if new mines are connected to the Whitehorse-Aishihik-Faro grid without the completion of the Carmacks-Stewart line and without the diesel generators' life extension being technically feasible.

No final decision has yet been made to implement any of these proposed projects. However, given the magnitude of the identified near term requirements on WAF, Yukon Energy is proceeding as required to carry out planning activities that will enable near term development of essential new capacity required on the WAF grid.

Yukon Energy will file with the YUB by June 1, 2006 its 20-year Resource Plan addressing major electrical generation and transmission needs in Yukon from 2006 to 2025. The last time we submitted a Resource Plan to the YUB was in 1992. The Resource Plan will provide background information on the Yukon's power systems and give an overview of what we expect our near-term and longer-term requirements will be, taking into account a number of industrial development scenarios as well as the new capacity criteria recently adopted by Yukon Energy to better protect customers from outages.

3. ***Outline YEC's priority for responding to items in the BC Hydro report, indicating what recommendations have been implemented and the priority assigned to outstanding recommendations in terms of steps being taken to improve system reliability both in terms of the short and long terms.***

   In 2004 the Corporation commissioned a number of independent engineers to provide an assessment of the current condition and remaining life of the Corporation's key generation and transmission assets and to make recommendations regarding the on-going operation, life extension, and replacement of these assets. The Corporation remains committed to addressing all of the recommendations contained in these reports. A corrective action plan arising from a review of the recommendations is contained in Appendix 1.

   Yukon Energy allocates budgets in its capital plans for each year for upgrades to infrastructure (Transmission lines, Substations, and Generating plants). As there were numerous recommendations arising out of the Generation and Substation Assessment reports, Yukon Energy budgeted over three years; 2005, 2006, & 2007, to complete all of the action plans. Appendix 1 contains the list of Generation and Substation corrective action plans and the current status of each plan. Of 133 items, 44 are complete, and 49 are in progress. The most critical action plans were scheduled to be started in 2005 with the rest scheduled over the subsequent 2 years to balance resourcing requirements. The 2005 action plans included the following high priority activities: purchase of critical maintenance tools such as infrared camera, circuit breaker analyzer, replacement of various battery banks, overhaul of Whitehorse Hydro Unit 1, correcting of Aishihik overhead crane and bulkhead gate deficiencies and the planned replacement of Mayo Hydro T1 transformer in 2007.

   Yukon Energy's ongoing capital and resource planning also focuses on near or longer-term major capital project requirements to the extent that these may arise from the earlier conditions assessment reports.

Yours truly,

David Morrison,
President and CEO

Appendix 1 **Detailed Generation and Substation Condition Assessment Corrective action plans**

List of Facility/Plant Numbers and Descriptions

Facility Number	Description
P125	Whitehorse Hydro Plant – Units 1,2,3
P126	Whitehorse Diesel Plant –Units 1 thru 7
P127	Whitehorse Hydro Plant – Unit 4
P130	Aishihik Hydro Plant - Units 1,2
S150	Whitehorse Hydro/Diesel Substation
S164	Takhini Substation
S167	Aishihik Hydro Substation
S170	McIntyre Substation
S171	Riverside Substation (in Riverdale)
S249	Mayo Hydro Substation

FACILITY CORRECTIVE ACTION PLAN

Plant	Description	Comments	Planned or Completed	Count of Item	Complete	In Progress
Other						
	1 spare 38kV Vacuum Circuit Breaker	2006 Breaker Install will make one SF6 unit spare	2006	1		1
	1 spare Surge Arrester 108kV(rated 86kV MCOV, 5kJ/kV)	Part of 2005 / 2006 Insulation Coordination	2006	1		1
	3 spare Current Transformers 600/400/100: 5:5:5	Under review	2007	1		
	3 spare Ring disconnect 34.5kV, 600A	Under review	2007	1		
	3 spare Surge Arresters 30kV(rated 24kV MCOV, 5kJ/kV)	Part of 2005 / 2006 Insulation Coordination	2006	1		1
	Purchase Infrared Camera	Completed 2005	2005	1	1	
	Purchasing a Circuit Breaker Analyzer	Complete-Dec 2005	2005	1	1	
	Governor Testing	Governors overhauled every 2 years	2005+	1	1	
	Oil Separators	Oil detection to be added to sumps	2006	1		1
	Brake Dust Collection system - all units	Asbestos linings removed , no further action required	2007	1	1	
	Inspect Reactor phases at Kulan Storage area		2006	1		1
P125						
	HVDC absorption testing of WH1, 2 stators	PI and power factor tests performed annually.	2005+	1	1	
	HVDC testing of WH3 stator and 6.9kV AC Cables	PI and power factor tests performed bi-annually.	2005+	1	1	
	Investigate about spare coils for WH3	Under review	2007	1		
	Load testing the Battery Bank	Will investigate in 2006.	2006	1		1
	Relocation or Automation of Deluge valves	Part of 2006 Gen Capital Work	2006	1		1
	Replace 125VDC cable to Intake Gate house	Looked at in 2005 - decided to keep system as it is.	2005	1	1	
	Unit Protection Documentation and Review, adding or setting up inter-turn winding failure protection	Review as part of overall hydro unit protection standard	2007	1		
	WH1 & 2 single unit operation at the 6.9kV Bus	Under review	2007	1		
	WH2 slip-ring brush gear run-out on positive Slip-ring	Corrected in early 2006	2006	1	1	

FACILITY CORRECTIVE ACTION PLAN

Plant	Description	Comments	Planned or Completed	Count of Item	Complete	In Progress
	Center Rotor & Adjust Guide Bearings	To be done at next major overhaul	2007	1		
	WH1 Overhaul	Completed 2005	2005	1	1	
	WH2 Overhaul	Completed 2004	2004	1	1	
	East Gate Rollers	Completed 2004	2004	1	1	
P126						
	Belly tank fuel level float switch installation or restoration	WD5 comp in 2005, WD4/6 to be done in 2006/7.	2007	1		1
	Check and replace non-functional instruments	WD5 expected completion in April 2006. WD4 in 2006/7 budget.	2007	1		1
	Restore WD7 PLC	Complete Feb 2006. Reconditioned HMI and purchased new power supply.	2006	1	1	
	Thermocouple mechanical switch replacement with a solid state scanner	WD5 completed in 2005. Installed new switch and digital display.	2005	1		1
	WD4,5,6 Cable Replacement		2007	1		
	Winding Insulation Testing	Part of 2006 PM plan	2006	1		1
	Waste Fuel System	Part of Diesel plant modernization	2007	1		
	Fuel Utilidor		2006	1		1
	Refill Swing Arm	Under review	2007	1		
	Testing of pressure vessels		2007	1		
	Air Dryers	Part of Diesel plant modernization	2007	1		
	Crankcase doors on WD4, 5 & 6	Under review	2007	1		
	Belly Tank Controls on WD 4, 5 & 6		2006	1		1
	Maint. Sched. on WD4 & 5 Heat Exchangers	(blank)	2005	1	1	
	Fire Valve	Location of valve under review	2007	1		
	Lube Oil Systems WD4, 5 & 6	Under review	2007	1		
	Positive Ventilation for the 125VDC battery room	Completed in Aug 2004	2004	1	1	
P127						
	Check, Calibrate and Replace the gauges of T9	Protection upgrade in 2004, Planned in 2006	2004	1	1	
	Excitation bus bar replacement	Replaced in 2005. Additional upgrades In progress.	2005	1		1
	Excitation system augmentation	Excitation assessed in 2005 - Excellent condition	2005	1	1	

FACILITY CORRECTIVE ACTION PLAN

Plant	Description	Comments	Planned or Completed	Count of Item	Complete	In Progress
	Excitation transformer forced cooling	Plant Cooling Upgraded instead	2005	1	1	
	Fuse installation on 3 phase cables or replace with single phase cables (excitation and SS xfmr)	Will be done with exciter upgrade	2008+	1		
	HVDC absorption Testing	PI and power factor tests performed annually.	2005+	1	1	
	Implementing dual battery chargers in place of present single charger	Chargers Purchased in 2005, Installation in 2006	2005/6	1		1
	Lower pole brush gear run-out problem	Inspected in 2006, will monitor to next major overhaul	2006	1	1	
	Modification to the generator terminal equipment	Under review	2007	1		
	Power Cable HVDC testing	Currently perform PI and power factor tests.	2005+	1	1	
	Relocate PDA couplers to the bottom of the unit	Couplers were slightly relocated; GE assessment is location is good.	2005	1	1	
	Station service DC Battery replacement	Battery Bank purchased in 2005, Install in 2006	2005/6	1		1
	Rough Load Zone	Study completed in 2001, no further action required	2001	1	1	
	Start Problems	Part of governor work planned in 2006	2006	1		1
	Servo Isolating valves		2005	1	1	
	Oil Containment	Part of 2006 Capital Plan	2006	1		1
P130						
	48VDC battery replacement with station batteries or moving the auto batteries to different location		2006	1		1
	Automatic transfer of DC battery chargers	Reviewed in 2006, not required	2006	1	1	
	Connect motor operators for intake square butterfly valves	Bulkhead gates done in 2005	2007	1		1
	Fire Protection	Generator housing deluge system under review	2007	1		
	HVDC Absorption testing	Currently perform PI and power factor tests.	2005+	1	1	
	HVDC testing of 13.8kV Power Cables	Will develop schedule after new cables installed.	2007	1		

FACILITY CORRECTIVE ACTION PLAN

Plant	Description	Comments	Planned or Completed	Count of Item	Complete	In Progress
	Load testing of Battery bank	Battery Bank replaced in 2005.	2005	1	1	
	PDA testing	Done bi-annually since 2005.	2005	1	1	
	Slip ring brush replacement with standard brushes in place of brushes with copper insert	Exist brushes have performed satisfactory for 30 years	2005+	1	1	
	Split generators at metal clad to two separate units and run cables to a tie breaker at switch yard	Identified in 2007 capital plan	2007	1		1
	Unit Protection upgrade	May be postponed for timing with AH3	2006	1		1
	AH2 Rewind	Rewind Planned for 2006	2006	1		1
	TIV Seal Leaks & positive Pressure		2007	1		
	Crane Cables & Maintenance	Completed 2005	2005	1	1	
	Governor Tests	Governors overhauled every 2 years	2005+	1	1	
	Draft Tube Crane Structure	Sandblasted & repainted	2005	1	1	
	Intake Valves - Align and Motorize		2007	1		
	Air Receivers	Under review	2007	1		
	Oil skimmer in sump	Oil detector	2006	1		1
	Aishihik Bulkhead Gates	Completed 2005	2005	1	1	
	AH2 Vibration Running Signature	Part of Rewind Project	2006	1		1
	AH2 Install Vibration Probes	During Rewind Project	2006	1		1
	Install automatic water deluge system for generators	Needs assessment in 2006 for possible 2007 capital project	2007	1		
S150						
	52-1, 2, 3, 4, 5, 8, 9 Fire stops at cable entry	Part of next PM in 2006	2006	1		1
	52-1, 2, 3, 4, 5, 8, 9 Fixing Rear panel Bolts	Part of next PM in 2006	2006	1		1
	52-11 fixing leaks on phases B & C	Part of next PM in 2006	2006	1		1
	52-12 fixing porcelain damage	Part of next PM in 2006	2006	1		1
	52-15, 52-19 install heaters inside the operating mechanism	Complete breakers being replaced in 2005/2006	2006	1		1
	52-23 grounding	Needs Investigation	2007	1		
	Battery bank replacement	Completed in 2004	2004	1	1	
	Check, Calibrate and Replace the gauges of T2	Part of next PM in 2006	2006	1		1

FACILITY CORRECTIVE ACTION PLAN

Plant	Description	Comments	Planned or Completed	Count of Item	Complete	In Progress
	Check, Calibrate and Replace the gauges of T7	Part of next PM in 2006	2006	1		1
	Phase Identification	Part of next PM in 2006	2006	1		1
	Replacement of 138kV Nucletron switches with post type disconnect switch (89-HT2, 89-HT7)	Inspect and repair as necessary	2007	1		
	Replacement of 34.5kV Circuit breakers	2 Purchased in 2005, Installation in 2006	2006	1		1
	T3, T4 HV arrestor relocation	Insul Coord Study completed in 2005, Arrestor work planned for 2006	2006	1		1
	Timing test - Various Breakers	S150-52-11,12,13,14, & 15 completed in 2005	2005	1	1	
S164						
	Check, Calibrate and Replace the gauges of T7	Part of next PM in 2007	2007	1		
	Installation of a PT sub for Station Service	Under review	2007	1		
	Oil conditioning of R1	Part of next PM in 2007	2007	1		
	Phase Identification	Part of next PM in 2007	2007	1		
	Replacement of damaged insulators	Part of next PM in 2007	2007	1		
	Surge arresters upgrade with MOV type	Insul Coord Study 2005, Arrestor work 2006	2006	1		1
	Timing testing of Circuit breakers	S164-52-1,2,3 tested in 2004	2004	1	1	
	89-1L, 89-1S, 89-1B, 89-2L, 89-2S, 89-2B, 89-3L, 89-3S, 89-3B, 89-R1 disconnect switch (Morgan Power VBV) wiper alignment or replacement with new ones	Inspect and align as equipment is available	2007	1		
S167						
	89-2S, 89-2L, 89-2B, 89-HT3, 89-LT3 bases to be connected to station ground grid	Already done	2004	1	1	
	Battery bank to be fixed to the floor	Part of 2006 PM plan	2006	1		1
	Better mechanical support to the cable risers near R1, 89-LT3	Part of 2006 PM plan	2006	1		1
	Check LV bushings of T3	Planned PM in 2007	2007	1		
	Check, Calibrate and Replace the gauges	Planned PM in 2006	2006	1		1

FACILITY CORRECTIVE ACTION PLAN

Plant	Description	Comments	Planned or Completed	Count of Item	Complete	In Progress
	of T1					
	Phase Identification	Part of 2006 PM plan	2006	1		1
	Repairs to Air Core reactor	Planned PM in 2007	2007	1		
	Retrofitting of 52-R1 pressure relief flaps, door latching and ventilation	Planned PM in 2007	2007	1		
	Surge arresters upgrade and installation for T1 & R1	Insul Coord Study 2005, Arrestor work 2006	2006	1		1
	TI pad to be leveled	Completed in 2005	2005	1	1	
	Timing testing of Circuit Breaker 52-1 ABB HLR	S167-52-1,2 tested in 2004	2004	1	1	
	89-1L, 89-1S, 89-1B disconnect switch (Morgan Power VBV) wiper alignment immediately or replacement with new ones	Inspect and align as equipment is available	2007	1		
S170						
	Check LV Bushings of T1	Planned Maint in 2006	2006	1		1
	Fence Grounding issues to be addressed	Completed in 2004	2004	1	1	
	Phase Identification	Part of 2006 PM plan	2006	1		1
	Rectify oil leaks of 52-1, b phase	Planned Maint in 2006	2006	1		1
	S170-52-1 Circuit Breaker Timing Tests	Both S170-52-1 & 2 were tested	2005	1	1	
	Surge arresters upgrade on T1 with MOV type	Insul Coord Study 2005, Arrestor work 2006	2006	1		1
S171						
	Installation of a PT sub for Station Service	Under review	2007	1		
	Installation of surge arrestors	Insul Coord Study in 2005, Arrestor work in 2006	2006	1		1
	Phase Identification	On-going, as equipment is scheduled out-of-service	2006	1		1
	Replacement of damaged insulators	Breaker insulators replaced	2005	1	1	
	Replacement of L172PT B phase leaking top Capacitor	Under review	2007	1		
	Timing testing of Circuit breakers	S171-52-1, 3 & 4 tested in 2004	2004	1	1	
S249						
	Grounding issues with 6.9 &12 kV hook stick operated disconnect bases to be	Under review	2007	1		

FACILITY CORRECTIVE ACTION PLAN

Plant	Description	Comments	Planned or Completed	Count of Item	Complete	In Progress
	addressed					
	Phase Identification	On-going, as equipment is scheduled out-of-service	2007	1		
	Refurbish or replace T1	Part of Capital plan for 2007	2007	1		
	Refurbish or replace T2	T1, T2, & T3 back each other up	2007	1	1	
	Refurbish or replace T3	T1, T2, & T3 back each other up	2007	1	1	
	S7745,7747,7749,7750 & S249 bases to be connected to station ground grid	To be done during T1 replacement	2007	1		
	Surge arresters relocation & Upgrade	Mayo Arrestor work in 2007, will coordinate with T1 replacement	2007	1		1
Grand Total				133	44	49