Re: Page B-25, Upgrade Intake #4 Gate Controls, $115,500

Q. Please provide documentation outlining the problems encountered during the two major incidents that occurred during penstock filling.

A. There were two major incidents that occurred on two different intake gates structures of the Bay D'Espoir Generating Facility. The first incident took place during the summer of 1982 and occurred on intake gate #4. The second incident took place on July 2nd, 2000 and occurred on intake gate #2.

The first incident in 1982 resulted in the complete destruction of the Bay D'Espoir intake gate #4 vent house. During this time, the penstock was completely dewatered to allow for maintenance to take place on unit #7. Note that since unit #7 does not have a spherical valve for isolation, the penstock must be dewatered each and every time maintenance is performed on this unit. This incident occurred while operations were in the process of re-filling the penstock to restore the unit for operation. During this time, the intake gate was given a remote raise control command from the control room which is located inside Powerhouse #1. The gate then started to rise but did not stop at the crack position (3" above sill) as it is supposed to do. As a result of this failure, the gate proceeded to open to the fully opened position (19 feet above sill) and thus allowed the penstock to fill at a much faster rate than normal. As a result, the air that was trapped in the penstock was allowed to form a large "pressure bubble" which ultimately rose up through the penstock and exploded the vent house. This incident also involved a high potential near miss as a security guard had left the vent house only minutes before it was completely destroyed by being blown apart.

In 2000, there was a similar event that occurred on Intake #2. During this time, there was a diving inspection taking place on intakes #1 and #2. To facilitate this inspection, both intakes were isolated which consisted of each intake gate being locked in the closed position. In addition, one of the unit spherical valves, located at the base of the penstock, was left in the open position until about four hours later due to problems with its automatic controls. This allowed for the water in the penstock to slowly drain to a level of about 65% full. The fact that the penstock had partially de-watered was not known to the operators at that time. During the restoration of the unit, the gate was raised to the crack position (3" above sill) and the operator incorrectly confirmed that the penstock was full. He then proceeded to open the intake gate to the fully opened position (19 feet above sill). When the intake reached a level of about 12 feet above the sill, the hoist house, where the operator was standing, started to shake violently and flooded with water coming from the penstock. After the flooding stopped, the vent house and most of the electrical equipment previously located inside the vent house were completely destroyed. There was also severe damage to a Hydro vehicle that was parked close by as well as damage to security fencing and the intake guard rail. Sections of the roadway to the intake were also washed out and electrical power and water level indications were lost to all four intake structures. This incident was also classified as a near miss as it once again presented major opportunity for personnel injury.

The pictures below show the severity of the last incident in 2000.

Bay D'Espoir Intake #4. Shown is the vent house down below as well as the hoist house located about 30 feet above the ground.

Bay D'Espoir Intake #1 (shown on left) and Intake #2 (shown on right) after the failure in 2000. Notice that the vent house structure has been completely destroyed as it previously resembled that of

Bay D'Espoir Intake #2 after the failure in 2000.

Bay D'Espoir Intake #2 after the failure in 2000.