

# **REPORT ON VISIT TO SACRAMENTO CALIFORNIA, U.S.A.**

TO ATTEND HYDROVISION INTERNATIONAL - 2011

July, 15<sup>th</sup> to July, 25<sup>th</sup> - 2011

Mahaweli Complex Office  
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Kandy

W.R.A. Perera  
DGM (Mahaweli Complex)

C.G.S. Gunasekera  
Chief Engineer (Mahaweli Complex)

## **Introduction :**

As nominated by Ceylon Electricity Board, my-self and Mr. C.G.S. Gunasekera were sponsored to participate in the HYDROVISION International – 2011 held in Sacramento, California, U.S.A. by United States Energy Association under SARI/Energy executive exchange program under USAID. This Conference and exhibition was held at the Sacramento Convention Centre during the period July, 19<sup>th</sup> to July, 22<sup>nd</sup>.

## **Hydrovision International 2011 :**

This Conference and Exhibition is considered to be the largest gathering of hydro professionals in the world with participation of Hydro Equipment and services suppliers from around the world and professionals totaling nearly 3000 participants. There are 8 tracks of subjects featuring 73 sessions and nearly 500 speakers on subjects related to hydro power. 280 companies and organizations from throughout the world participate exhibiting their products and services in the exhibition hall.

## **Program attended :**

17<sup>th</sup> July, 2011 - Arrived at Sacramento Residence Inn Hotel after flight delay in Tokyo at 20.30 hrs.

18<sup>th</sup> July, 2011 - Hydro Plant Technical Tour. Visited OROVILLE Hydro Electric Project of the California Department of Water Resources.

This Project is on the Feather River in the Sierra Nevada Mountain of Butto County California . The Oroville Hydroelectric Project consists of three power houses with a capacity of 760 MW.

The 770 foot tall Oroville Dam which forms the Lake Oroville is the tallest earth filled dam in the U.S. In the bedrock beneath Oroville dam is Edward – Hyatt power plant, a 645 MW pump storage facility. Lake Oroville is the second largest reservoir in California, in addition to power production, the reservoir is used for irrigation, flood control and municipal water supplies



Fig 1. Oroville dam



Fig 2 Oroville Hydroelectric Plant 760 MW

Visits were made to Feather River Fish Hatchery, Edward Hyatt and Thermalito Pump Generation plants, Lake Oroville and its' visitor centre.

It was possible to observe unique nature of construction of the power intake where baffle Schutes have been used primarily to control water intake levels and also avoiding surge structure inside dam which was in a region of high seismic activity. A high concrete chamber of height in range of 800 ft. is not suitable for the location.

It was also noted that even in the years of 1950's, where the project construction was made and designs were made much consideration has been given to environmental aspects and their mitigation, specially by making mitigatory actions incorporated in to the project components, where a separate fish hatchery has been built and maintained up-to now. When the project was planned in 1950's, there would have been little environmental laws or environmental activist groups to agitate, but the planners have incorporated mitigation action in the project.

19<sup>th</sup> July, 2011 -

Hydro plant technical tour to Folsom dam of Bureau of reclamation U.S. Department of Interior, Folsom dam in a 340 foot tall concrete gravity structure on the American River, about 25 miles northeast of Sacramento. Folsom dam and the Folsom Lake are part of the Central Valley project, which provides flood control, hydro power, irrigation, drinking water for Northern California.

The Folsom power plant at the base of the dam is equipped with three francis turbines that can produce up to 199 MW.



Fig 3. Folsom dam

A new spillway is being constructed as additional capacity for flood discharge and it was observed that the generator turbine units were refurbished by rewinding generators by M/s ANDITZ Hydro and runners, wicket gates and controls were replaced by power station staff.



Fig. 4 new spillway is being constructed

A presentation was made at a Hotel about composite bearings by THORDON bearings Inc.

Opening key note session was held with special feature of an exclusive report for the International Hydropower Association on how outcomes and decision by world leaders which will affect your organization and the hydro power industry. An executive round table was held to express view on Hydro power in the west – trends and transition. During this discussion,

- Current market trends
- Anticipated industry transition
- Where hydro is heading in the future

were discussed.

20<sup>th</sup> July, 2011 - Multi – track Conference Session

Following Conference sessions were attended –

- i. Generator monitoring to prevent forced outages
  - ii. Turbines - New and best maintenance practices
- i. Generator monitoring to prevent present outages :

All aspects of hydro generator monitoring were discussed, to enable more reliable and predictable unit operation. There was

an opportunity to learn about key components of prevention and analysis including partial discharge, air gap, vibration, electromagnetic impulse and double testing.

ii. Turbines – New and best maintenance practice :

In site was gained from power producers that are applying best practices to their turbine maintenance activities. Important topics covered were cavitation/erosion repair, Kaplan unit blade seals and cam tuning, greaseless bushings, wicket gate leakage/seals, governors and head cover failures

21<sup>st</sup> July, 2011 - Multi-track Conference Sessions

i. Turbine – Generators : Challenging Repairs and creative solutions :-

Following topics were discussed:

- a. Fixed blade turbines - A natural solution for low head turbines
- b. Mitigation measures for thermal cycling of existing hydro generators experiencing more starts and stops.
- c. Modeling operation history of hydroelectric turbines
- d. Pump turbine guide vane vibration – problems resolution at Yixing Power Station
- e. Turbine shaft corrosion Fatigue Cracking at Jenpeg Generator Station – Analysis repair and improvement

ii. Arc Flash and other personnel safety consideration :

Discussed the latest industry trends and products available in personal protective equipment. Covered key safety items, arc flash hazards. fire protection, job hazard analysis, confined spaces, transition from tags to locks.

iii. Using new tools to come up with a long-term approach to Asset Management

Industry participants discussed how they are using risk informed decisions making and innovative financial models to move toward a long term asset management strategy. Also discussed how new asset management tools and equipment health monitoring are improving investment decisions.

22<sup>nd</sup> July, 2011 : Multi-track Conference Sessions :

i. Understanding the social effects of building a hydro power project, following topics discussed :

- Community involvement in the implementation of 60 MW Sondu-Miriu Hydropower Project in Kenya.
- Hydropower Projects in Developing Countries – Benefitting the local communities
- Managing community expectations in hydro-electric projects – A Nepalese experience
- The hydroelectric, the best sustainable option for electricity in Mexico

ii. Controls at the Heart of the system :

- A new method to extrapolate a Kaplan CAM curve from a single head index test into a family of CAM curves over a full head range
- Design considerations for the Application of a digital governor for the hydro-grid and isochronous operation
- Aspects of power system stabilizer blocking
- Operational and performance advances with digital governor controllers on multiple needle impulse turbines
- Why the adoption power system stabilizer in hydro plants is becoming increasingly important.

iii. A country presentation was made for the executive exchange delegates for Hydro Vision International – 2011 co-ordinated by United States Energy Association.

23<sup>rd</sup> July, 2011 : Left Sacramento for Colombo Sri Lanka in the morning of 23<sup>rd</sup> Saturday and arrived in Colombo at 2.00 A.M. on 25<sup>th</sup> Monday, 2011.

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05/08/2011

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05<sup>th</sup> August, 2011

DGM (Training),

**VISIT REPORT OF ATTENDING**  
**HYDROVISION INTERNATIONAL EXHIBITION AND CONFERENCE – 2011**  
**15<sup>TH</sup> July, 2011 to 25<sup>th</sup> July, 2011**

We attended the above Conference in Sacramento, California, U.S.A. during the period 15<sup>th</sup> July, 2011 to 25<sup>th</sup> July, 2011. The report of the above visit is sent attached.

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