Hydropower Asset Management Partnership
(hydroAMP)

Objectives

hydroAMP is the process by which condition assessments are made for critical hydroelectric generation equipment. It is a structured two-tiered framework designed to streamline and improve the assessment and documentation of the condition of hydroelectric equipment within and between projects to enhance asset management and investment decision-making. Assessment of equipment condition supports:

- Development of long-term investment strategies.
- Prioritization of capital investments.
- Coordination of O&M budgeting processes and practices.
- Identification and tracking of performance goals.

Condition Indices, the quantitative outputs of the hydroAMP equipment condition assessment process, can assist managers and other personnel involved in making decisions on repair, rehabilitation, or replacement when faced with competing demands and limited resources. Options are:

- Use the Condition Indices to prioritize, rank, and sort equipment needs to determine the order of refurbishment actions.
- Combine the Condition Indices of multiple pieces of equipment to develop an assessment of the condition of a single generating unit consisting of its entire set of power train equipment.
- Combine the Condition Indices of multiple generating units to develop an assessment of the condition of an entire plant.

Condition Indices may be used to formulate a business case that addresses a wide range of factors such as risk of failure, efficiency, safety, economic, environmental, political and regulatory consequences, as well as other considerations. The analysis tools designed by hydroAMP are flexible to fit into existing maintenance, planning, budgeting, and decision-making structures.

Background

Technical teams comprised of experts from the four organizations involved in hydroAMP, the Bureau of Reclamation (BOR), Hydro-Québec (HQ), the Army Corps of Engineers (COE), and the Bonneville Power Administration (BPA), joined together beginning in 2001 to develop condition assessment guides for hydroelectric power plants.

The result of this collaborative work is a common framework and process to streamline, simplify and improve the assessment and documentation of the condition of

hydroelectric equipment and facilities in order to support condition-based prioritization of hydropower asset business decision-making.

Overview

A two-tiered objective approach for assessing equipment condition and risk of failure for hydropower equipment is used:

- Tier 1 of the condition assessment process incorporates the results of tests, measurements, and inspections that are normally obtained during routine operation and maintenance activities. These condition indicators are combined to compute an equipment Condition Index.
- Tier 2 of the assessment relies on more in-depth, non-routine test results and inspections requiring specialized knowledge to refine the equipment Condition Index score from the Tier 1 assessment.

Process

1. Perform Tier 1 assessment to score condition indicators and calculate the Condition Index.
2. Use the Condition Index to rate condition and determine a course of action. A low value of Condition Index may indicate the need for a Tier 2 assessment.
3. Use the Condition Index to evaluate risks and establish investment priorities.

Status

Condition assessment guides, accessible from the Hydropower Gateway (http://operations.usace.army.mil, select the BMPs tab) as Adobe Acrobat 7.0 pdf documents, are available for the following hydroelectric power plant equipment:

- Turbines
- Generators
- Circuit Breakers
- Governors
- Excitation Systems
- Transformers
- Batteries
- Compressed Air Systems
- Cranes
- Surge Arresters
- Emergency Closure Gates and Valves

Tier 1 assessments and database are complete and in use for all of the main power train equipment, and important auxiliary systems, at all of the power plants of the Federal Columbia River Projects (FCRPS) in the Pacific Northwest.

Tier 2 assessment guides are complete for all of the main power train equipment and some of the important auxiliary systems. A Tier 2 database has yet to be created for all equipment.

A Guidebook has been developed that provides an overview of the hydroAMP program and gives guidance on the use of condition assessments in making asset management decisions.

hydroAMP Database

A hydroAMP database was developed to allow plants and organizations to input their equipment condition data into a single database in a standardized format. It also allows for individual plant and utility analysis and reporting. There is an incentive to have accurate data since these data are used in the priority and budget processes and must be accurate to properly represent the mission and activities of the projects. Quality assurance is the responsibility of district management.

The hydroAMP database is real-time and web-accessible, and provides centralized data entry, storage, and retrieval for hydroAMP assessments. The hydroAMP database can be accessed through the internet at the following address:

https://secure.bpa.gov/hydroAMP/

Minimum browser requirement is IE 5.5/Netscape 6.0 or greater. The database is on a secure website hosted by BPA, which means that an account is required to access the data for data entry or reporting. (See Database Access below.) The database and website themselves are using MSSQL and ASP.net technologies.

Database Input

The equipment condition data is updated as additional or new data become available. The hydroAMP database can be updated by simply logging onto the website and updating user entry forms within the system. All updates made in this fashion are available immediately via the reporting tools.

We are in the development stage of creating a file updating standard and procedure that will allow for export of updates directly from any computerized Maintenance Management System, such as MAXIMO.

Website Menu Options:

- Condition Assessments - Input equipment condition data for Tier 1 assessment.
- Equipment - Add, update and delete equipment for specific plants.
- Reports - View and export condition assessment reports.
- My Account - View and make changes to your account.
- Help - Provides links and contacts for information.

Database Output

The hydroAMP website has been developed such that a number of reports can be generated directly by the system. These reports give summary information and are available directly through the user's web browser. All reports are exportable in multiple formats depending upon user preference; HTML, PDF, Microsoft Excel, Tiff images, CSV, or XML.

Database Users and POCs

The hydroAMP database is available to operation and maintenance staff, plant managers, technical support staff, and investment decision makers of the hydroAMP organizations. The development of hydroAMP was initially funded by the partner organizations. Implementation and maintenance of hydroAMP is currently being funded by the COE, BOR, and BPA.

Contacts are Lori Rux (503-808-4221, COE) and Steve Bellcoff (503-230-3319, BPA).

Database Access

To access the hydroAMP database, and for security reasons, individuals wanting access to the system are required to open an account. The account will include a log-in, a password (which you can change after logging in initially – see "My Account"), and permissions. The permissions involve two parameters – first, what actions you as a user will be performing (e.g., read, read/write, or management review) and secondly, which hydro projects/plants you have authorization to view and/or edit.

All requests for access to this database, and for reporting problems or concerns, should be sent to the hydroAMP e-mail address hydroamp@bpa.gov and must include your full name, e-mail address, phone number, and the plants for which you are requesting access. The hydroAMP administrator will assign log-ins and passwords and respond to you via e-mail.