Announcing SOAPP-CT O&M Cost Estimator, Version 4.0

The SOAPP-CT O&M Cost Estimator is a spreadsheet software product that estimates operations and maintenance (O&M) costs for combustion turbine and combined-cycle plants for specific gas turbine models over the operating life of the asset.

The SOAPP-CT O&M Cost Estimator software contains powerful capabilities to assist users in evaluating non-fuel O&M costs and in supporting a life-cycle cost evaluation perspective. The software uses a "bottoms-up" approach for scheduled maintenance estimates based on costs for gas turbine components and their estimated life. The database includes initial component costs and life estimates for 28 gas turbine models, including D/E, F and G class heavy-duty and aero-derivative engines. Maintenance intervals are determined based on manufacturer algorithms. Unplanned maintenance costs are also estimated based on statistical experience for gas turbines.

Steam turbine component costs and life estimates are also provided and steam turbine overhauls may be timed to coincide with gas turbine hot gas path or major inspections. The software framework can be used to evaluate alternative approaches to satisfying maintenance requirements for both new and existing plants, such as the comparison of long term maintenance contracts with self-managed maintenance.

With an optional statistical Monte Carlo simulation capability, the SOAPP-CT O&M Cost Estimator provides an integrated approach for quantifying the costs and benefits of mitigating technology risks through the use of business interruption insurance, long term maintenance contracts and extended warranties in the context of possible unplanned gas turbine maintenance events. Overall, the SOAPP-CT O&M Cost Estimator is useful in the planning and development of combustion turbine-based power plant projects and subsequent planning of maintenance budgets for new and existing plants. Some benefits and value offered with the SOAPP-CT O&M Cost Estimator software include:

- Enables the user to estimate O&M costs for combustion turbine-based simple cycle, cogeneration, and combined-cycle power projects on an engine model-specific basis.
- Generates a cash-flow projection of O&M costs for use in a pro forma financial analysis and provides an economic analysis to determine present value and annualized costs.
- Provides a framework for the user to perform "what if" scenarios, such as examining the impact of changes in operating mission, or the cost impact of incorporating risk mitigation alternatives such as long term maintenance agreements and insurance.

Software requirements: MS Windows (7, Vista, XP) with MS Excel (2010, 2007, 2003).

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New Features in SOAPP-CT O&M Cost Estimator, Version 4.0

The SOAPP-CT O&M Cost Estimator is a spreadsheet software product that provides O&M cost estimates for combustion turbine and combined-cycle plants, and an integrated approach for quantifying and mitigating technology risks in the planning and development of CT power plant projects.

This latest version has been reviewed and several major enhancements were made:

- **Steam Turbine Maintenance Costs Based on Component Costs and Life.** The steam turbine (ST) now has its own maintenance interval algorithm for minor/medium inspections and major overhauls based on an Equivalent Operating Hour (EOH) formula. The relative influence of steam turbine starts and trips on EOH can be modified by the user. The user has the option to align medium ST inspections and major ST overhauls with CT hot gas path inspection/major overhauls if desired. Default values for component repair and replacement costs and life are estimated and scaled based on ST capacity but are not OEM model-specific. Users can adjust costs and life in the new **Stm Turb** sheet. Selections for Light, Medium, or Heavy repairs for certain steam turbine components and alignment of Medium Inspection and Major Overhaul Timing are also made on the **Stm Turb** sheet. Cost details and timing are displayed on the new **ST Maint Detail** and **ST Quarterly** sheets. In addition, the current cash flow sheets are expanded to show cost results at the same level of detail as the CTs.

- **Adjustable Annual Operating Hours, Starts and Trips.** The user can now choose to manually adjust operating hours and number of starts for each operating type and fuel type on an annual basis, as well as adjust the number of trips and other parameters on the new **Annual Hours** sheet. These values are used in each CT OEM's maintenance interval calculations. Plant capacity factor can also be manually adjusted for each year. In addition, the software totals the annual operating hours, starts and trips and applies them to the steam turbine, with the option of applying a multiplier factor to each. This sheet also includes the EOH calculation with user-adjustable factors for maintenance intervals and lifing of the steam turbine.

- **Emission Control Catalyst Costs and Water Costs.** The **Operations Inputs** sheet has been enhanced to provide a more detailed estimate of variable non-fuel operating cost items. Selections for NOx reduction catalyst (SCR) and ammonia reagent, CO oxidation catalyst, and heat rejection system for the steam turbine condenser set initial default values for catalyst replacement costs and cooling water consumption. Catalyst replacement costs are assigned to an operating quarter based on operating life and are displayed in the **O&M Cash Flow** sheet in the operating year they are incurred. Initial estimates for ammonia consumption rate and cost can also be refined by the user. Default estimates for raw water cost and consumption rate, based on cooling system selected, can also be refined by the user.

- **OEM-Specific Sheets for CT Maintenance Intervals.** Rather than combine all OEM algorithms on a single sheet, calculation methods for Factored Hours/Factored Starts or EOH (as appropriate) are now displayed in an OEM-specific sheet based on the OEM selected on the **Input Summary** sheet.

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- **Improved Simulation for Existing Plants.** For plants in which aged CT components have hours and starts since their last replacement, the software has been modified to account for rotation sparing and fallout. In addition, aged steam turbine components are now included on the **Existing Plants** sheet.

- **Updated Costs for CT Models.** Component replacement and repair costs for selected models have been updated based on input from consultants and utility users where available. When specific estimates are not available, costs have been escalated. Other balance-of-plant costs have been escalated to 2010 base year costs.

- **Updated Insurance Cost Estimates.** Rough estimates for insurance costs (Boiler & Machinery, Business Interruption, Property) have been updated based on current market conditions and consultant estimates.

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