Curtiss-Wright Nuclear Division

Announces New Version Release

PEPSE

Version 86

December 2021

Curtiss-Wright is excited to announce the release of the new version of Scientech's PEPSE in December 2021. The Version 86 release includes many new features and enhancements as requested by our clients and end users. These improvements are designed to enhance PEPSE's user productivity while increasing its thermal analysis capabilities. PEPSE's annual releases sustain its leading role as the most powerful predictive and design analysis tool on the market.

The demand for optimization technology has advanced significantly over the past few years, driven by competitive generation, the environment, and the need to connect critical thermal performance data with end users who contribute to the thermal efficiency of the power plant. PEPSE with its annual upgrades is pushing the envelope and leading the industry with state-of-the-art, optimization technology through accurate modeling, analysis and simulation software to improve the heat rate of generation assets. Accurate models producing a few tenths of one percent heat rate improvement can make a difference of several hundreds of thousands of dollars in fuel reduction costs or in increased generation sales annually for a single unit.

Specifically, PEPSE's best achievable and "What-If" analysis allow performance engineers to establish key performance indicators (KPIs) that produce the lowest cost of production for dispatch operations, e.g., capacity marketing. Additionally, PEPSE allows the evaluation of equipment and process changes required for justification of capital expenditures, e.g, coal to gas fuel conversion. With the release of Version 86, PEPSE continues to be the industry benchmark for optimizing power plants' thermal efficiency and process cycles. This has been proven by the selection of PEPSE by many utilities as their gold standard in its ability to realize improved heat rate and generation goals.

We have listened to our clients and incorporated lessons learned from our technical support and services into our annual PEPSE upgrades. The markets are changing, and Curtiss-Wright is listening and changing our software accordingly.

PEPSE's Version 86 provides engineers with the ability to readily and accurately analyze and optimize a system's efficiency, and the plant operation derives a number of direct and important benefits. PEPSE is your key to accurately analyzing plant performance and identifying ways to increase generation and reduce heat rate. PEPSE helps to eliminate causes of inefficiency allowing a plant to produce every possible kilowatt and conserve every possible BTU thus providing for reductions in plant emissions and carbon footprint. This also lowers operating costs through higher efficiency, fewer repairs, less downtime, and lower fuel costs.

PEPSE program enhancements have been improved to enhance its ease of use, e.g., speed, reporting capabilities, displays/graphics, data reduction, help functionality, error corrections, and "user friendly" operation. These enhanced features complement its business value for a complete performance improvement program.

PEPSE V86 Enhancement Summary

PEPSE upgrades are implemented to enhance user productivity and introduce the latest calculation standards as provided by the power production industry. Outlined below is a summary of several of the major features of Version 86.

PEPSE Program Enhancements

- Added a seawater option for the circulating water in the HEI calculation mode for condensers.
- Added a reactor thermal power calculation.
- Added the option to input outlet temperature and pressure instead of efficiency for the compressor stages of the Type 77 CGT turbine.
- Added an unburned fuel fraction input for the Type 77 CGT turbine.
- Added four more output tables for the Type 77 CGT turbine.
- Added a pump head output variable.
- For PEPSE-RT:
    a. Modified the export of PEPSE-RT displays to include variable icons ('123' icons).
    b. Fixed processing of output and formulas when the unit is in low load.
    c. Post calculation formulas are only processed if the PEPSE calculation finishes with normal termination status.
- In PEPSE-RT:
    a. Modified the export of PEPSE-RT displays to include variable icons ('123' icons).

b. Fixed processing of output and formulas when the unit is in low load.

c. Post calculation formulas are only processed if the PEPSE calculation finishes with normal termination status.

PEPSE Error Corrections

On the graphical interface, the following error corrections have been made:

- Fixed a problem with the Key Performance Indicators table that caused the table to be blank when non-default metric engineering units were used for output.
- Fixed the equation for ALEB (A less than or equal to B) operation in the operations list.
- Added variable ENERDR (drum energy convergence criterion) to the convergence criteria window in generic input, and added it input processing.
- Fixed a memory leak in the operations list window.

In the PEPSE thermodynamic analysis program, the following error corrections have been made:

- Fixed processing of variable names in operations that use formulas. Variable names that contained a numeral were not read correctly, causing an error that disabled the formula.
- For the Type 77 CGT turbine:
    a. Fixed the wet bulb temperature for the calculation of the compressor inlet temperature when evaporator effectiveness is specified.
    b. Fixed the calculation of bleed flows when English engineering usits are selected and the bleed flow is specified as a fraction.
- Fixed a bug in the Type 9 gas turbine calculations that caused the code to stop calculating the outlet conditions for all Type 9 components if the inlet flow to any one of them was 0.0 lbm/hr at any time during the iterations.
- Fixed the results output for controls that caused problems with reading the results in PEPSE R/T.
- Fixed engineering units conversion for the feedwater heater TTD and DCA tuning factors.

PEPSE Version 86 will run on Windows 7 and newer operating systems; and Windows Server 2008 and newer operating systems, including 32-bit or 64-bit versions.

We look forward to working with you and continuing to provide the most powerful off-line thermal performance modeling tool available. Upgrading to Version 86 will provide enhanced functionality of the leading performance analysis and simulation tool, PEPSE, and demonstrate a valued return on your investment.

To upgrade to PEPSE Version 86 or to receive more information, contact please contact Josh Bartlett at (208) 497-3547 or jbartlett@curtisswright.com.