

ELECTRICITY AND WATER DO MIX

This quarter, "Electricity and Water Do Mix" presents highlights from the EPEC Committee's recent "Update on Equipment Energy Efficiencies" presentation at the IWEA Plant Operations Seminar.

At a wastewater treatment facility, one of the largest expenditures is energy usage. Two users of electricity are transformers and motors, both of which have been the subject of recently enacted federal guidelines to improve their energy efficiency. This article will discuss transformers. The next will address motors.

In April 2006, the new U.S. Department of Energy law (10 CFR-Part 431, Subpart K) was passed to improve energy efficiency standards for certain commercial/industrial equipment, including distribution transformers. Per this law:

- Low Voltage Dry Type Transformers manufactured after January 1, 2007 must comply with the law. The National Electrical Manufacturers Association (NEMA) has classified these transformers as "TP-1".
- Medium-Voltage Liquid-Filled and Dry Type Transformers manufactured after January 1, 2010 must comply with the October 2007 adopted Energy Efficiency Standard.

Low Voltage Dry Type TP-1 Transformers

The efficiency design goals of TP-1 transformers:

- Reduced the operating energy losses of lightly loaded transformers
- Reduced "no-load" losses of the transformers
- Improved the operating efficiency of the transformers, especially for lightly loaded transformers, by approximately 0.5%
- Maintained the efficiency of fully loaded transformers

Medium Voltage Transformers

The new standard addresses both medium voltage liquid-filled transformers and medium voltage dry-type transformers.

For medium voltage liquid-filled transformers, the updated standards:

- Decreased operating costs and electrical losses by 15-23%
- Increased the initial capital costs by 6-12%
- Improved equipment efficiencies to 98.36-99.49%, depending on transformer kVA

For medium voltage dry-type transformers, the updated standards:

- Decreased operating costs and electrical losses by 9-26%
- Increased the initial capital costs by 3-13%
- Improved equipment efficiencies to 97.50-99.31%, depending on transformer kVA

So what does this mean to you? Be sure to update project specifications to ensure that newly supplied equipment meets these standards. The new increased efficiencies, while an improvement, often cannot provide the financial payback to justify the cost to replace a transformer. And when replacing older transformers with equipment that meets these standards, review the existing equipment space available to ensure that it is adequate; the new transformer designs are often larger and heavier than their older counterparts.

For more information on Energy Efficiency and Renewable Energy, visit www.EERE.energy.gov.

For additional information on transformers, visit the U.S. Department of Energy website to download the *Environmental Assessment for Adopted Energy Conservation Standards for Distribution Transformers* at http://www.gc.energy.gov/NEPA/nepa_documents/ea/ea1565/EA-1565.pdf.