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COMBINED CYCLE Journal
User Groups Gas Turbines HRSGs Controls

Updates on water discharge regs, reducing air emissions, complying with NERC CIP

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An outstanding feature of CTOTF™ meetings is the organization's environmental and NERC/FERC regulatory coverage. In a single day at each conference, plant and asset management personnel can come up to speed on the laws and regulations impacting equipment operation and maintenance—no shortage of material here. Perhaps the best part of the half-day Environmental Systems and NERC/FERC sessions (a/k/a roundtables) is you can understand what you are being told from the podium. Legalese is not spoken in these forums.

Kimberly Williams, who manages environmental permitting and compliance for NV Energy, chairs the Environmental Systems Roundtable, traditionally held on Tuesday morning at CTOTF's spring and fall conferences. An electrical engineer by education, she came to the utility in 2005 from the oil and gas industry where Williams advised on environmental matters in California.

John Horishny, who manages compliance with NERC 693 Reliability Standards for 35 generating facilities in EthosEnergy Group's portfolio, chairs the NERC/FERC Roundtable on Tuesday afternoons. His day job includes monitoring the activities of the eight NERC regional entities.

Williams split her session at the spring 2015 meeting in the Sanibel Harbour Marriott, Fort Myers, Fla, April 12-16, between air and water interests. Gas-turbine users generally are unfamiliar with water regulations, so she compiled a valuable backgrounder, "New and Upcoming Water Regulations: Why you should care." It covered Section 316(b) of the Clean Water Act (CWA), proposed federal Effluent Limitation Guidelines (ELGs), and the proposed Waters of the United States (WOTUS) rule.

CWA Section 316(b). A quick read of the highlights in Williams' presentation should help you identify which of these regs to post on your white board for further investigation. The chair began by explaining the purpose of the 316(b) revision, which became effective Oct 14, 2014: Reduce impingement and entrainment of fish and other aquatic organisms at intake structures used by power generation and manufacturing facilities to withdraw cooling water from WOTUS. Details are in Title 40 of the *Code of Federal Regulations,* Parts 122 and 125 (subparts I, J, N).

Damaris Negron, the environmental manager for EcoElectrica LP, an LNG-fueled combined-cycle cogeneration plant located in a sensitive ecosystem on the southern coast of Puerto Rico, who followed Williams at the podium, estimated that about 1000 existing facilities (about half powerplants) are affected by 316(b).

Those affected, Williams continued, would have or require an NPDES permit, have a design intake flow greater than 2 million gallons per day (mgd), and use at least 25% of that water for cooling purposes. If you need a refresher on the National Pollutant Discharge Elimination System, it is the permit program that controls water pollution by regulating point sources discharging pollutants into WOTUS.

Williams next discussed compliance options—such as a closed-cycle recirculating system and daily monitoring of intake flows, velocity limits through intake screens, etc—and requirements of the statute. The scary revelation: Even if 316(b) is not applicable, the permitting authority still can impose requirements on a case-by-case basis. Information on compliance deadlines closed out this portion of the presentation. Dig deeper on the material presented by Williams and other speakers cited in this article by accessing the PowerPoints of interest at CTOTF's Presentations Library.

The federal Effluent Limitation Guidelines, originally promulgated in 1974 and last revised in 1982, established technology-based effluent discharge limits (read 40 CFR 423). Williams said EPA proposed revisions on Apr 19, 2013 to account for powerplant technology improvements over the last three decades and to address changes in wastewater composition resulting from the widespread installation of air pollution controls.

Regarding applicability, ELGs apply to any steam/electric unit with an NPDES permit. Proposed revisions apply to new and existing units that use a fossil fuel, fuel derived from fossil fuel, or nuclear fuel "in conjunction with a steam/water system to generate electricity as the predominant source of revenue." EPA proposed eight options for setting the new ELGs, each a matrix of technology-based standards for seven separate waste streams. All apply to coal-fired units, one—non-chemical metal cleaning wastes—to plants powered by gas turbines (GTs).

Examples of non-chemical metal cleaning wastes pertinent to GT plants identified by Williams: compressor and condenser cleaning wastes. ELGs include limits for iron, copper, total suspended solids, and oil and grease. The way to avoid this ELG is not to discharge any of these wastes, meaning combined cycles with zero-liquid-discharge (ZLD) systems are not affected.

The final rule is expected by Sept 30, 2015; the proposed ELGs would be phased in between 2017 and 2021 at the time of NPDES permit renewal.

WOTUS rules bear watching. Consider that the Clean Water Act was enacted in 1972, and Supreme Court cases in 2001 and 2006 raised questions about which waters were WOTUS, you can only imagine how difficult the acronym is to define. The latest attempt by EPA and the US Army Corps of Engineers on a definition was proposed Apr 21, 2014. The public comment period, which ended last November, revealed how contentious things WOTUS are. The "final" rule is expected shortly. Editors' suggestion: Access Williams' presentation in the CTOTF library and read through her WOTUS slides while relaxing with an adult beverage.

Given NV Energy's desert location and reliance on air-cooled combined cycles, Williams has limited direct experience with 316(b) requirements and compliance options. So she invited participation by EcoElectrica's Negron, a chemical engineer and environmental psychologist by education, who spends a significant portion of her workday interfacing with EPA's CWA Rules 316(b) and 403.

Negron's case study, supported by spectacular underwater photographs illustrating how this award-winning combined cycle guards the marine environment against degradation and protects sensitive ecological communities, was highly regarded by attendees. The plant's compliance with 316(b) and 403 are critical to its operation. Keep in mind that if your plant must comply with Rule 403 and it doesn't meet the requirements, no NPDES permit will be issued.

Maintaining air emissions within regulatory limits was addressed by Joseph Spahn of Johnson Matthey SEC LLC and Jeff Bause of Groome Industrial Service Corp. Spahn, a chemical engineer by education who is responsible for ensuring his company's catalyst design solutions are in lock-step with customer needs, began with a review of CO and SCR catalysts and their performance goals. Next he explained by way of equations how catalysts are designed, and then spent several minutes reviewing catalyst testing procedures and how to plan a meaningful test program—all geared to optimal use and life management.

Bause, who heads up Groome's HRSG maintenance and industrial cleaning divisions, spends the better part of his professional time at powerplants. He quickly summarized the reasons for SCR and CO maintenance and the reasons for cleaning HRSG heat-transfer surfaces, ammonia injection grids, and ammonia vaporizers, in the process describing the procedures required for success.

Several brief case histories illustrated the economic benefits of catalyst care. At a 2 × 1 501G combined cycle, Team Groome removed one of the two layers of SCR catalyst, then cleaned and repacked both layers. Results: A 2.5-in.-H2O reduction in backpressure, improvement in NOx removal to more than 85%, and a reduction in ammonia consumption of nearly 1 gpm.

At a 2 × 1 501F plant with a single layer of SCR catalyst, the ammonia vaporizer, ammonia injection grid, and catalyst were cleaned, and the SCR repacked. Results: NOx emissions were reduced from 2.2 to 1.7 ppm and ammonia consumption dropped from 192 lb/hr to 144.

Deep-module tube blasting of six tube-bundle faces at a 1 × 1 7FA-powered combined cycle reduced backpressure from 17.5 to 10 in. H2O. Backpressure dropped by 7.5 in.

NERC/FERC Roundtable. Horishny's session was arranged much like a workshop with John Ballentine, director of cybersecurity and compliance for HPI LLC, doing the heavy lifting for which he is well-qualified. He presented on the following topics and conducted open discussion sessions after each:

- NERC Critical Infrastructure Protection v.5: standards and compliance timelines. CIP v.5 covers the details, tight schedule, and general applicability guidelines for this extensive set of regulations, which will be unleashed on the industry over the next two years.
- NERC Reliability Assurance Initiative. RAI requires entities to maintain an extensive compliance-control environment; how well they do this will determine NERC audit frequency and scope.
- FERC/NERC regional super-audits. The joint-agency compliance audit, recently announced, is important for powerplant owner/operators to understand. Lessons learned about planning, preparing for, and processing through the super-audit action is valuable for resource planning at the facility and corporate levels.

- Risk-based registration. Important, but for a good reason. Risk-based regulation affords certain smaller entities the opportunity to significantly shrink their regulatory footprint and compliance budget.

By way of professional background, Ballentine has over two decades of experience in the energy industry, including corporate and consulting roles managing cybersecurity and FERC/NERC compliance for power generators. He has more certifications after his name than British loyalty—specifically:

- CISSP, Certified Information Systems Security Professional.
- CISA, Certified Information Security Auditor.
- CCEP, Certified Compliance and Ethics Professional.
- GLEG, Certified Information Law Specialist.
- CSSA, Certified SCADA Security Architect.

It is impossible to summarize Ballentine's course notes, encompassing more than 170 information-dense slides, into an article of value to asset management and powerplant personnel. The only way for you to gauge what you have to learn, and how quickly, is to access the speaker's presentations in the CTOTF Library.