

Refinery Wastewater Treatment 101 - Fundamentals

WEFTEC® 2018 – New Orleans Convention Center

Sunday, September 30, 2018

Objective and Description

The objective of Workshop 101 is to introduce the fundamental concepts, approaches and technologies of refinery wastewater treatment to junior and mid-career wastewater process engineers. Following this workshop, participants will have a basic understanding of treatment concepts, technology applications, and basic design guidelines for unit processes in a typical refinery wastewater treatment system. Participants will gain a working knowledge of operation and troubleshooting from experienced professionals. Participants in this workshop will be fully prepared for the advanced Workshop 201, to be offered at WEFTEC 2019 in Chicago.

The workshop will cover fundamental concepts, approaches and technologies, operations, and troubleshooting of the unit processes of a typical refinery wastewater treatment system. The workshop will provide a working knowledge of wastewater characterization; oil/solids removal; equalization; biological treatment; biological solids separation; sludge and oil handling and dewatering; and will conclude with an operation and maintenance forum. Each presentation will include lecture, example problems, video of special test methods with Q&A breaks after each subject (several per presentation) to encourage an interactive relationship between presenters and participants. Further description of each topic follows:

1. Characterization – including key process parameters and alternate test methods; major waste streams and their characteristics; impacts of crude slate changes; current and future permit parameters and limits; and in situ and in line monitoring.
2. Oil/Solids Removal – including Stoke's Law; gravity/flotation/filtration approaches; system design consideration; regulatory impacts, safety in design, removal expectations; technology options; operations and troubleshooting; video of separation testing.
3. Biological Treatment – including equalization concepts and advantages; suspended and attached growth treatment system fundamentals; technology options; introduction to modeling; microbiological issues; toxicity; operations and troubleshooting; video of oxygen uptake testing.
4. Biological Solids Separation – including characteristics of biological solids; microbiological impacts on separation; gravity, flotation and filtration approaches; basics of technology selection; design subtleties; operations and troubleshooting; video of settling and flotation testing.
5. Sludge and Oil Handling and Dewatering – including characteristics of oil, oily solids and biological solid residuals at refinery WWTPs; dewatering and disposal approaches (including coker injection); basics of technology selection; operations and troubleshooting, video of centrifuge testing.
6. Operation and Maintenance Forum – including overview of most important operational parameters; operator requirements and functions; manual versus automatic control; in situ and in line analytical techniques; and troubleshooting.

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Agenda

<i>TIME</i>	<i>TOPIC</i>	<i>INSTRUCTOR AND AFFILIATION</i>
	Introduction	Mark Knight, Suez
8:30	Refinery Wastewater Sources and Characteristics	David Marrs, Valero
9:30	Oil/Solids Removal	Tom Schultz, Siemens
10:00	Networking/Discussion Break	
10:30	Oil/Solids Removal	Tom Schultz, Siemens
11:00	Biological Treatment	Kar Munirathinam, Tetra Tech
12:00	Lunch Break	
1:30	Biological Solids Separation	Everett Gill, Brown & Caldwell
2:30	Sludge and Oil Handling and Dewatering	Mouloud Hendou, Veolia
3:00	Networking/Discussion Break	
3:30	Sludge and Oil Handling and Dewatering	Mouloud Hendou, Veolia
4:00	Operation and Maintenance Forum	John Faber, ExxonMobil
5:00	Wrap-up and Adjourn	Mark Knight, Suez

Faculty

Mark Knight, Suez

Mr. Knight is the Chair of the Refining Subcommittee of the Industrial Wastewater Committee. Mark Knight is currently a Technical Specialist for SUEZ - Water Technologies & Solutions in Toronto and provides technical support for wastewater treatment systems across the Canadian refining industry. Prior to SUEZ, Mark worked for Suncor Energy as a Senior Engineer focused on Environmental Excellence & Climate Change. He holds a bachelor's degree Chemical Engineering (Environmental Option) from Queen's University in Kingston, Ontario and a master's degree in Environmental Applied Science & Management from Ryerson University in Toronto, Ontario.

David Marrs, Valero Energy Corporation

Mr. Marrs is the senior wastewater technologist at Valero Energy Corporation, San Antonio, Texas. He oversees wastewater-related projects at 15 oil refineries in the United States, Canada, and the United Kingdom. His responsibilities cover collection systems, treatment units, discharge structures, and residuals management. He holds an M.S. degree in chemical engineering from Case Western Reserve University as well as a B.A. in chemistry from Williams College.

Tom Schultz, Siemens

Mr. Schultz is the Technical Director for Siemens Water Solutions in wastewater treatment for the downstream petroleum/petrochemical industry. Mr. Schultz has authored numerous technical papers on both oil/water separation and biological treatment technologies which are applied in the petroleum industry and holds many patents pertaining to this equipment. Mr. Schultz holds a Bachelor of Science Degree in civil/environmental engineering with post graduate studies, also in environmental engineering.

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Kar Munirathinam, Tetra Tech

Dr. Munirathinam has over 35 years of wastewater experience for refineries from 100,000 bbl/day to 550,000 bbl/day. His specific major refinery wastewater treatment experience feasibility evaluation, bench-scale and pilot scale treatability studies, process designs, and coordination during detailed design, start-up and commissioning of biological and physical/chemical systems including recycle/reuse applications. Dr. Munirathinam hold a B.E., Civil Engineering and an M.E., Environmental Engineering from Madras University, India and a Ph.D. in Environmental Engineering from Oklahoma State University.

Everett Gill, Brown & Caldwell

Mr. Gill has over 18 years of professional experience in industrial wastewater treatment including refinery, petrochemical, landfill leachate, food processing, pharmaceuticals, and pulp and paper. Everett's work includes conducting, evaluating, and developing full-scale process design and operating guidelines developed from bench, pilot- and full-scale wastewater treatment studies. Specific process design experience includes development and use of static models as well as dynamic wastewater treatment simulation tools. He holds a B.S. in Environmental Engineering from the University of Florida.

Mouloud Hendou, Veolia

Dr. Hendou is presently Technical Director for Veolia Water Technology Oil & Gas. He is responsible for process flow definition and technologies proposed for projects, and the associated guarantees and the technical validation of Oil & Gas projects. Mouloud is a Chemical Engineer and an associate Professor holding a double PhD in Chemical Engineering from ENSIGC in Toulouse, France. He has spent 30 years in water and wastewater treatment for upstream and downstream Oil & Gas market. Mouloud is the author of more than twenty patents and has presented numerous papers in water treatment specializing in Oil & Gas. He is a member of GFGP (Groupement Français de Génie des Procédés). He has acted as coordinator of various European projects, and advisor of major R&D projects of European Commission.

John Faber, ExxonMobil

Mr. Faber is Vice Chair of the Refining Subcommittee of the Industrial Wastewater Committee. John is a Wastewater Discipline Technology Leader with ExxonMobil Research and Engineering Co. in Houston, Texas, and provides global technical support for wastewater treatment and waste management for the company's manufacturing facilities around the world. He holds dual bachelor's degrees in Chemical Engineering and Environmental Engineering from Stevens Institute of Technology in Hoboken NJ.

Registration and Attendance

Registration for the workshop is available along with conference registration and housing at <https://www.weftec.org/>. Attendance will be limited in order to allow close interaction between the faculty and the participants. Early registration is encouraged, as the number of applicants is expected to exceed the maximum.