*I. PROPOSED TITLE: “Back to Basics: Wastewater Treatment Fundamentals for Petroleum Refineries and Petrochemical Plants”

*II. NAME OF SPONSORING WEF COMMITTEE(S): Industrial Wastes
   Note: This workshop was endorsed by the WEF Industrial Wastes Committee (IWC) at its meeting in Orlando on October 11, 2009. See the IWC meeting minutes (available from Rob Schweinfurth) and the attached e-mail from Joe Cleary.

*III. WORKSHOP LEADERS:
   WORKSHOP CHAIRMAN
   *Name: Mr. David Marrs
   *Company/Institution: Valero Energy Corporation
   Mailing Address: One Valero Way – MS E2-158A
   City, State Zip/Postal Code: San Antonio, TX 78249
   Country: USA
   *Phone: (210) 345-3748
   FAX: (210) 345-2014
   *E-Mail: david.marrs@valero.com

   WORKSHOP VICE CHAIRMAN
   *Name: Mr. Jeff Pintenich
   *Company/Institution: Brown and Caldwell
   Mailing Address: 501 Great Circle Road – Suite 150
   City, State Zip/Postal Code: Nashville, TN 37228
   Country: USA
   *Phone: (615) 250-1237
   FAX: (615) 256-8332
   *E-Mail: jpitnenich@brwncaald.com

   WORKSHOP ORGANIZING COMMITTEE
   Dr. Somnath Basu (CDM – Cambridge, MA)
   Mr. Perry Lankford (CH2M Hill – Houston, TX)
   Mr. David Marrs (Valero Energy Corporation – San Antonio, TX)
   Mr. Jeff Pintenich (Brown and Caldwell – Nashville, TN)
   Dr. Jamal Shamas (CH2M Hill – Baton Rouge, LA)
**IV. WORKSHOP SPEAKERS:**

*SPEAKER #1

- Confirmation Attached
*Name: Mr. David Marrs
*Company/Institution: Valero Energy Corporation
Mailing Address: One Valero Way – MS E2-158A
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Phone: (210) 345-3748
FAX: (210) 345-2014
*E-Mail: david.marrs@valero.com

*SPEAKER #2

- Confirmation Attached
*Name: Dr. Davis Ford
*Company/Institution: Davis L. Ford & Associates
Mailing Address: 3300 Bee Cave Road – Suite 650
City, State Zip/Postal Code: Austin, TX 78746
Country: USA
Phone: (512) 327-6599
FAX: (512) 327-6408
*E-Mail: dfordphd@aol.com

*SPEAKER #3

- Confirmation Attached
*Name: Dr. Remi Van Compernolle
*Company/Institution: Shell Global Solutions
Mailing Address: Westhollow Technology Center
City, State Zip/Postal Code: Houston, TX 77210
Country: USA
Phone: (281) 544-8432
FAX: (281) 544-8727
*E-Mail: remi.vancompernolle@shell.com

*SPEAKER #4

- Confirmation Attached
*Name: Dr. Kar Munirathinam
*Company/Institution: CH2M Hill
Mailing Address: Five Penn Center West – Suite 300
City, State Zip/Postal Code: Pittsburgh, PA 15276
Country: USA
Phone: (412) 249-6620
FAX: --
*E-Mail: kar.munirathinam@ch2m.com
V. DESCRIPTION OF WORKSHOP (up to two pages)

The IWC recently conducted a telephone survey of environmental managers representing a broad cross-section of the domestic petroleum refining industry. Responses were obtained from integrated major oil companies, independent petroleum refiners, engineering contractors, and trade associations. The intent was to identify refiners’ most pressing needs in the area of wastewater treatment technology and then to determine how WEF, and WEFTEC in particular, could address those needs more effectively.

This survey was motivated by several factors:

- IWC has noted declining participation by petroleum refining and petrochemical companies at WEFTEC over the last several years.
- There are many refineries and petrochemical plants located in Southeast Louisiana and along the Gulf Coast, all within a day’s drive of New Orleans. These facilities represent an obvious target market for WEFTEC 2010.
- WEFTEC’s presence in New Orleans every other year (beginning in 2010) presents a longer-term opportunity to improve “brand identity” with a key industrial segment that by and large does not participate in WEF activities.

The IWC survey had several major findings:

- Most respondents were familiar with WEF, had a high regard for WEF’s professionalism and its publications, and had participated in WEFTEC in the past (although not so much recently).
- WEFTEC’s recent programming is not viewed as particularly relevant to the wastewater technology needs of the petroleum refining industry.
- Survey respondents also stated that there is no other professional organization or trade association that meets their needs for information in the area of wastewater technology. Thus, there is an unfilled market niche that WEFTEC may be able to fill.
Training was identified by most respondents as their principal unmet need, especially training for WWTP unit supervisors and engineers. Most training of water/wastewater professionals in the refining and petrochemical industries occurs “on the job”. There was general recognition of the need for good formalized training programs to compliment and undergird this real world experience.

In response to the findings of the survey, this proposed workshop will provide a structured training opportunity for unit supervisors and early career engineers responsible for WWTP operations in petroleum refineries and petrochemical plants. These individuals typically have plant experience but generally little if any academic background in environmental engineering or related disciplines. The intent of the workshop is to present an overview of wastewater treatment technology fundamentals and operating principles as applied in these industries. Topics to be covered include wastewater characterization, oil/water/solids separation, fundamentals of aerobic biological treatment, the activated sludge process and its modifications, secondary clarification, and management of WWTP residuals (biosolids, oily sludge, and VOC emissions). Practical guidance will be provided on design and operating criteria for these unit operations in an industrial setting.

The proposed speakers are all experienced engineering practitioners and were selected to represent a range of refining companies, consulting firms, and wastewater equipment vendors. Each speaker has previously taught at similar professional development and training courses.

We particularly call the review committee’s attention to Dr. Davis L. Ford’s agreement to speak at this workshop. Dr. Ford has worked in this field for over 40 years and is the most recent recipient of WEF’s Lifetime Achievement Award for Industrial Water Quality. He is well known among wastewater professionals in the refining and petrochemical industries as a consultant, author, and educator. We believe that Dr. Ford’s participation will be an added draw for potential attendees.

This workshop proposal should also be reviewed as part of a larger effort by the IWC to provide more targeted programming at WEFTEC aimed at attracting participation by the refining and petrochemical industries. As a parallel activity, the Industrial Wastes Symposium of the Program Committee has actively sought abstracts with a refining/petrochemical focus for the 2010 annual conference. The goal of the Symposium is to have 1-2 sessions on refining issues as part of the WEFTEC technical program. This will build on momentum from the very successful refinery wastewater session that took place at the 2009 Orlando conference and provide additional reasons for industrial participants to attend WEFTEC in New Orleans.

VI. SHORT DESCRIPTION
This workshop will provide an overview of wastewater treatment technology fundamentals and operating principles as applied in the petroleum refining and petrochemical industries. Topics to be covered include wastewater characterization, oil/water/solids separation, fundamentals of aerobic biological treatment, the activated sludge process and its modifications, secondary clarification, and residuals management (biosolids, oily sludge, and VOC emissions). Practical guidance will be presented on design and operating criteria for these unit operations in an industrial setting. Suggested WWTP troubleshooting/optimization checklists will be provided for each major unit operation as part of the course notes.
**VII. LEARNING OBJECTIVES**
Participants will be provided with theoretical and practical tools that will allow them to more knowledgeably operate, monitor, troubleshoot and optimize WWTPs at refineries and petrochemical plants.

**VIII. ASSESSMENT**
Participants will be provided with a take-home quiz at the conclusion of the workshop. Individuals desiring CEU credits will be directed to complete the quiz and return it to the workshop organizers for evaluation within 10 days. Results will be summarized and reported to WEF so that CEU credits may be awarded.

In addition, WEF’s usual workshop assessment surveys will be distributed to attendees and gathered for analysis. This will provide critical feedback to the organizers and the IWC as they consider future workshops on this or related topics.

**IX. OUTCOME**
The questions and problems presented on the quiz will be drawn from real-world situations encountered by the workshop organizers in refinery and petrochemical plant WWTPs. The speaker presentations and workshop materials will contain sufficient information for attendees to complete the quiz. A grade of 70 percent or greater will be considered a passing score.

**X. WHO SHOULD ATTEND?**
This workshop is intended primarily for unit supervisors and early career engineers responsible for the operation of wastewater treatment systems in the petroleum refining and petrochemical industries.

**XI. INTERACTIVE COMPONENT OF THE WORKSHOP**
The workshop will include tables set up along the perimeter of the meeting room with bench-top laboratory equipment to demonstrate several of the process control tests typically used at refinery and petrochemical plant WWTPs. These process control tests will be introduced by the speakers, and the interactive demonstrations will take place during the morning and afternoon breaks, as well as during lunch. The following will be demonstrated: jar testing of polymers for enhanced liquid/solid separation, laboratory test of dissolved air flotation for secondary oil/water separation, oxygen uptake rate test with activated sludge biomass, microscopic examination of activated sludge mixed liquor, and biomass settling and compaction tests. If possible, we will also set up some simple wet chemistry bench tests such as pH, phosphate, and ammonia-nitrogen. The equipment and manpower for these tests will be provided by the workshop organizers, with some assistance expected from interested WEFTEC exhibitors such as Hach Company or Nalco Chemical. Wastewater and activated sludge mixed liquor samples will be obtained from the Valero St. Charles Refinery, which is located approximately 15 miles upriver from New Orleans.

**XII. WHAT ARE THE PREREQUISITES FOR THE WORKSHOP?**
Basic understanding of typical WWTP unit operations in refineries and petrochemical plants. Interest in applying WWTP technology to improve performance and reduce costs. Prior academic training in environmental science or engineering will be helpful but is not required.
*XIII. AGENDA
See attachment.

*XIV. AUDIO VISUAL /PUBLICATION NEEDS

- LCD Projector (for Power Point presentations)
- DVD player with TV Monitor
- Flip Charts with markers Number Requested 2
- Table top microphone (for panel discussions)
- Microphone for audience participation
- Computer Number Requested _____ (Computers are for demonstrations, exercises, etc. Note that a computer for presentation is already included in the standard set up.)
- Calculator Number Requested _____
- Electrical outlets
- Other (list detailed specifications for equipment rental)

I would like to include the following WEF publication as a supplement to the proceedings provided by the speakers:

*XV. SPECIAL EQUIPMENT NEEDS

- I DO NOT need special equipment for this workshop that will need to be shipped or obtained from an exhibitor. All equipment required for the desktop demonstrations will fit into suitcases and will be hand carried by the presenters.
- I DO need special equipment for this workshop that will need to be shipped or obtained from an exhibitor.
  - I understand that all equipment must be provided by a WEFTEC 2010 exhibiting company.
  - I understand that moving equipment into and out of the workshop must be coordinated with WEF staff now so that workshop prices can be set accordingly.
  - I anticipate the following equipment for this workshop (provide name of equipment, anticipated provider, size, weight, crating method, etc.)
    Equipment piece 1:
    Equipment piece 2:
    Etc. as needed

*XVI. WORKSHOP ROOM SETUP

Attendee Seating:
- Classroom Style (rectangular tables with chairs)
- Rounds (round tables with chairs) How many seats per table? __________
- Special set. Please include 6 rectangular conference tables placed across the back and along one side of the room for desktop demonstrations.

Speaker Seating:
- Podium Only
- Podium with Speaker Table for 4 speakers (head table on a raised platform with a maximum of 6 speakers). For this option, include the number of speakers. Note: A speaker table will decrease the seating space in your room.
**XVII. DAY AND TIME OF WORKSHOP**
A. This workshop should be held on: **X Saturday** □ Sunday □ Either □ Other

B. Please attempt to avoid conflicts with the following WEFTEC®.10 events: Industrial Wastes Committee meeting (usually scheduled for Sunday afternoon of WEFTEC)

C. The workshop will last □ a half day (8:30 a.m. – 12:00 p.m.) or □ a half day (1:30 p.m. – 5:00 p.m.) or **X a full day** (8:30 a.m. – 5:00 p.m.)

**XVIII. ATTENDANCE INFORMATION**
A. Estimate the number of attendees you anticipate for your proposed workshop □ 0-25 □ 26-50 **X 51-100** □ 101-150 □ > 150

B. Is there a maximum number of people who can attend this workshop? □ Yes How Many? ________ **X** No.

C. If you answered yes, please explain the reason for the limit.

**XIX. MARKETING PLAN**
In addition to the publicity provided by WEF, the organizers will make a concerted effort to market this workshop directly to petroleum refineries and petrochemical plants located in Southeast Louisiana and along the greater Gulf Coast. WWTP staff at these facilities comprise the target audience. However, as these individuals are not currently involved in WEF activities to any great extent, they are unlikely to be reached by conventional WEF marketing materials.

To bridge this gap, the organizers will prepare a one-page flyer describing the workshop. This flyer will be distributed to Gulf Coast refineries and petrochemical plants using the following industry contacts and information channels:

- We will enlist the support of national and regional trade associations to reach out to their membership for potential attendees. The Workshop Chairman and Vice Chairman are committed to contacting the following organizations:
  - American Petroleum Institute (API)
  - National Petrochemical and Refiners Association (NPRA)
  - American Chemistry Council (ACC)
  - Louisiana Mid-Continent Oil & Gas Association
  - Louisiana Petroleum Partners
  - Louisiana Chemical Association

- One of the workshop organizers has agreed to promote the workshop through his contacts in the Environmental Division of the American Institute of Chemical Engineers.

- The three consulting engineering firms represented on the workshop organizing committee have agreed to promote the workshop to their Gulf Coast refinery and petrochemical plant clients.
We have contacted representatives of GE Water & Process Technology and Nalco Chemical regarding this workshop. GE and Nalco provide water and wastewater treatment chemicals and related services to many Gulf Coast refineries and petrochemical plants. Our initial contacts with these companies indicate that they recognize the potential value of this workshop to their customers and that they are willing to distribute promotional materials prepared on behalf of WEF.
PROPOSED AGENDA FOR WEFTEC 2010 PRE-CONFERENCE WORKSHOP

BACK TO BASICS: WASTEWATER TREATMENT FUNDAMENTALS FOR PETROLEUM REFINERIES AND PETROCHEMICAL PLANTS

<table>
<thead>
<tr>
<th>Time</th>
<th>Topic</th>
<th>Speaker</th>
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<tbody>
<tr>
<td>8:30-8:35</td>
<td>Welcome &amp; Introductions</td>
<td>David Marrs</td>
</tr>
<tr>
<td>8:35-9:15</td>
<td>Wastewater Characterization</td>
<td>David Marrs</td>
</tr>
<tr>
<td>9:15-10:00</td>
<td>Primary Oil/Water/Solids Separation</td>
<td>Davis Ford</td>
</tr>
<tr>
<td>10:00-10:30</td>
<td>BREAK**</td>
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</tr>
<tr>
<td>10:30-11:00</td>
<td>Secondary Oil/Water/Solids Separation</td>
<td>Remi Van Compernolle</td>
</tr>
<tr>
<td>11:00-12:00</td>
<td>Fundamental Concepts of Aerobic Biological Treatment</td>
<td>Kar Munirathinam</td>
</tr>
<tr>
<td>12:00-1:30</td>
<td>LUNCH**</td>
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<tr>
<td>1:30-2:15</td>
<td>Control and Optimization of the Activated Sludge Process</td>
<td>Kar Munirathinam</td>
</tr>
<tr>
<td>2:15-3:00</td>
<td>Activated Sludge Process Modifications</td>
<td>Everett Gill</td>
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<tr>
<td>3:00-3:30</td>
<td>BREAK**</td>
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<tr>
<td>3:30-4:15</td>
<td>Control and Optimization of Secondary Clarifiers</td>
<td>Everett Gill</td>
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<tr>
<td>4:45-5:00</td>
<td>Panel Discussion/Wrap-up</td>
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**Hands-on interactive demonstrations of WWTP process control tests will be offered during the break periods, as discussed in Section XI above.
As the Chair of the Industrial Waste Committee, I hereby endorse the Workshop Proposal from David Marrs on Petroleum Wastewater Treatment. This workshop was in response to our survey of the petroleum industry members as well as the location of WEFTEC 2010 in New Orleans. The majority of the refineries in the US are located in the Gulf Coast area. We expect a strong interest and turnout for this workshop. This workshop is consistent with our goal to share technical knowledge with our industrial members.

Thanks
Joe

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