Western Refining
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April 30, 2010

CERTIFIED MAIL No: 7008 2810 0000 4726 1413

Hope Monzeglio
Hazardous Waste Bureau
New Mexico Environmental Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6303

RE: **Response to Notice of Disapproval Process Design Report for Wastewater Treatment Plant Work Plan (Alternative Design)**
Western Refining Company Southwest, Inc. (Gallup Refinery)
EPA ID# NMD000333211
HWB-GRCC-09-006

Dear Ms. Monzeglio

Enclosed please find the Response to Notice of Disapproval Process Design Report for Wastewater Treatment Plant Work Plan (Alternative Design). The purpose of this report is to give an outline of the new Waste Water Treatment Plant and address the comments presented to Western Refining.

Please feel free to contact Ed Riege at 505-722-0217 with any questions.

Sincerely,

Mark S. Turri

Mark Turri
General Manager

cc: Carl Chavez OCD

April 30, 2010

Mr. James P. Bearzi
Chief, Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505-6303

Subject: Response to Notice of Disapproval
Process Design Report for Wastewater Treatment Plant Work Plan (Alternative Design)
Western Refining Company Southwest, Inc. (Gallup Refinery)
EPA ID# NMD000333211
HWB-GRCC-09-006

Dear Mr. Bearzi:

This letter is in response to the Notice of Disapproval (NOD) for Western Refining's "Process Design Report for Wastewater Treatment Plant Work Plan (Alternate Design) dated September 2009 (Work Plan). The comments from the NOD and the responses addressing those comments are included below. In addition, the Work Plan (Alternative Design) has been revised and is being re-submitted with this response as a complete replacement for the Work Plan dated September 2009. In Western Refining's responses in this letter, references to the Work Plan now refer to the attached "Process Design Report for Wastewater Treatment Plant Work Plan (Alternative Design, Revision A)" dated April 2010.

Among the Work Plan revisions are two new sub-sections in Section 4. New Section 4.2.1 is entitled "Combined Process Sewer and Process Area Storm Sewer," and new Section 4.2.4 is entitled "API Separator Influent Pump Station." The original sub-sections of Section 4 are re-numbered accordingly in the Work Plan. When this letter refers to Section 4 sub-sections, brief acknowledgments are given of former and current numbering.

Comment 1

The "Response to Comment A" indentified in the Cover Letter dated September 25, 2009 "Process Design for the Wastewater Treatment Plant Work Plan (Alternative Design)." The Permittee requests approval to continuously discharge flows of less than 30 gpm from the storm sewer to T27 and T28.

NMED Response

NMED approves the use of Tank T27 and T28 to receive storm water flow. See Comment 8 below for required revisions to the Work Plan.

Western Refining Response

Western Refining appreciates the approval of this request.

We want to advise NMED that the design approach for the process sewer and process area storm sewer has been changed. The design now incorporates the use of a single sewer to convey the process wastewaters and process area storm water to either the Equalization (EQ) tank or to T27/28. This change was motivated by the location of the existing tanks, and the ease of installing a new equalization tank at a low elevation close to the future process area. This in turn enabled the use of a single sewer that conveys both process wastewater and storm water to the three tanks, rather than a segregated sewer for the storm water all the way into the containment area and directly to T27/28. Normal flow from the combined sewer will be to the EQ Tank. Sewer flows will be directed to T-27/28 when the EQ Tank is out of service or nearing its capacity or to ensure that the contents of the tank(s) meet the <90-day storage requirements. Please see the Comment 2 response and Section 4.2.1 of the revised Work Plan for further discussion.

Comment 2

The Permittee states on the second page of the Cover Letter that "[Note: We believe it is prudent to have interconnectivity between the process sewer and the storm sewer in order to provide flexibility in management of our process wastewater and storm waters. This "normally closed" interconnection is reflected in Figure 1 of the PDR Work Plan.]"

NMED Response

NMED is assuming this is the line identified in Figure 1 with arrows on either end that states "(NORMALLY CLOSED)" upstream of Tanks T27 and T28 and the Equalization (EQ) Tank. The above statement does not explain the purpose of this connection between the Storm Water Tanks and the EQ Tank. The Permittee must explain the purpose for the proposed interconnectivity between the process sewer and the storm sewer and explain flexibility in management of the process wastewater and storm water and why it is desirable.

Western Refining Response

With a single sewer in the containment area conveying process wastewater and the small amount of dry weather storm sewer flow, the normal management of conveyed flow will be to direct it to the EQ Tank. High-flow wastewaters associated with significant storm events will be directed first to the EQ Tank and then to T27 or T28 if the EQ Tank approaches its capacity. However, it is reasonable to anticipate a situation in which an alternative wastewater management will be preferable – that is, flow conditions may occur or the tanks may be at such a capacity that, for a limited period, the EQ Tank or T27/28 will be in a better position than the others for receiving influent flow from the sewer. Thus, piping flexibility is valuable. Please see Section 4.2.1 of the revised Work Plan for further discussion.

Comment 3

In the "Response to comment D" identified in the Cover Letter dated September 25, 2009; "Process Design for the Wastewater Treatment Plant Work Plan (Alternative

Design)," the Permittee requests an extension from September 4, 1010 to March 31, 2011 to have the upgraded wastewater treatment system installed and operating. The Permittee also states that "[t]o date, we have researched an upgraded wastewater treatment system and completed its process design. However, we have not been able to complete the full design package required for construction due to the negotiation of the recently finalized Compliant and Consent Agreement and Final Order (CAFO). The CAFO now requires compliance with 40 CFR 62.34(a) [sic] which has a major impact on the design requirements for the alternative system."

NMED Response
NMED does not approve of this extension request. An alternative deadline may be established upon approval of the revised Work Plan, if and when this Work Plan is approved; however, the Permittee already has an approved work plan and could have begun implementing the plan as of September 1, 2009. The Permittee has known since the first submittal of the February 26, 2009 *Process Design Report for Wastewater Plant Upgrade* that the system would likely have to comply with 40 CFR 262.34(a). In addition, a meeting was held on August 7, 2009 between NMED and Gallup explaining that these requirements would be required. No response is necessary.

Western Refining Response
Please refer to the revised Work Plan Section 5 for our proposed schedule.

Comment 4
In Section 1.2 (Project Scope), bullet one, page 2, the Permittee states "[t]wo existing tanks put in service for the storage of process area storm water and diversion of off-spec wastewater."

NMED Response
It is not clear which two existing tanks are being references, nor is it clear what "off-spec wastewater" is. The Permittee must revise the Work Plan to identify the two existing tanks by name (e.g., Tanks 27 and 28). The Permittee must clearly define what "off-spec wastewater" is (identify all sources) since this term is used throughout the Work Plan. The Permittee must also discuss the capacity of these tanks and their ability to handle the additional flow volumes and the ability of the API separator to handle potential increased flow from these tanks.

Western Refining Response
Work Plan Section 1.2 was revised to clarify tank designation and the meaning of "off-spec wastewater." Sections 4.2.2 and 4.2.3 (formerly 4.2.1 and 4.2.2) discuss the wastewater storage capacities of T27, T28 and the new EQ Tank. Section 4.2.4 describes how the flow to the API Separator will be controlled so the design capacity of 500 gpm will not be exceeded.

Comment 5
In Section 1.4 (Treatment Objectives), page 2, the Permittee states "[t]he treatment objectives for the WWTP upgrade are to provide water quality that is suitable for discharge to the unlined EP-1. Specifically, the objectives are for there to be no visible

free oil ≤ 0.5 mg/L benzene. This project design was developed based on these objectives."

NMED Response
The effluent entering into the unlined Evaporation Pond 1 (EP-1) must have benzene concentrations less than 0.5 mg/L. In addition, the treatment objective of the upgraded wastewater treatment system (WWTS) is for all effluent entering into EP-1 to comply with all applicable regulations. Discharges to the unlined Evaporation Ponds must not create the potential for impacts to groundwater. The Permittee must revise the Work Plan to state that benzene concentrations will be below 0.5 mg/L for benzene.

Western Refining Response
Work Plan Section 1.4 was revised to state that the effluent entering EP-1 must be <0.5 mg/L benzene, rather than ≤0.5 mg/L benzene. Also, the revised Section 1.4 states that the effluent entering EP-1 shall meet the definition of EPA RCRA non-hazardous as required by Condition 23 of our OCD Discharge Permit GW-032.

Comment 6
In Section 2.3 (Pilot Travel Center Wastewaters), page 4, the Permittee states "[t]he lift station's submersible pumps then transfer the wastewater through a pipeline to the refinery for further pumping and treatment." In Section 4.2.5 (Travel Center Pretreatment), page 9, the Permittee states "The sanitary wastewater from the Pilot Travel Center and refinery will be pretreated prior to discharge to EP-1"…"[t]he new pretreatment system will provide removal of soluble organics. The technology selection for the system has not been finalized, but candidate technologies include: A new lined aeration lagoon (treating only Pilot Travel Center and refinery sanitary wastewaters), vertical flow wetlands, a recirculation media filter."

NMED Response
The Permittee does not appear to have a finalized pretreatment system design to treat the sanitary wastewater generated at the Pilot Station and at the refinery. NMED cannot evaluate the design of a system without knowing the system being proposed. The revised Work Plan must include the selected proposed pretreatment technology and design, process flow diagram(s), required maintenance, and contingencies that will be put in place if the system fails, etc. A list of candidate technologies is not acceptable.

Western Refining Response
Work Plan Section 4.2.7 (formerly 4.2.5) was enhanced to provide design information about the aerated lagoon technology selected to treat Travel Center sanitary wastewaters.

Comment 7
In Section 3.3 (Macro Porous Polymer Extraction Technology), page 6, the Permittee states "[a] schematic of MPPE process is provided in Figure 2."

NMED Response
The schematic diagram shown in Figure 2 is a generic schematic diagram from the

manufacturer, which was also shown in Attachment B. The Permittee must revise Figure 2 of the Work Plan to include the design drawing of Macro Porous Polymer Extraction (MPPE) Technology that will actually be installed at the facility, in addition to all design details.

Western Refining Response

Western Refining would ask that NMED forgoes review of the design detail prior to approval, based on the results provided by the pilot demonstration. The pilot demonstration results summary is attached in the revised Work Plan: Attachment D. The pilot test was able to demonstrate that this technology will produce the required results of the treated waste water. The pilot demonstration is more prudent to the applicability than the process and instrumentation diagrams. We agree to provide NMED with the detailed plans and specification that will be used for construction, at the time they are released for contractor bidding. This sequence will allow NMED to review and comment on system details prior to construction.

Comment 8

In Section 4.2.1 (Stormwater/Diversion Tanks), page 8, paragraph 2, the Permittee states "Oil that may accumulate on the liquid surfaces of T27 and T28 will be captured from a skimmer device contained within each tank's floating roof. The skimmed oil will be collected by a vacuum truck and transferred to the refinery's rerun oil system for recycling back to the refining process. Prior to pumping the T27/T28 contents to the API Separator, solid material that may have settled on the tank bottom will be re-suspended through mixing."

NMED Response

The Permittee provided insufficient detail concerning the removal of skimmed oil and the mixing process described above. The Permittee must revise the Work Plan to address the following. (see also Comment 1)

a. Indicate how often oil will be skimmed from Tank T27 and T28.

b. Explain how the solid material will be re-suspended through mixing (e.g., how will the mixing occur, what equipment will be used). The Permittee must also discuss what measures will be implemented to demonstrate that mixing was successful.

c. Explain how the refinery will demonstrate that the liquids and solids in Tanks T27 and T28 meet the 90-day storage requirements, by clearly explaining the type of measurements and record keeping to be implemented to assure that the 90-day accumulation period is not exceeded.

d. Tanks T27 and T28 shall not accumulate more than two feet of sludge during any 90-day accumulation period. The Permittee must demonstrate how the sludge level will be measured.

Western Refining Response
Refer to revised Work Plan Section 4.2.2 (formerly 4.2.1).

Item a: Oil level will be checked before a wastewater pumping event (or approximately every two weeks), with skimming conducted as needed. The minimum frequency for checking/skimming the oil will be every 75 days, because the wastewater pumping will be at least that often.

Item b: Solids re-suspension will be done by pump recirculation, a commonly used method for mixing tank contents. Revised Section 4.2.2 explains the approach for re-suspension and demonstrating successful mixing.

Item c: The tank (T27/28) pumped effluent flow rate and liquid level will be tracked, both electronically logged, thus acquiring the data needed to follow the guidelines of the USEPA February 16, 2007 interpretation letter (included as Attachment C of the revised Work Plan) regarding the turnover of hazardous waste stored in tanks.

Item d: We do not understand NMED's basis for limiting the accumulation of solids in the bottom of T27/28 to less than 2 feet. The re-suspension mixing described under Item b and in the revised Work Plan will ensure that the 90-day accumulation period is not exceeded. Therefore, the amount of sludge that accumulates in the interim is not relevant to complying with this requirement. We request relief from the requirement that solids accumulation be limited to less than 2 feet.

Comment 9
In Section 4.2.1 (Stormwater/Diversion Tanks), page 8, paragraph 3, the Permittee states "Cleanouts will be installed on the conveyance pipelines to and from the Stormwater/Diversion Tanks…[u]nderground piping will be buried below the frost line to prevent freezing. Above ground piping will be electric heat traced to prevent freezing."

NMED Response
The Permittee must revise the Work Plan to provide a figure of the WWTS that identifies where all cleanout and above and below ground piping will be placed and describe how pipelines will be tested for mechanical integrity or leakage.

Western Refining Response
Please also see the response to Comment 10, which relates to secondary containment and leak detection for piping, and to the response to Comment 16, which references a new table in the revised Work Plan Section 4.5 that itemizes, among other things, the locations of above ground and below grade piping.

Revised Section 4.2.2 (formerly 4.2.1) states that cleanouts will be placed in gravity piping (not force mains) approximately every 300 feet (four are anticipated on the 1,200 linear feet of new buried gravity sewer pipe). Cleanouts on force mains will be minimal, if any, due to continuous flows, acceptable scour velocities, and the desire for all-welded

connections. The exact placement of cleanouts will shown on the detailed design plans and specifications for construction, which will be shared with NMED (see Comment 6).

The revised flow diagram (Figure 1) provided with the Work Plan indicates which piping is buried and which piping is above ground. The new buried and above ground piping installed for the project will be hydrostatically tested with clean water prior to being placed into service. This will be the initial test of mechanical integrity and leak detection. Once in service, we will comply with the requirements of 40 CFR 265.193(f) for the piping covered under paragraph 100 E and F of the CAFO since the piping is ancillary equipment ("CAFO piping"). We will meet the requirements of 40 CFR 265.193(f) by a combination of providing full secondary containment (per 40 CFR 265.193(b); using welded flanges, welded joints, and welded connections for above ground piping; and inspecting the above ground piping daily. The intention is for all CAFO piping to be above ground to allow for visual inspection. Where CAFO piping is within a tank secondary containment area, then that containment area will be used to provide containment for that piping. Where CAFO piping is outside of a tank containment area, then the approach of welded piping with daily visual inspection will be used. Revised Section 4.5 of the Work Plan provides a listing of which piping runs are covered by the CAFO and what method will be used to comply with 40 CFR 265.193(f) for that piping.

Comment 10

In Section 4.2.1 (Stormwater/Diversion Tanks), page 8, paragraph 3, the Permittee states "[u]nderground piping will be buried below the frost line to prevent freezing. Above ground piping will be electric heat traced to prevent freezing. The piping design is referenced in section 4.5."

NMED Response

Section 4.5 does not include many details relating to the piping design as stated above. Section 4.5 states "[t]he secondary containment and leak detection requirements for piping systems covered by the CAFO will also be implemented where required." The Permittee must revise the Work Plan to describe what type of secondary containment and leak detection will be used for the piping systems. All design details proposed to comply with the CAFO must be included in the Work Plan.

Western Refining Response

Section 4.5 has been revised to provide additional details regarding which piping segments are deemed to be covered by the CAFO and the proposed secondary containment and leak detection measures (if any) for each piping segment. The detailed drawings of the piping design will be included in the construction documents to be provided to NMED (see Comment 6).

Comment 11

The Permittee addresses the Equalization Tank (EQ) in Section 4.2.2.

NMED Response

The Permittee provided insufficient detail concerning the EQ Tank and must address

the items below in the revised Work Plan.

a. Discuss the operation of this tank in detail (e.g., flow controls, residence time, capacity).
b. Explain the oil recovery process including the destination of the skimmed oil.
c. Discuss sludge accumulation and address how the sludge be managed. Describe tank maintenance procedures (e.g., how will the tank be cleaned, frequency of cleaning, will cleaning require the tank to be removed from service, if so, how long will it be removed from service, effects on the operation of the wastewater treatment system, contingencies to be put in place to accommodate cleaning).

Western Refining Response
Item a: Refer to the revised Section 4.2.3 (formerly Section 4.2.2).

Item b: Refer to the revised Section 4.2.3 (formerly Section 4.2.2).

Item c: Sludge that accumulates in the EQ Tank will be managed like tank sludge elsewhere in the refinery, with standard cleanout and removal procedures implemented as needed, expected to be every three to five years. The flexibility of wastewater management discussed under Comments 1 and 2 will enable either T27 or T28 to function in the place of the EQ Tank during sludge removal periods (normally about two to four weeks).

Comment 12
The Permittee address the Dissolved Gas Flotation System in Section 4.2.3.

NMED Response
This Section did not discuss the maintenance of the Dissolved Gas Flotation (DGF) system. The Permittee must revise this section to address maintenance required for this system, the frequency of maintenance, and all other operation and maintenance details.

Western Refining Response
Work Plan Section 4.2.5 (formerly Section 4.2.3) has been revised to discuss float management further. Attachment A provides maintenance information from the DGF vendor. Mechanical dewatering, if needed, will be conducted by a contract service, who will manage their equipment maintenance.

Comment 13
In Section 3.3 (Macro Porous Polymer Extraction Technology), page 6, the Permittee states "[t]he design of the MPPE system employs two extraction columns allowing continuous operation in one column with simultaneous extraction and regeneration in the other column. A cycle time of one-hour extraction and one hour regeneration is typical." The Permittee states in Section 4.2.4 (MPPE System), page 9, that "[t]he MPPE system will consist of two columns operating in parallel. One column will be in

service while the other is being regenerated. The columns will switch their mode of operation on a routine schedule (e.g., hourly)."

NMED Response
The Permittee must revise the Work Plan to address the maintenance of the MPPE system to include the frequency of maintenance and the effects of such maintenance on the operation of the WWTS.

Western Refining Response
Attachment B in the revised Work Plan provides maintenance guidance from the MPPE vendor. (The previous Attachment B information has not been re-submitted.) Section 4.2.6 (formerly 4.2.4) of the Work Plan has been updated to discuss the MPPE maintenance impacts on WWTP operations. Section 4.2.3 (formerly 4.2.2) describes the storage capacity of tankage upstream of the MPPE system, presenting calculations demonstrating that the combination of EQ Tank and T27/28 will be able to retain 2.5 to 3 days of wastewater flow without discharge to the API Separator, DGF unit, or MPPE system. This wastewater storage and discharge retention will enable MPPE system maintenance (as well as maintenance of other downstream WWTP components), given the vendor-supplied descriptions of recommended maintenance and expected maintenance durations.

Comment 14
In Section 4.2.3 (DGF System), page 9, paragraph 3, the Permittee states "The DGF float material will be skimmed from the top of the DGF using a variable speed scraping mechanism. The skimmed float will be sent to the DGF float storage and dewatering system. The float system will consist of retention tanks with gravity dewatering. This material will normally be recycled to a refining process (on-site or off-site). If recycling is not available, the float material will be managed as a hazardous waste."

NMED Response
The Permittee must provide more details about the DGF unit and DGF float storage and dewatering system and revise the Work Plan to identify how many retention tanks will be utilized and discuss all maintenance requirements and frequency of maintenance of the DGF unit and the DGF float storage and dewatering system.

Western Refining Response
See response to Comment 12.

Comment 15
In Section 4.4 (Management of Off-Spec Wastewater), page 10, the Permittee states "[p]rocess monitoring will be used to identify when this diversion is needed."

NMED Response
The Permittee did not describe or define the process monitoring, does not address how the upgraded WWTS will be monitored to ensure system is operating correctly, or discuss how the Permittee will demonstrate that the effluent entering into EP-1 is not a hazardous waste. The Permittee must revise the Work Plan to include sampling

activities that will be conducted to monitor the upgraded wastewater treatment system and describe "process monitoring." In addition, the Permittee must discuss in detail in the text of the Work Plan where sample ports will be located within the wastewater treatment system (influent and effluent sampling ports in the EQ Tank, new API separator, DGF, MPPE, T27/T28). The sampling ports must be constructed in a manner that allows for reduced flow rate (low flow) to minimize the loss of volatile organic compounds (VOCs) when samples are collected (Figure 1 depicts sample points but these are not described within the text).

Western Refining Response
Work Plan Section 4.4 is revised to describe the process monitoring approach.

Comment 16
In Section 4.5 (Tank Design, Secondary Containment, and Leak Detection), page 11, the Permittee states "Under the terms of the CAFO, the tanks and ancillary equipment downstream of the API Separator, including diversion tank systems, are subject to 40 CFR §262.34(a). By reference, these systems are therefore subject to 40 CFR 265 Subpart J for tank systems. Accordingly, the systems downstream of the new API separator will comply with the tank design requirements of 40 CFR 265 Subpart J, including secondary containment and leak detection. Since the CAFO was signed just recently, Western Refining is still determining how the specific design requirements of the CAFO will be implemented."

NMED Response
NMED cannot evaluate a Work Plan that does not include complete design specifications. The Permittee must revise the Work Plan to include all the design details that comply with 40 CFR 262.34(a) and 40 CFR 265 Subpart J Tank Systems. The Permittee must identify all units by name that are subject to the requirements and how they will comply with 40 CFR 34(a) and 40 CFR 265 Subpart J (this must include the EQ Tank, Tanks T27 and T28, the DGF, the DGF Float Storage and Dewatering tank(s), and the MPPE unit).

Western Refining Response
A new Table 4-2 is inserted into revised Section 4.5 (Tank Design, Secondary Containment, and Leak Detection), which presents a component-by-component description of what is required by paragraphs 100 E and F of the CAFO, as well as methods to be used for secondary containment and leak detection.

Comment 17
In Section 4.5 (Tank Design, Secondary Containment, and Leak Detection), page 11, the Permittee states "[i]n general, secondary containment requirements for tanks will be met through concrete or impermeable liner containment areas. Containment volumes will be 1.3 times the volume of the largest tank within that area to include an allowance of precipitation. Leak detection for tanks with bottoms that cannot be visually inspected will be provided by installing double bottoms with leak detection on those tanks. The secondary containment and leak detection requirements for piping systems covered by the CAFO will also be implemented where required."

NMED Response
The Permittee indicates that the upgraded system, where applicable, will comply with secondary containment and leak detection requirements. The Permittee must revise Work Plan to provide the specific design details where secondary containment and leak detection will be constructed, including the specific units and individual type of secondary containment to be constructed, including piping and leak detection devices. The upgraded WWTS must comply with the applicable requirements of the OCD Discharge Permit (GW-032) as well.

Western Refining Response
Please see response to Comment 16.

Comment 18
In Section 4.5 (Tank Design, Secondary Containment, and Leak Detection), page 11, the Permittee states "In the event that there are new tank(s) or ancillary equipment not covered by the CAFO, such as those upstream of the API separator, those systems will be designed to standards in accordance with GW-032 and related OCD requirements.

NMED Response
The WWTS must be designed to meet all applicable regulations upstream and downstream of the API separator.

Western Refining Response
Please see response to Comment 16.

Comment 19
In Section 4.6 (Air Emissions Control), page 11, the Permittee states that some units generate "Negligible air emissions."

NMED Response
The Permittee must revise the Work Plan to define the methods used to determine air emission levels and, based on those methods what would be considered negligible. The Permittee must identify and describe air sampling ports and their locations within the WWTS.

Western Refining Response
There will be two new emission points associated with the upgraded WWTP: the DGF and the MPPE condensate drum. A common vapor-phase granular activated carbon (GAC) will be used for emission control of these points. The air sampling ports will be at the DGF emission point, MPPE emission point, GAC inlet, and GAC canister outlet, as shown on Figure 1. Revised Work Plan Section 4.6 addresses this comment.

Comment 20
The Permittee provided supplemental information for the DGF and MPPE in Attachments A and B, respectively. The attachments provide the general manufacturers information about the DGF and MPPE units, which also include system diagrams. The

diagrams are not necessarily specific to the WWTS. The Permittee must revise the Work Plan to include the design and process flow diagrams for the actual DGF and MPPE units that will be installed at the refinery. See Comment 21 Below.

Comment 21

The Permittee included a flow diagram of the alternative design to the WWTS in Figure 1 Flow Diagram Alternative WWTP UPGRADE (attached). The Permittee must revise the figure and add additional figures as necessary to address the following in the revised Work Plan.

a. The Legend found in Figure 1 defines dashed lines as existing; the figure has the API separator surrounded by dashed lines because it is an existing structure. In the response letter, the Permittee must explain why the Storm Water Tanks T27 and T28 were not surrounded by dashed lines since these also are existing structures. The Permittee must revise the figure accordingly.
b. The figure(s) must be design drawings of the actual WWTS that will be installed. The drawings must include the exact number of tanks that make up each component of the WWTS, piping, secondary containment, and leak detection. The drawing must also depict exactly where the flows will be entering and exiting through the various WWTS units (e.g., will influent enter at the top of tanks, sides).
c. The flow diagram must present all above and underground piping associated with the WWTS.
d. NMED requires additional flow meters. The locations of the flow meters are shown on the Attached Figure 1.

Western Refining Response

Item a: T27 and T28 physically exist, but they have never been in service for the purpose intended in the September 2009 Work Plan or the revised Work Plan. Therefore, we considered it misleading to depict them with the dashed line indicative of existing equipment, and the Figure has not been changed.

Item b: The Figure 1 flow diagram has been updated to provide more information. Figure 2 has been added to provide a site layout drawing. The detailed plans and specifications to be used for construction will be provided to NMED for review and comment when available.

Item c: Figure 1 has been updated to distinguish between below ground and above ground piping.

Item d: Figure 1 has been updated to reflect the location of flow meters to be installed in the new system. We have included a flow meter on the diversion line to T27/28 as requested by NMED. We have included a flow meter on the discharge to the API Separator (from the EQ Tank, T27, or T28). This latter flow meter will serve the intent of the flow monitoring the EQ Tank influent, T27/T28 influent, and T27/T28 effluent proposed by NMED.

Please contact me at (505) 722-0202 if you have any comments or questions regarding the contents of this letter or the enclosed report.

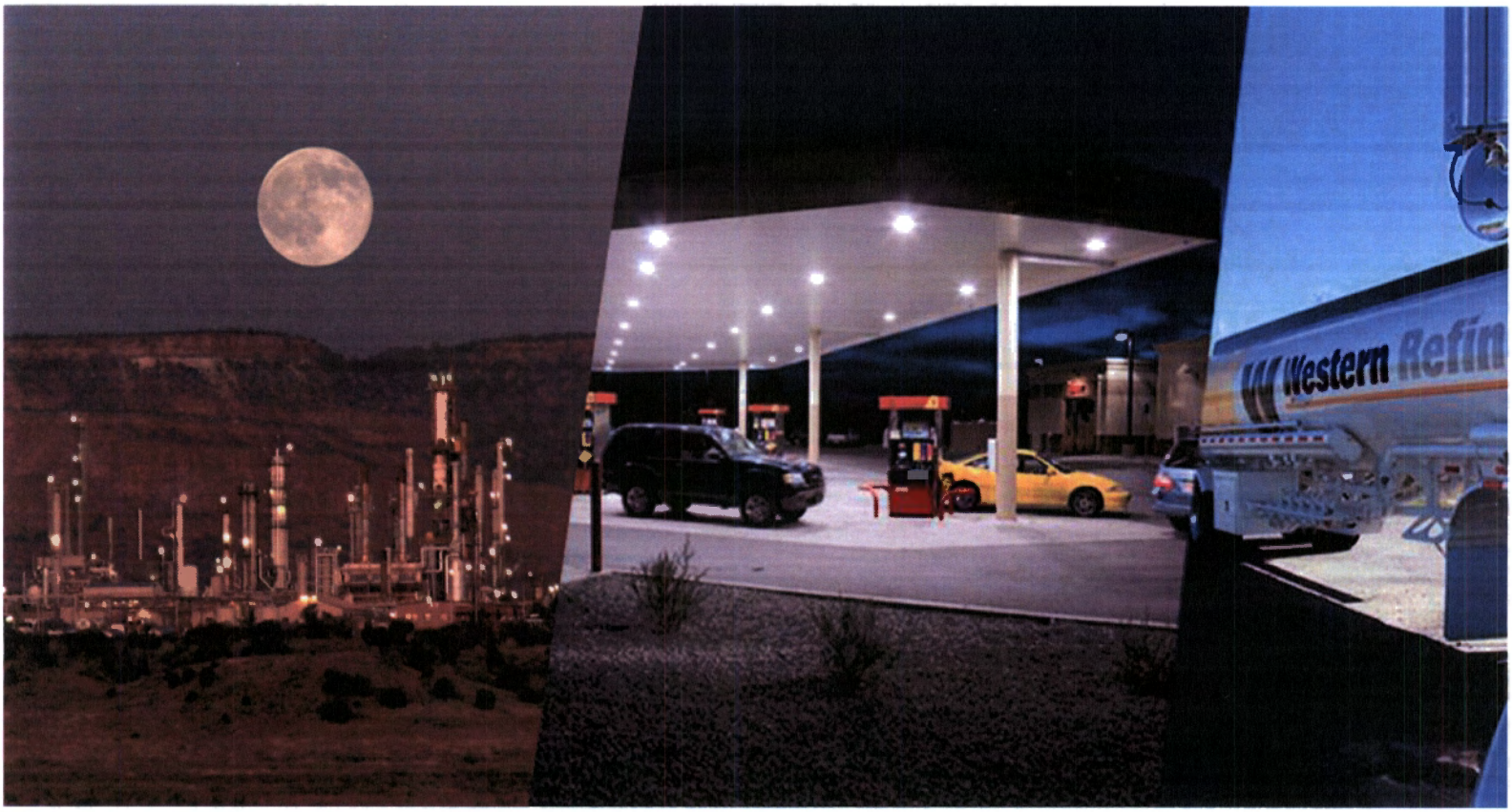
Sincerely,

Mark Turri
General Manager

cc: Ed Riege
Ann Allen
Don Riley
Shane White
OCD
EPA Region 6

Process Design Report for Wastewater Treatment Plant Work Plan (Alternative Design, Revision A)

Western Refining
Gallup, New Mexico



April 2010

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ATTACHMENT B: SUPPLEMENTAL MPPE SYSTEM INFORMATION
ATTACHMENT C: USEPA FEBRUARY 16, 2007 INTERPRETATION LETTER
ATTACHMENT D: PROCESS DESIGN REPORT, JANUARY 21, 2010

1. INTRODUCTION

1.1 Introduction

The Western Refining Southwest's Gallup Refinery is a petroleum refinery located in Jamestown, New Mexico at Interstate 40 Exit 39. This Process Design Report for Wastewater Treatment Plant Work Plan (PDR Work Plan) presents the planned upgrades of the wastewater treatment plant (WWTP) at the refinery. This version of the PDR Work Plan is a revision to the previous version submitted in September 2009.

On August 27, 2007 Western Refining received a renewal of its discharge permit GW-032 from the New Mexico Oil Conservation Division (OCD). The permit required the refinery to complete certain actions related to wastewater management. This Work Plan addresses aspects of the following permit conditions:

1. Condition 16C - Treatment Study and Design
2. Condition 16D - Aeration Lagoons
3. Condition 16E – Evaporation Ponds

In August 2009, Western Refining, NMED and USEPA Region 6 agreed to the terms of a Complaint and Consent Agreement and Final Order (CAFO) that imposes additional regulatory requirements on the upgraded WWTP. Paragraph 100 of the CAFO sets forth certain WWTP-related compliance requirements under the Resource Conservation and Recovery Act (RCRA). These include:

1. Paragraph 100 B – "*Respondent shall cease the operation of, and dismantle, all existing Benzene/Air Strippers at its facility. . .*"
2. Paragraph 100 C – "*Respondent shall design, construct, properly permit, and commence operation of an upgraded wastewater treatment system . . . that is capable of treating all wastewater. . .*"
3. Paragraph 100 E – ". . . *The tanks and ancillary equipment in the upgraded wastewater treatment system that are in operation downstream of the API Separator shall be compliant with 40 C.F.R. § 262.34(a) . . .*"
4. Paragraph 100 G – "*Respondent shall limit volatile organic ("VO") air emissions from the upgraded waste water treatment system . . . to the limits in 40 CFR 265 subpart CC.*"

This document is an updated version of the May 26, 2009 Work Plan referenced by the CAFO and presents an alternative design. This alternative design was first presented in an earlier updated version of the May 26, 2009 Work Plan dated September 2009. This document revises and completely replaces the September 2009 version.

The design presented herein for the upgraded WWTP will meet the requirements of permit GW-032 and the CAFO. The new treatment system components will replace the Benzene Strippers, which will be taken out of service and dismantled, and the Aeration Lagoons, which will be taken out of service and closed pursuant to the "Closure Plan Aeration Lagoons". The effluent quality from the new treatment system will meet the requirements for discharge to an unlined surface impoundment - Evaporation Pond No. 1 (EP-1).

1.2 Project Scope

The scope of the WWTP upgrade project consists of the following new systems:

- A new equalization (EQ) tank upstream of the existing "new" American Petroleum Institute (API) separator that is connected to the process sewer. [Note: this API separator is referred to as the "API Separator" in this Work Plan. It is also known as the NAPIS]. The EQ Tank will receive process wastewater and process area storm water, working in parallel to T27 and T28. The EQ Tank will differ from the T27 and T28 in that it will be the primary tank for equalization and storage, it will have a larger capacity than T27 and T28, and it will not receive off-spec wastewater (in other words, it will not be a diversion tank).
- Two existing tanks put in service for the equalization storage of process wastewater and process area storm water and diversion of off-spec wastewater. These tanks have existing designations as Z84-T27 and Z84-T28, hereafter referred to as T27 and T28. [Note that "off-spec wastewater" means wastewater discharged from the MPPE system containing visible free oil or ≥0.5 mg/L benzene. API separator effluent and DGF effluent may also be qualitatively classified as off-spec if their characteristics (for example, oil, solids, pH) would upset the downstream processes.
- A dissolved gas flotation (DGF) system downstream of the API Separator
- A Macro Porous Polymer Extraction (MPPE) system downstream of the DGF system
- A treatment system for the sanitary wastewater from the Pilot Travel Center and refinery

The new system will allow the following existing systems to be decommissioned:

- Benzene Stripper Nos. 1, 2 and 3
- Aeration Lagoons Nos. 1 and 2 (AL-1 and AL-2)
- The Old API Separator (OAPIS) that is connected to the storm sewer. [Note: this API separator is referred to as "OAPIS" in this Work Plan.]

The following existing equipment will continue to be operated in their current function within the upgraded system:

- API Separator
- EP-1 through EP-12

A flow diagram of the upgraded system is provided in Figure 1 at the end of this Work Plan.

1.3 Related Project - Pilot Travel Center Lift Station

A lift station to collect, screen, and pump the sanitary/restaurant wastewater from the Pilot Travel Center to the WWTP has recently been installed and put into service. A force main conveys the wastewater from the new refinery lift station to the WWTP. In the new, upgraded configuration of the WWTP, the wastewater from the new refinery lift station will be pretreated before being discharged into EP-1.

1.4 Treatment Objectives

The treatment objectives for the WWTP upgrade are to provide water quality that is suitable for discharge to the unlined EP-1. Specifically, the objectives are for there to be no visible free oil, <0.5 mg/L benzene, and a wastewater quality that meets the definition of EPA RCRA non-hazardous.

1.5 Regulatory Compliance

The upgraded WWTP described herein will be designed and constructed in accordance with the requirements of OCD permit GW-032 and the CAFO.

1.6 Report Organization

The PDR Work Plan is organized as follows:

Section 1. Introduction

Section 2. Wastewater Sources

Section 3. Technology Selection

Section 4. Process Description

Section 5. Project Schedule

Attachments to the Process Design Report include the following documents:

Attachment A. DGF System Maintenance Information

Attachment B. MPPE System Maintenance Information

Attachment C. USEPA Interpretation Letter (February 16, 2007)

Attachment D. Process Design Report, January 21, 2010

2. WASTEWATER SOURCES

2.1 Overview

This section of the report reviews the sources of wastewater generated at the refinery. The wastewater sources discharged to the refinery's WWTP fall under two broad categories: those wastewaters generated at the refinery and those generated at the adjacent Pilot Travel Center. The two sources are further described below.

2.2 Refinery Wastewaters

The process wastewaters (including storm water that emanates in the process area) generated by the refinery are directed to the process sewer connected to the inlet of the API Separator. In addition, two non-oily refinery wastewaters are discharged directly to Evaporation Pond No. 2 (EP-2). These sources are the water softener system and the reverse osmosis (RO) system. Both of these systems are part of the larger boiler feed water treatment system. These wastewaters are not oily and do not contain benzene and are RCRA non-hazardous wastewaters.

The sanitary wastewater generated at the refinery and the seven adjacent homes owned by the refinery currently discharges to the refinery's newly constructed lift station for the Pilot Travel Center (see Section 2.3 below).

2.3 Pilot Travel Center Wastewaters

The refinery has a contract with the adjacent Pilot Travel Center to treat the sanitary and restaurant wastewaters generated by that facility. The wastewater from the restaurant at the Pilot Travel Center passes through a new grease trap system installed in 2008. The grease trap effluent and the sanitary/restaurant wastewaters from the rest of the Pilot Travel Center flow to a septic tank system. Septage is pumped out of the septic tank system on a scheduled quarterly basis for off-site disposal (as reported by Pilot Travel Center staff). The effluent from the septic tank system gravity flows to a lift station on the Pilot Travel Center property. This lift station, the grease trap, and the septic tank system are owned and operated by the Pilot Travel Center. The lift station's submersible pumps then transfer the wastewater through a pipeline to the refinery for further pumping and treatment. Western Refining is now operating a new lift station on its property to receive the wastewater from the Pilot Travel Center's lift station and the refinery's sanitary systems.

The Pilot Travel Center generates other wastewaters that are not discharged to the refinery. These other waste streams include truck washing and vehicle maintenance activities. They are managed with on-site oil-water separators, holding tanks, and retention ponds at the Pilot Travel Center.

2.4 Design Flow

The design flow rates for the individual sources are summarized in Table 2-1.

Table 2-1. Design Flow Rates

	Average, gpm	Maximum, gpm
API Separator Effluent	250	500
Pilot Travel Center	50	120
RO Reject	100	150
Refinery Sanitary	4	--

The design flows for the API Separator effluent were set at an average of 250 gallons per minute (gpm) and a maximum of 500 gpm. The average rate was based on historical data and allowances for future flows. The maximum flow rate equals the maximum flow capacity of the API Separator with both bays in service.

The contract between Western Refining and the Pilot Travel Center limits the maximum flow to 50 gpm. However, the refinery's new lift station pumps are capable of pumping a combined flow of 120 gpm. Accordingly, the Pilot Travel Center design flows were set at 50 gpm average and 120 gpm maximum.

The average flow rate for the refinery's sanitary sources is based on the number of refinery employees. The maximum flow rate for the refinery's sanitary source is included in the Pilot Travel Center maximum flow rate, since it is also constrained by the combined pumping capacity of the new lift station pumps.

3. TECHNOLOGY SELECTION

3.1 Overview

This Section provides the basis of the two major technologies that were selected for the WWTP upgrade: dissolved gas flotation (DGF) and macro porous polymer extraction (MPPE). The DGF system replaces the Tank-based Separator concept from the prior version of the Work Plan. The MPPE system provides the benzene removal capacity of the prior bioreactor concept.

3.2 Dissolved Gas Flotation

API separators (including the Gallup API Separator) provide first-stage (i.e., primary) oil-water separation. As such, they provide removal of free oil that readily separates from the wastewater by gravity. A second-stage oil-water separation step is required to provide additional O/G removal beyond what is consistently achievable by an API separator. Second-stage oil-water separation can remove the residual O/G and suspended solids that do not readily separate by gravity (i.e., emulsified O/G). This additional removal is required to provide the appropriate influent quality to the downstream unit

process (MPPE).

A DGF system will provide the second-stage oil-water separation process for the upgraded WWTP. DGF systems are a common refinery technology downstream of API separators. The DGF process involves the pressurization of wastewater in the presence of air or nitrogen, creating a super-saturated solution that when passed into the flotation chamber at atmospheric pressure creates small gas bubbles in the liquid. These bubbles unite with the dispersed oil phase to form a collection of distinct gas-oil particles called coagules that are carried to the surface, called "float". The float is removed to disposal by a mechanical scraper system while the underflow is the clarified water effluent. The air or nitrogen is introduced to the wastewater by pressurizing a side stream of DGF effluent and recycling it back to the flotation chamber. Organic polymers are added to the DGF influent stream to facilitate the oil-water separation.

3.3 Macro Porous Polymer Extraction Technology

The MPPE technology removes dissolved and dispersed hydrocarbons from water. Developed in the early 1990s by Akzo Nobel, MPPE is a liquid-liquid extraction process where the extraction liquid is immobilized in a macro-porous polymer particle. MPPE particles have a diameter of 1,000 microns, with pore sizes of 0.1 to 10 microns.

The MPPE technology has been successfully applied to the treatment of process water, offshore produced water, industrial wastewater, and contaminated groundwater since 1994. Dissolved and dispersed compounds that can be removed from water and wastewater with the MPPE technology include aromatics (e.g., benzene, toluene, xylenes, and ethylbenzene); polyaromatic hydrocarbons (PAHs) (e.g., naphthalenes, phenanthrenes, dibenzothiophenes); and aliphatics including halogenated aliphatics. MPPE systems currently in operation are removing dissolved aromatics (principally benzene), PAHs, and aliphatics. The high hydrocarbon removal efficiencies achievable with MPPE technology result from the number of mass transfer stages that are developed in the packed bed, mainly from the high specific surface area for mass transfer associated with the porous polymer beads. Benzene is the rate limiting constituent and determines the sizing of the MPPE system. The proposed DGF pretreatment system upstream of the MPPE technology will minimize fouling of the porous polymer beads by free oils and solids in the influent wastewater.

A schematic of the MPPE process is provided in Figure 3. Following primary and secondary oil-water separation, the refinery wastewater is passed through a column packed with MPPE particles. The particles are porous polymer beads that contain an extraction liquid suitable for the removal of aromatic hydrocarbons and PAHs. The immobilized extraction liquid removes only the dissolved hydrocarbons that have a high affinity for the extraction liquid (i.e., the constituents that are removed have partition coefficients that guarantee a high affinity for the extraction liquid). The treated wastewater is then free of the target constituents (e.g., benzene), which now reside only in the extraction liquid.

The extraction liquid must be regenerated at fixed intervals to sustain effective target constituent removal. The extraction liquid (immobilized on polymer beads) is regenerated by stripping the hydrocarbons from the MPPE bed with low pressure steam. The stripped hydrocarbons are condensed and separated from the water phase by gravity. This 100 percent pure hydrocarbon phase is recycled to the refinery for reprocessing via the oil

recovery system. The condensed water is recycled to the MPPE system. The design of the MPPE system employs two extraction columns allowing continuous operation in one column with simultaneous extraction and regeneration in the other column. A cycle time of one-hour extraction and one hour regeneration is typical.

The MPPE technology provides the following benefits:

- The dual-column system can be sized for the specific flow requirements and optimized for benzene removal.
- Hydrocarbon phase recovery.
- The wastewater flow turndown ratio can be adjusted to less than 20 percent of the installed flow capacity of the unit.
- The system is flexible in that it can be adjusted to changing flow and target constituent concentration levels while maintaining consistent effluent quality.

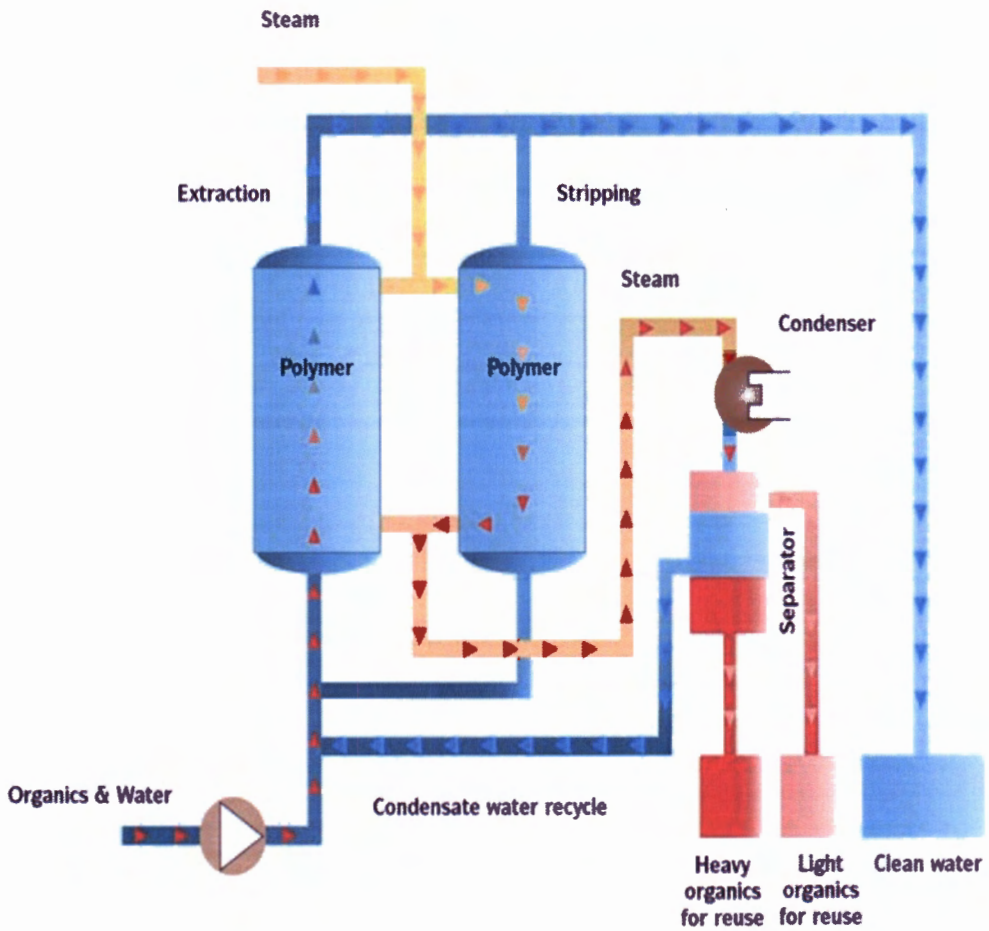

Figure 3. MPPE Process Schematic
(courtesy of Veolia Water)

4. PROCESS DESCRIPTION

4.1 Overview

This section provides a process description of the new systems that will comprise the refinery's WWTP following implementation of the upgrades. The first subsection discusses the new systems to be installed as part of the WWTP upgrades. The second subsection discusses the existing systems that will be decommissioned as part of the WWTP upgrades. This section concludes with a discussion of management of off-spec wastewater, and secondary containment and leak detection. A flow diagram and a site layout drawing are included as Figure 1 and Figure 2, respectively, at the end of this Work Plan.

4.2 New Systems

A description of the major equipment for the new WWTP is provided below.

4.2.1 Combined Process Sewer and Process Area Storm Sewer

Currently, the existing process sewer connects directly to the API Separator and the existing process area storm sewer connects directly to the OAPIS. In the new configuration, the two existing sewers will be connected together by a new 24-inch process sewer. This new process sewer, constructed of carbon steel, buried, and approximately 1,200 linear feet in length, will flow by gravity to the EQ Tank, T27 and/or T28. The EQ tank will be the primary destination of the combined sewer. When operating conditions dictate that the wastewater not be sent to the EQ Tank, the process sewer will be re-routed to T27 or T28 by manipulating manual valves. Examples of this situation are when the EQ tank is close to its liquid holding capacity or it is out of service for maintenance.

Collectively, the contents of this sewer are referred to as process wastewater in this Work Plan. The reader should note that the sewer will also convey process area storm water during precipitation events.

Cleanouts will be installed on the gravity sewer to T27 and T28. Cleaning events will be scheduled on a regular, recurring basis with collected material managed along with similar material collected from the API Separator. This material is normally recycled to an off-site refining process. If recycling to a refining process is not available, the cleanout material will be managed as a hazardous waste. The sewer will be buried below the frost line to prevent freezing.

4.2.2 Surge/Diversion Tanks (T27 and T28)

T27 and T28 are existing tanks in the WWTP area that will be upgraded for surge/diversion service. The two tanks will be utilized as back-up equalization for when the EQ tank is out of service, as additional surge capacity when the EQ tank is near full, and as diversion tanks for when the MPPE effluent is off-spec and cannot be discharged to EP-1. T27 and T28 will also provide diversion capacity when the API Separator effluent or DGF effluent is off-spec and would hamper downstream treatment.

T27 and T28 have dimensions of 33 ft-5 inch diameter by 32 ft height, for a volume of 210,000 gallons each. The combined volume of 420,000 gallons is equivalent to storage capacity for a 100-yr, 1-hour storm event (415,886 gallons). This combined capacity is also equivalent to 24 hours of wastewater storage at the design average wastewater flow of 250 gpm. The tanks will have internal floating roofs for air emissions control.

Wastewater that is managed in T27/28 will be pumped to the new API Separator by the API Separator Influent Pump Station as described in Section 4.2.4.

The water will be pumped a minimum of every 75 days so that the 90-day accumulation time will not be exceeded. We will follow the guidance of the USEPA February 16, 2007 interpretation letter (see Attachment C), which describes how tank liquid level and effluent flow rate can be used to confirm that tank turnover occurs at least every 90 days. Tank liquid level and effluent flow rate will be monitored by the refinery's electronic data logging system.

Oil that may accumulate on the liquid surfaces of T27 and T28 will be captured from a skimmer device attached to each tank's floating roof. The skimmed oil will be collected by vacuum truck and transferred to the refinery's oil recovery system for recycling back to the refining process. The oil level will be checked before every wastewater pumping event and skimmed as needed. Oil skimming will be conducted a minimum of once every 75 days, or more frequently if operating conditions dictate (for example, if oil accumulates to the extent that it might be entrained in the tank wastewater outlet to the API separator).

Prior to pumping the T27/28 contents to the API Separator, solid material that may have settled on the tank bottom will be re-suspended through mixing. Solids re-suspension will be done by pump recirculation, a commonly used method for mixing tank contents. The API Separator Influent Pump Station will be used for this purpose. When mixing of T27 or T28 is needed (intermittently), the tank will not be receiving influent or diversion flow. The operating pump will take suction from the tank to be mixed, and the pump discharge will be routed back to the same tank through the piping and tank connection used for diversion. (Forward flow to the API Separator will cease during the mixing event. The influent wastewater coming from the sewer will be allowed to accumulate in the EQ Tank.) The reduced head condition in recirculation mode will allow the mixing flow rate to increase to680 gpm combined from three operating API Separator Influent Pumps (see Section 4.2.4). The mixing power of this fluid is equivalent to 8 hp based on an 80 percent pump mechanical efficiency. The recirculation mixing will be performed with the tank at a low level in order to enhance the mixing intensity as well as reduce the pump-out time following mixing. If the tank is mixed at a 5-ft liquid level, the equivalent liquid volume is 33,000 gallons. The mixing intensity will be 8 hp per 0.033 million gallons, or 242 hp per million gallons. (Power levels above 150 hp per million gallons are considered to provide complete mixing in wastewater applications. By contrast, the mixing requirement for aggressive biological treatment is only 6 hp per million gallons.)

The duration of the mixing event will be long enough to provide at least three turnovers of the liquid volume. At 680 gpm mixing of 33,000 gallons, the mixing time for three turnovers would be 150 minutes. Feed to the mixed tank and pumping from the mixed tank will continue until the equivalent of three original volumes have been pumped. At

33,000 gallons of original volume, 99,000 gallons would be pumped. This pumping event would last 400 minutes at the 250-gpm average influent flow rate to the API Separator. The operational mode would return to normal after pumping of the three tank volumes was completed. At the end of the mixing cycle, the pump discharge will be directed back to the API Separator. At the same time, influent flow from the sewer or diversion flow from the WWTP will be directed to the mixed tank to displace the original contents to maintain the vapor control of the floating roof.

In order to demonstrate successful mixing, near the end of the pump out cycle (400 minutes in the above example), samples will be pulled from the bottom of the tank. Four sample taps will be provided on the tank side wall, located 90 degrees apart, at an elevation just above the tank floor (as low as possible, 1 to 3 inches above the floor depending on welding/tank integrity constraints). The samples will be visually inspected for solids level and compared against a sample collected for the current tank influent. If the solids content of any of the four tank samples is visually higher than the influent, then mixing will be continued for another turnover (133 minutes in the above example) and the sample comparison process repeated. This mixing procedure will be performed on each of T27 and T28 at least once every 75 days, ensuring that the 90-day accumulation period will not be exceeded.

4.2.3 Equalization Tank

A new Equalization (EQ) Tank will be constructed to dampen variability in both flow and concentration prior to the API Separator and downstream components of the WWTP. It will operate with a variable level/volume, providing a supplemental surge control function. Since the tank will only remain one half to one third full, the remaining volume of the tank may be utilized as surge control or surge capacity. The process sewer will gravity flow into the EQ Tank, via the piping arrangement described in Section 4.2.1. The API Separator Influent Pump Station will transfer the wastewater from the EQ Tank to the API Separator. The tank will have a floating roof for air emissions control. There will be sample ports for both the EQ Tank influent and effluent.

During dry weather conditions, the EQ Tank will be operated at less than full capacity, such that the EQ Tank can provide surge capacity during wet weather events. This available surge capacity will be used to control the forward flow to the API Separator during storm events so that the separator's 500 gpm-design capacity is not exceeded. The EQ Tank will have a 1.0-million-gallon total volume with a 78-ft diameter and a 32-ft height. With a routine operating level of one-third to one-half full, the EQ tank will provide 22 to 33 hours of residence time for equalization (333,000 to 500,000 gallons), with 33 to 44 hours of surge capacity (500,000 to 667,000 gallons), based on a 250-gpm average flow rate. The combined surge capacity of the EQ Tank and T27 and T28 will be 920,000 to 1,087,000 gallons depending on the operating level of the EQ Tank. Combined, these three tanks could retain 2.5 to 3 days worth of flow without discharge in the event that forward flow to the API Separator needs to be prevented (for example, for maintenance of the downstream WWTP equipment).

The EQ Tank level will control the pumping rate of the API Separator Influent Pump Station, which is described in Section 4.2.4. Under normal conditions, the EQ Tank will operate to target a constant outflow (250 gpm for example). If the tank level reaches an upper tank capacity set point, then the outflow rate will be increased by increasing the pump speed to maintain the level within desired operating limits. Similarly, if the tank level reaches the lower tank capacity set point, the outflow rate will be decreased by lowering the pump speed.

In a similar fashion to T27 and T28, oil that may accumulate on the liquid surface of the EQ Tank will be captured from a skimmer device attached to the tank's floating roof. The skimmed oil will be collected by vacuum truck and transferred to the refinery's oil recovery system for recycling back to the refining process. The oil level will be checked on a routine basis and skimmed as needed. The frequency of oil layer monitoring and skimming will be dictated by operating conditions and performance. It would be undesirable to allow oil to accumulate to the extent that it might be entrained in the tank outlet and carry-over to the API separator. We anticipate that oil skimming will be required once or twice a month (removal of a 1-inch oil layer, for example, equates to 550 gallons, a volume readily managed by vacuum truck). The oil skimming conducted in the EQ Tank will reduce the oil removal demands on the API Separator.

Solids entering the EQ Tank will accumulate as a sludge layer, which will require removal periodically, currently expected to be every three to five years. Standard refinery tank cleanout and sludge management procedures will be followed. During cleanout times, expected to be 2 to 4 weeks in duration, T27 and/or T28 will function as the EQ Tank. The flexibility designed into the piping routing will enable sending wastewater to any of these three tanks as needed.

4.2.4 API Separator Influent Pump Station

The API Separator Influent Pump Station will be a set of four 10-hp pumps for transferring the liquid contents of the EQ Tank, T27, or T28 to the API Separator. The pump station will only pump from one tank at a time. One pump will be available as an installed standby. The pumps will be variable-speed controlled to allow variable output for matching the desired flow condition. Up to three pumps will operate at once, providing a combined flow to the API Separator of up to 500 gpm at 65 feet of head. At no time will the flow to the API Separator exceed its 500 gpm design capacity, as limited by automated controls based on the flow meter to be installed on the pump station discharge.

The outlet from the pump station will be a 6-inch diameter above ground force main, approximately 1,000 linear feet and constructed of carbon steel, that will connect to the inlet of the API Separator. The pipe will be insulated and electric heat traced to prevent freezing.

The number and locations of clean-outs on this force main will be determined during detailed engineering (following NMED's approval of this Work Plan). This pipe line will be flowing nearly continuously at a scour velocity (2.8 feet per second), so the need for clean outs will be minimal, if any. Additionally, as described in Section 4.5, the CAFO compliance approach for this pipe line will be welded connections with daily inspections. Since, cleanouts would require non-welded connections, we will seek to minimize these and there may in fact be none.

4.2.5 DGF System

The DGF system will be a single, covered, above-ground, stainless steel vessel. The DGF will be designed for an average flow of 250 gpm and a maximum flow of 500 gpm. The API Separator effluent will be pumped to the DGF system using the existing API Separator effluent pumps. Polymer will be injected into the DGF influent line to enhance flocculation. Dissolved gas for flotation will be plant nitrogen from the refinery's existing utility system. The nitrogen will be injected into a pumped recycle stream of the DGF effluent.

The clarified effluent wastewater from the DGF system will be pumped to the MPPE system. Two variable speed pumps (one operating, one standby) will be installed, each rated for 250 gpm average, 500 gpm maximum, to accomplish this transfer from the DGF system to the MPPE system.

The DGF float material will be skimmed from the top of the DGF using a variable speed scraping mechanism. The skimmed float will be sent to the DGF float management system, which will consist of "Float Tanks." The purpose of the tanks will be to provide storage capacity and reduce the volume of oily solids through gravity separation. Oily solids collected in the Float Tanks will be recycled to a refining process (on-site or off-site). Should operating experience indicate that volume reduction would be beneficial, mechanical dewatering would be conducted by a contractor-supplied mobile system. Wastewater decanted from the Float Tanks will be discharged to the API Separator inlet

It was determined that a single DGF unit, with a redundant recirculation pump, will provide reliable operation and performance. This design configuration is acceptable because there is no routine reason for the unit to be taken out of service for an extended period (longer than the 2.5 to 3 days of combined storage capacity provided by the EQ Tank and T27/28). A standby DGF recirculation pump will be installed in parallel to the primary DGF recirculation pump to provide redundancy for the one critical rotating equipment item in the DGF system. Appendix A provides information from a preferred DGF vendor to support this design approach. The vendor also provides information regarding general maintenance requirements.

4.2.6 MPPE System

The MPPE system will consist of two columns operating in parallel. One column will be in service while the other is being regenerated. The columns will switch their mode of operation on a routine schedule (e.g., hourly). The operating column will receive pumped clarified effluent from the DGF. The wastewater will pass through the column entering the bottom and exiting the top and will be discharged to EP-1 by gravity. Steam will be used to regenerate the non-operating column. The steam will be supplied by the existing plant utility system or an electric boiler as part of the MPPE skid. The steam will pass through the column entering at the top and exiting at the bottom and will extract the hydrocarbons that had previously been retained by the polymer beads. The hydrocarbon-laden steam will then be sent through a condenser to convert the stream to a cooled liquid phase. The cooled hydrocarbon-water liquid mixture will then go to a separator, which will produce a water stream that is recycled to the operating column and a hydrocarbon stream that will be sent to the refinery for reprocessing.

Appendix B provides information from the MPPE vendor regarding maintenance requirements. The vendor-supplied maintenance activities include replacing pump seals and valve seats, instrument recalibration, and media replacement, activities that can be accomplished in a matter of hours. As discussed in Section 4.2.3, the combined wastewater retention capacity of the EQ Tank and T27/T28 is 2.5 to 3 days, which will enable expected MPPE system maintenance to be completed while withholding discharge.

4.2.7 Pilot Travel Center Pretreatment

The sanitary wastewater from the Pilot Travel Center and the refinery will be biologically treated in an aerated lagoon system prior to discharge to the evaporation pond system. The wastewater already receives treatment for solids removal by the upstream septic tank (owned and operated by Pilot) and the screening system in the new refinery lift station.

The new aerated lagoon system will provide removal of soluble organics, using the two existing basins located just east of the T27/28 containment area. The approximate dimensions of these basins are 120 ft x 90 ft x 7 ft deep and 260 ft x 100 ft x 7 ft deep. The combined treatment volume will be 1,600,000 gallons, which provides a 22-day residence time at the average design flow of 50 gpm. A liner system will be installed in the eastern basin (and smaller basin) as part of the new construction. Lining of the western basin (in series) is deemed not necessary based on the level of treatment which will be provided in the eastern basin. Influent flow from the existing refinery sanitary lift station will enter the eastern basin, which will be operated as a complete mix aerated lagoon with two 5-hp floating aerators. The second basin will function as a facultative lagoon for polishing and settling, aerated with one 5-hp floating aerator.

The effluent from the aeration lagoon system will flow by gravity to EP-2. It is discharged to EP-2 rather than EP-1 to allow for gravity flow.

4.2.8 Evaporation Pond No. 1

The MPPE cleaned wastewater effluent will flow by gravity into EP-1. A flow meter will be installed on this EP-1 influent line to track discharge volumes. The MPPE clean wastewater effluent will be free of floating oil and will have a benzene concentration <0.5 mg/L and will be RCRA non-hazardous. This EP-1 influent quality will be assured by the following WWTP upgrades:

- Less variability in flow rates and waste loads provided by the EQ Tank
- Improved upstream oil-water separation provided by the DGF system
- Reliable removal of benzene and other hydrocarbons using the MPPE technology

4.3 Decommissioned Systems

Placing the new WWTP systems into service will allow some of the existing systems to be decommissioned.

4.3.1 Benzene Strippers Nos. 1, 2 and 3

The MPPE system will replace the benzene removal capacity of the two Benzene Strippers (Z84-V4 and Z84-V5) located at the WWTP and the one Benzene Stripper located in the process area of the Refinery (Z84-V7). These units will be decommissioned and dismantled. The associated Benzene Stripper Air Blowers (Z84-AB3, Z84-AB4 and Z84-AB5) will also be decommissioned and dismantled.

4.3.2 AL-1 and AL-2

The two Aeration Lagoons (AL-1 and AL-2) will be decommissioned and closed pursuant to "Closure Plan Aeration Lagoons". The associated surface aerators will also be decommissioned. The Corrective Measures Implementation Work Plan for the Wastewater Aeration Lagoons (Solid Waste Management Unit No. 1) has been submitted separately to NMED (July 30, 2009) under which closure will be conducted following NMED approval.

4.3.3 OAPIS

The Old API Separator (OAPIS) currently collects storm water from the process area. In the future, this sewer will be directed to the new process sewer and from there to the EQ Tank (or T27 or T28). The tank contents will then be pumped to the API Separator. Therefore, the OAPIS will be decommissioned. A separate work plan to be submitted to NMED will address the closure of the OAPIS (Solid Waste Management Unit No. 14).

4.4 Management of Off-Spec Wastewater

Off-spec events are not anticipated for the MPPE effluent. However, contingencies have been included in the design as safeguards. If at anytime the MPPE effluent is deemed unsuitable for discharge to EP-1 (i.e. "off-spec wastewater"), it will be diverted to T27 or T28. Process monitoring, described below, will be used to identify when this diversion is needed. The diversion would be "all or nothing" rather than a partial diversion and partial flow to EP-1. For added flexibility, the capability to divert the API Separator effluent and the DGF effluent will also be provided. A common diversion line to T27 and T28 will connect the three potential diversion sources (i.e. the MPPE effluent, the API Separator effluent, and the DGF effluent) to T27 and T28.

The MPPE process monitoring will consist primarily of two daily measurements (at approximately 7:00 am and 7:00 pm) of benzene in samples of wastewater. These samples will be analyzed at Gallup Refinery's on-site testing laboratory using Gas Chromatograph/ Mass Spectrometer (GC/MS). The results will be available almost immediately – that is, within a few hours of sample collection. To account for the fact that our on-site method is not identical to the EPA-approved method, and to divert proactively, we will use 0.4 Mg/L of benzene as a trigger for diversion.

If the on-site value is found to be 0.4 mg/L or greater, we will divert wastewater away

from EP-1We will begin taking corrective actions to reduce hydrocarbon content in the API Separator effluent by opening the hatches and adjusting skimmer settings, increase the level of wastewater being held in the EQ Tank, and divert the wastewater to T27/28. During the diversion period, samples will be taken on more frequent intervals and analyzed in the on-site laboratory. When the sample results are less than 0.4 Mg/L, we will restore flows back into EP-1.

4.5 Tank Design, Secondary Containment, and Leak Detection

Under the terms of the CAFO, the tanks and ancillary equipment downstream of the API Separator, including diversion tank systems, are subject to 40 CFR §262.34(a). By reference, these systems are therefore subject to 40 CFR 265 Subpart J for tank systems. Accordingly, the systems downstream of the new API separator will comply with the tank design requirements of 40 CFR 265 Subpart J, including secondary containment and leak detection.

Table 4-2 below identifies the components of the WWTP upgrade project described in this Work Plan. For each component, the table lists whether it is subjected to the requirements of paragraphs 100 E and F of the CAFO and, if so, how secondary containment and leak detection will be accomplished to conform to the requirements of 40 CFR 262.34(a) and 40 CFR 265 Subpart J Tank Systems.

Table 4-2. CAFO Sub Part J Compliance

Item No.	Name	Description	Covered by CAFO?	Secondary Containment	Leak Detection
1	Buried Gravity Sewer to EQ Tank, T27, T28	Connects process sewer and process area storm sewer in a single line to the tanks.	No; not downstream of API Separator	None	None
2	Above ground Gravity Sewer to EQ Tank, T27, T28	As the new sewer piping enters the secondary containment area, it will be routed above ground for connection to the tanks.	No; not downstream of API Separator	Yes; Within common tank containment area	Yes; Visual
3	T27, T28	Diversion tanks for off-spec wastewater; additional influent/storm water storage capacity.	Yes; specifically referenced by the CAFO as Diversion Tanks	Yes; will share a common containment area with the EQ tank. Concrete liner. Volume is 1.3 times the largest tank.	Yes; Double Bottom with Leak Detection at the Tank Perimeter
4	EQ Tank	For wastewater equalization and surge capacity of influent from the combined process sewer	No; not downstream of API Separator	Yes; OCD requirments	Yes; Double Bottom with Leak Detection at the Tank Perimeter, per OCD requirments
5	Above ground force main from tanks to transfer pump station	Common pump suction piping from the three tanks.	Yes; part of Diversion Tank system	Yes; located within common tank containment area	Yes; Visual (daily)
6	Transfer pump station	The that transfer the wastewater from the tanks to the API Separator	Yes; part of Diversion Tank system	Yes; within common tank containment area	Yes; Visual (daily)

Table 4-2. CAFO Sub Part J Compliance					
Item No.	Name	Description	Covered by CAFO?	Secondary Containment	Leak Detection
7	Above ground force main from transfer pump station to API Separator	Single line from the common pump suction piping from the three tanks.	Yes; part of Diversion Tank system	Yes; all above ground; welded pipe flanges, joints and connections; inspected daily.	Yes; Visual (daily)
8	API Separator including skimmed oil and bottom solids systems	Existing; no change.	No; not downstream of API Separator	Existing; no change.	Existing; no change.
9	Wastewater Piping from API Separator to DGF	Above ground	Yes; downstream of API Separator	Yes; above ground; welded pipe flanges, joints and connections; inspected daily; Partly within DGF tank containment area	Yes; Visual (daily for those portions not within containment area)
10	DGF Unit	Tank with elevated bottom	Yes; downstream of API Separator	Yes; concrete containment area with a volume 1.3 times the largest tank.	Yes; Visual
11	Wastewater Piping from DGF to MPPE	Above ground	Yes; downstream of API Separator	Yes; Partly within DGF/MPPE tank containment area; above ground; welded pipe flanges, joints and connections; inspected daily.	Yes; Visual (daily for those portions not within containment area)
12	MPPE Unit	Two vessels with elevated bottom	Yes; downstream of API Separator	Yes; Concrete containment area with a volume 1.3 times the largest tank.	Yes; Visual
13	Wastewater Piping from MPPE to Diversion Valve	Above ground. Diversion valve will direct flow away from EP-1 back to T27/28.	Yes; downstream of API Separator	Yes; within DGF containment area	Yes; Visual
14	Wastewater Piping from MPPE Diversion Valve to EP-1	Buried.	No; non-hazardous waste; <0.5 mg/L benzene	None	None
15	Wastewater Diversion Piping from MPPE Diversion Valve to T27/28	Above ground	Yes; downstream of API Separator and part of Diversion Tank System	Yes; Partly within T27/28 containment area; Partly all above ground; welded pipe flanges, joints and connections; inspected daily.	Yes; Visual (daily for those portions not within containment area)

Table 4-2. CAFO Sub Part J Compliance					
Item No.	Name	Description	Covered by CAFO?	Secondary Containment	Leak Detection
16	DGF Float Tanks	Will use a float management system.	No; oil-bearing residuals exemption per 40 CFR 261.4(a)(12)	Yes; Double wall tanks or containment area with a volume 1.3 times the largest tank; containment area may be common with DGF unit.	Yes; Visual
17	MPPE Recovered Hydrocarbon Stream Piping	Above ground	No; by-product reclaimed and exempt per 40 CFR 261.2 (c)(3)	None; Except those portions within MPPE tank containment area.	Yes; Visual
18	Aerated Lagoon System	Receives sanitary wastewater only. Piping generally buried.	No; Does not receive process wastewater or process area storm water; Not downstream of API Separator	An impermeable liner will be installed in the first cell of the lagoon.	No

For Item Nos. 7, 9, 11 and 15, there may be instances of exceptions to the "all welded" pipe connections for above ground pipe run outside of secondary containment areas (for example, at flow meter and valve locations). In those instances, a dedicated secondary containment device (e.g., fabricated or constructed box) will be installed under the non-welded connection(s).

4.6 Air Emissions Control

The upgraded WWTP will meet the air emission regulatory requirements, including Paragraph 100 G of the CAFO as applicable, through the following measures:

- The Storm Water/Diversion Tanks (T27/T28) will have floating roofs to control air emissions from these tanks.
- The DGF system will be enclosed but will generate a continuous point source air or nitrogen emission.
- The MPPE units will be enclosed, but generate periodic air emissions from the condensate drum.

A common vapor-phase granular activated carbon (GAC) system will be used to control emissions from these latter two points. Vapor sampling points will be added the DGF emission point, MPPE emission point, GAC inlet, and GAC outlet as previously requested by NMED. Routine sampling from these locations is not anticipated, with the exception of the following: GAC performance will be based on results from exhaust vapor (GAC outlet) sampling, with carbon replacement based on breakthrough occurrence.

5. PROJECT SCHEDULE

The required project schedule for design and construction of the WWTP upgrade is 24 months as presented in Table 5-1.

Table 5-1. Project Schedule Through Construction (After Approval)

Description	Period
Detailed Engineering	4 Months
Air Permit Application Submittal	December 2009
Contractor Bidding	2 Months
Air Permit Issuance	June 2010
Contract Award & Notice to Proceed	2 Months
Equipment Procurement, Fabrication and Delivery	12 Months
Construction	3 Months
Testing, Start-up, and Clean-up	1 Months
Operational	24 Months

Attachment A –DGF System Maintenance Information

The following information regarding DGF system maintenance was provided by:

Traitements des eaux POSEÏDON Inc.
Suite 310, 1290 Van Horne Avenue, Montréal QC Canada H2V 4S2
Tel. 514-270-9593, Fax. 514-270-9355, Gen. E-mail: info@poseidoninc.com,
Web: poseidoninc.com

The need for maintenance will mainly come from mechanical components. The skimming device and its motor reducer require little maintenance. The Poseipump[1] requires the same maintenance as a typical centrifugal pump; i.e., replacement of the mechanical seal approximately once per year. In addition, there is a rotary joint on the shaft of the Poseipump that brings the flotation gas to the pump. It requires replacement approximately once or twice per year.

The units are built in stainless steel and there are no mechanical components below water level. All of the mechanical components that need attention are accessible from outside the unit and will not need down time for maintenance. They are the skimming device (inside the unit but above the water level) and its motor reducer (outside the unit), the recirculation/gas dissolution Poseipump and its motor. Some shelf spares and an installed Poseipump will offset the need for down time.

We estimate that it would be good practice to inspect and clean the unit during planned turnarounds. A typical DGF outage is simple and provision should be made for: complete skimming of the float, opening the cover hatch, draining of the water, removal of the cover (with a crane), cleaning the inside of the unit (with water hoses), re-installation of the cover with new seal and filling the unit with clean water. This can be done within one day for the Saturn model.

Since our units are built in stainless steel, since there are no mechanical components below water level, and since we use only the most dependable components (such as motor-reducers instead of chains and sprockets, etc.), operation reliability is improved and maintenance is significantly reduced. Therefore, it is possible to treat the entire

[1] The Poseipump provide dissolution of the flotation gas through pressurized recycle stream. It's the DGF recycle pump.

wastewater stream on a continuous basis with a single DGF unit and with reliability. We have DGF units that have been in operation since late 2003, that have been open only once during a planned turnaround in 2006 (for preventive inspection and cleaning) and that have been operating without any interruption since then.

Attachment B –MPPE System Maintenance Information

The following information regarding MPPE system maintenance was provided by Whittier Filtration:

Although the unit is designed to run automatically and unmanned, the unit should be inspected daily. Normal maintenance will include inspecting and/or replacing pump seals and valve seats. This should be done on an annual basis. The instruments should be checked and/or recalibrated semiannually. Pressure relief valves should be checked on a monthly basis to ensure safety. If found to be leaking or damaged, they should be replaced.

The performance is guaranteed for the operational lifetime of the unit. The media is designed to last between one and two years. When the media effectiveness decreases below a predetermined value, the media will need to be exchanged. This is determined by periodic effluent sampling. The exchange service is provided by Whittier Filtration as part of the performance guarantee. The exchange will take between four and eight hours. As part of the operating parameters, the media is steam stripped with low pressure steam every hour. This will remove the extracted hydrocarbons from the media as well as protecting the media from organic fouling.

Attachment C – USEPA February 16, 2007 interpretation letter

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

FEB 16 2007

OFFICE OF
SOLID WASTE AND
EMERGENCY RESPONSE

Mr. John Hopewell
Manager, Environmental Affairs
National Paint and Coatings Association
1500 Rhode Island Avenue N.W.
Washington, D.C. 20005

Dear Mr. Hopewell:

Thank you for your October 12, 2006 letter in which you seek clarification of 40 CFR 262.34(a)(1)(ii) in connection with the turnover of hazardous wastes stored in generator accumulation tanks. Specifically, you request guidance on whether a hazardous waste generator accumulation tank has to be completely emptied every 90 days to meet the accumulation time requirement, or whether the tank volume can be "turned over," removing a volume of material equal to or greater than the tank volume from the tank every 90 days. This turnover approach (which EPA refers to in our letter as the "mass balance approach") appears to be used, as described in your letter, in connection with tanks that receive hazardous wastes on an ongoing, continuing basis (which EPA refers to in our letter as a "continuous flow process"). By completing this turnover, you believe that the hazardous waste volume remaining in the tank unit would not be considered as being stored or accumulated for more than 90 days, thus avoiding the need to obtain a Resource Conservation and Recovery Act (RCRA) Part B storage permit. In response to your request, EPA is interpreting 40 CFR 262.34(a)(1)(ii) to allow for the turnover approach you describe in your letter, subject to the various conditions and requirements we discuss in greater detail below.

As you state in your letter, large quantity generators accumulating hazardous wastes in tanks must comply with the 40 CFR 262.34(a)(1)(ii) requirements in order to accumulate hazardous waste on-site in tanks for 90 days or less without a permit, provided they comply with the 40 CFR part 265 Subpart J requirements (except 265.197(c) and 265.200). You believe that, as written, this regulation is unclear and, in the absence of any clarification in this area, may be interpreted to mean that each tank must be completely emptied at least every 90 days even where the tank's "volume capacity" has already been turned over within the 90 day timeframe. You argue instead for an interpretation of this regulation to allow for hazardous waste "turnover" at least once every 90 days.

EPA interprets this regulation to allow large quantity generators accumulating hazardous wastes in tanks to meet the 40 CFR 262.34(a)(1)(ii) requirement by using periodic tank "turnover," so long as hazardous waste entering the tank remains in the unit for no more than 90 days. EPA's interpretation of this regulation is set forth below in greater detail.

Tanks can be operated in one of two ways – in a batch process or in a continuous flow process.

Batch Process

Under a batch process, a tank receives a batch (or batches) of hazardous waste on a one-time or intermittent basis. Under a batch process scenario, the 90-day waste accumulation clock for a large quantity generator starts when hazardous waste first enters the tank. If, for example, the tank fills up in 30 days, and is emptied on day 30, the requirements of 40 CFR 262.34(a)(1)(ii) are met since the hazardous waste has been in the tank for less than 90 days. The next 90 day period begins when hazardous waste is added to the tank that has been emptied (for example, on day 31). If the tank is emptied a second time within 90 days of day 31, the requirements of 40 CFR 262.34(a)(1)(ii) are met.

EPA explained this particular method of 90-day waste accumulation calculation, intended to apply to tanks utilizing a batch process, in the preamble to the generator accumulation final rule promulgated on January 11, 1982 (47 FR 1250):

> As with accumulation in containers, the 90-day period begins the moment the generator first places hazardous wastes in an "empty tank." The generator then must remove all wastes from the tank within 90 days from the time he first places wastes in the "empty" tank. A tank will be considered empty when its contents have been drained to the fullest extent possible. Since many tank designs do not allow for complete tank drainage due to flanges, screens or siphons, it is not expected that 100% of the wastes will always be removed. As general guidance, a tank should be considered empty when the generator has left the tank's drainage system open until a steady, continuous flow has ceased."

Large quantity generators utilizing a batch process must meet the requirements of 40 CFR 262.34(a)(1)(ii). For example, the use of inventory records in conjunction with tank markings may provide confirmation that the tank has been emptied within an appropriate time period. Specifically, the inventory records typically show the dates and associated quantity of hazardous waste entering the tank, as well as the dates the tank was emptied. Shipping or hazardous waste manifest records also may be used to verify when the tank was emptied. Likewise, tanks accumulating hazardous wastes may have information indicating the time and date hazardous waste first entered the tank. There may be other methods to demonstrate that a tank has been emptied, but any method used to confirm compliance with 40 CFR 262.34(a)(1)(ii) must be reasonable and easily discernible to EPA or an authorized state.

Continuous Flow Process

Under the continuous flow process, in contrast to the batch process described above, the tank receives hazardous waste on an ongoing, continuous basis. In the case of hazardous wastes flowing through tanks continuously, there is a means of demonstrating when a tank is "emptied" within 90 days under 40 CFR 262.34(a)(1)(ii) that would not require completely emptying the tank, and may be more suitable for tanks with continuous flow. More specifically, a mass balance approach (i.e., the "turnover" approach, as you referred to it, in your letter) can be used for continuous flow tanks rather than the approach described above for batch process tanks. The key parameters in this mass balance approach are the volume of the tank (e.g., 6,000 gallons), the daily throughput of hazardous waste (e.g., 300 gallons per day) and the time period the hazardous waste "resides" in the tank. In this example, the hazardous waste entering the tank would have a residence time of 20 days ((6,000 gallons/300 gallons per day) = 20 days) and meet the requirements of 40 CFR 262.34(a)(1)(ii) since the hazardous waste has been in the tank for less than 90 days.

Large quantity generators accumulating hazardous wastes through a continuous flow process must also demonstrate that the hazardous waste has not been stored for more than 90 days. This may be achieved by the use of inventory, or some form of accounting or monitoring data. For example, a generator could confirm that the volume of a tank has been emptied every 90 days by recording the results of monitoring equipment both entering and leaving a tank. This recordkeeping, in conjunction with the tank volume, would enable inspectors, as well as facility personnel to demonstrate compliance with 40 CFR 262.34(a)(1)(ii). Likewise, in marking the tank, a generator could mark both the tank volume and estimated daily throughput to allow inspectors to determine the number of days that hazardous waste resides in a tank to determine compliance with 40 CFR 262.34(a)(1)(ii). As noted above, there may be other methods to demonstrate that a tank has been emptied, but any method or demonstration to confirm compliance must be reasonable and easily discernible to EPA or an authorized state.

As you state in your letter, generators also would still be required to meet all applicable hazardous waste tank regulations found in 40 CFR part 265, Subpart J. In addition, if the tank is removed from service, the regulation requires the system to undergo a formal RCRA closure to remove or decontaminate all hazardous waste associated with the tank system.

Please note that this is EPA's interpretation of the federal hazardous waste regulations. Most states are authorized to operate their own hazardous waste management program. As such, states may impose regulations which may be more stringent and/or broader in scope than the federal regulations. Therefore, you should check with the appropriate state agency to determine the requirements applicable to your activities.

Should you have any questions on this subject, please contact Jim O'Leary at (703) 308-8827 or oleary.jim@epa.gov.

Sincerely yours,

Matt Hale, Director
Office of Solid Waste

cc: Tom Kennedy, Association of State and Territorial Solid Waste Management Officials (ASTSWMO)
Barry Elman, OPEI

Attachment D – Process Design Report, Western Refining Southwest Inc., January 21, 2010

January 21, 2010

VIA EMAIL AND CERTIFIED MAIL No. 7008 2810 0000 4726 2151

Mr. James Bearzi, Chief
Hazardous Waste Bureau
New Mexico Environmental Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6303

Joel Dougherty (6EN-HE)
Hazardous Waste Enforcement Branch
U.S. EPA Region 6, Suite 1200
1445 Ross Ave.
Dallas, TX 75202-2733

RE: **PROCESS DESIGN REPORT, WESTERN REFINING SOUTHWEST INC., GALLUP REFINERY; EPA ID #NMD000333211**

Dear Mr. Bearzi,

Gallup has reviewed your notice of disapproval (NOD) dated October 27, 2009. Gallup plans to address all comments contained in this NOD, provide additional information and submit a revised work plan as soon as possible. Prior to doing that, Gallup requires some additional guidance.

Gallup is confident that the Macro Porous Polymer Extraction technology in conjunction with the Dissolved Gas Flotation technology will fulfill the requirements outlined in the CAFO. However, a rigorous design of the Macro Porous Polymer Extraction technology along with the Dissolved Gas Flotation technology cannot be completed at this time. The information required to complete the design report accurately requires Western Refining to purchase the process units. The design details are considered proprietary information. Consequently, Western Refining is in a position that limits the ability of this project to progress to the point of providing clear design specifications requested by the State of New Mexico until a purchase order is placed.

Gallup takes great pride in this project and fully understands the necessity to complete the installation in a timely manner. During the time lapse from the submittal of the revised work plan to now, Gallup has been engaged in obtaining more assurance that this technology is applicable. During the month of November, a pilot study was conducted on site. This was a test demonstration of the proposed project. This demonstration consisted of a pilot Dissolved Gas Flotation Unit along with a pilot Macro Porous Polymer Extraction Unit (MPPE). This simulated

operation received an influent stream from the New API. This stream was then fed into a scaled down Dissolved Gas Flotation Unit (DAF). The capacity of the DAF was 15-70 gallons per minute. For the purpose of the test run, 20 gallons per minute were processed through the unit. The DAF unit was used to create a clarified stream to feed to the MPPE unit. The DAF also created a float stream that will be used to estimate the float that will be generated in the full scale operation. The clarified effluent stream was then sent to the MPPE unit. The MPPE unit then processed the stream at a rate of 20 gallons per minute. A report from the manufacturer of the MPPE is attached providing results of the Waste Water Treatment Project Trial Run. During the three week trial, the benzene level of the treated water was constantly below 0.5 ppm, with varying benzene inlet concentrations from 3.7 to 14.0 ppm, at an average flow rate of 15 gpm. This trial run was a closed system. All streams generated were contained and returned to the influent of the New API, where they were processed and sent to the benzene strippers and then to the aeration lagoons.

Gallup is requesting NMED HWB approval to proceed with the use of the Macro Porous Polymer Extraction technology along with the Dissolved Gas Flotation technology. With this approval, Gallup will be in a position to seek capital funds and purchase the equipment. After the order is placed, Gallup will be provided with the detailed design drawings for the equipment. These drawing will then be used to complete the design report which will then be promptly sent to the State of New Mexico. This will fulfill commitments of the CAFO.

I certify that the information contained in or accompanying this submission is true, accurate and complete. As to those identified portions of this submission for which I cannot personally verify the truth and accuracy, I certify as the company official having supervisory responsibility for the person(s) who, acting upon my direct instructions, made the verification, that this information is true, accurate, and complete.

Thank you for your review of this request. Please feel free to contact Ed Riege at 505-722-0217 with any questions.

Sincerely,

Mark B. Turri
Refinery Manager

cc: Hope Monzeglio NMED HWB
Carl Chavez OCD
Ann Allen Western Refining
Ed Riege Western Refining
Shane White Western Refining

WHITTIER FILTRATION

Macro Porous Polymer Extraction

Pilot Study

Analytical & Operational Report

Presented to: Western Refining, Inc.

Date: January 15, 2010

VEOLIA WATER

Solutions & Technologies

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1 Introduction

On request of Western Refining a MPPE (Macro Porous Polymer Extraction) pilot unit was operated at the refinery in Gallup, New Mexico.

The operational period of the pilot was around 3 weeks, including scheduled downtime over the holidays, starting on November 17, 2009 and ending on December 5th, 2009.

The process waste water (both with and without corrosion inhibitor) was taken directly from the plant and treated in three (3) steps. First an API separator, then a pilot DAF unit (for oil & solids removal), followed by the MPPE pilot unit.

Aim of the study was:

1. To demonstrate the capability of MPPE to reduce the benzene concentration from the industrial process waste water, to a desired level of <0.5 mg/l,
2. To determine to what extend the MPPE technology is also able to lower the concentrations of other (groups of) components like VPH (Volatile Petroleum Hydrocarbons), EPH (Extractable Petroleum Hydrocarbons) etc.,
3. To test the combination of a DAF filter followed by a MPPE system, in addition to the existing API separator, for the complete water treatment.

Table 1: Average influent characteristics as given by Western Refining

Components	Unit	Inlet Concentration	Outlet Requirement acc. EPA
Benzene	[mg/l]	7 - 24	0.25 – 0.50

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2 Equipment

2.1 MPPE process description

The standard MPPE unit consists of two columns, both containing a packed bed of MPPE material. The influent water is fed into the bottom of column C-01 where the extraction process takes place in order to remove the contaminants. At the same time the other column (C-02) is being regenerated with low-pressure steam. After a pre-calculated time (usually 1 hour), the feed is switched to the other column, C-02. Column C-01 is then regenerated by low-pressure steam. The steam evaporates the components from the MPPE material, resulting in a vapor flow of organics and steam. The vapor is routed through a condenser where condensation of both steam and organics takes place. The condensed steam and organics are led into a separator in which the organics are separated from the condensed steam. The practically 100% pure organics can be reused or disposed according to regulations. The water phase from the separator is recycled back into the MPPE system. The unit feed continuously cycles (usually approximately one hour) from column C-02 to C-01. The overall sound power level of the unit is very low and less than 80 dB(A) at switch-over once an hour.

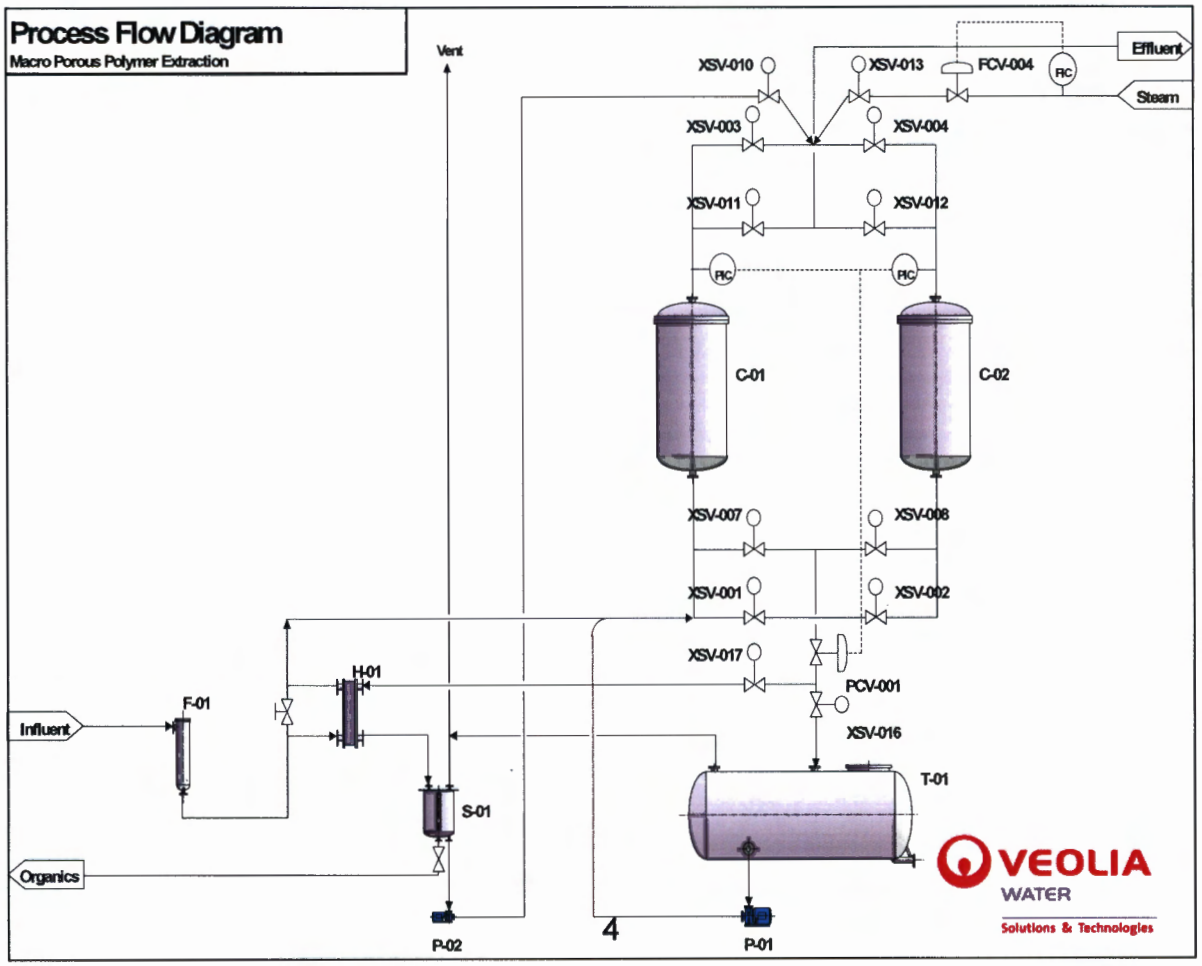

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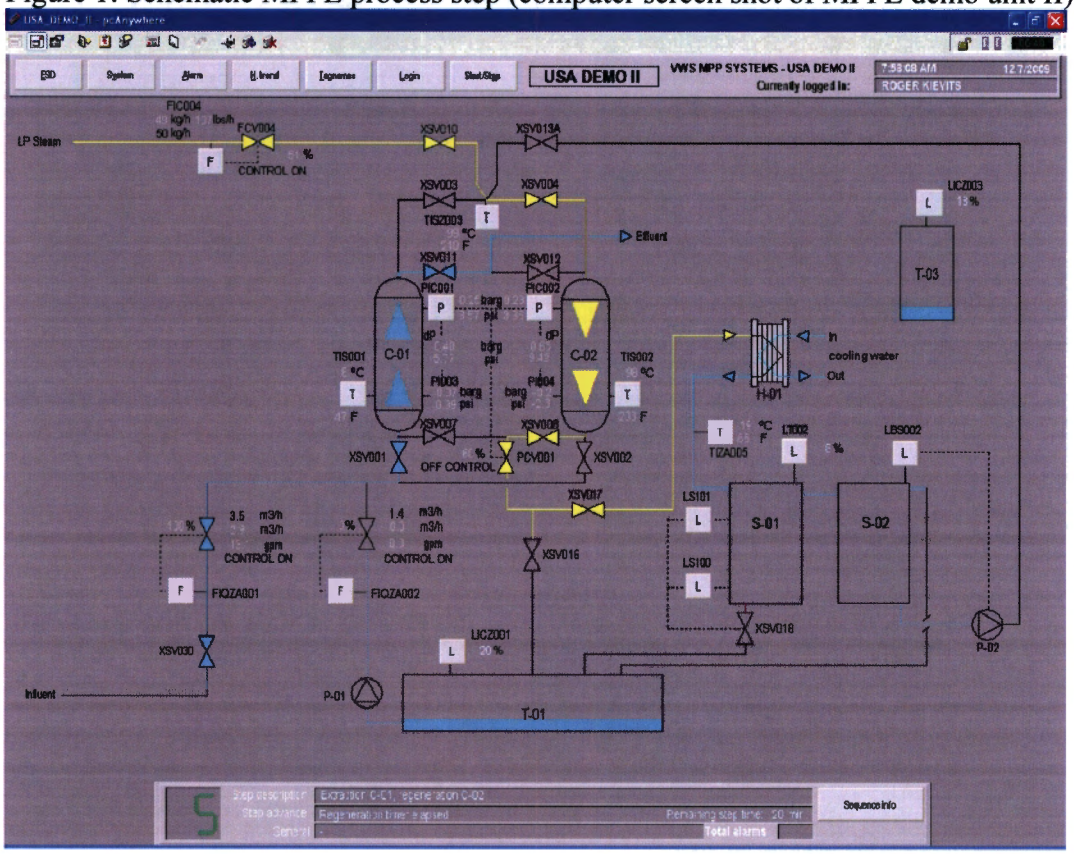
Figure 1: Schematic MPPE process step (computer screen shot of MPPE demo unit II).



The P&ID of the demonstration unit is presented in appendix 1 followed by the system screen and the set points. The PID screen in appendices 2 and 3 are showing all settings used for the demo unit.

During the operation, all measured data of the different installed instruments are saved on the hard disk of the PC. This historical data is visually displayed in appendices 7 - 10

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2.2 Pilot set-up

The influent waste water was taken directly from the refinery process waste stream. First step was to feed the water through the existing API separator. Next, the water was fed to the DAF pilot unit. After being treated by the DAF unit the water was then fed to the pilot MPPE unit using a membrane (diaphragm type) pump. The treated waste water leaving the MPPE unit was discharged to an external buffer tank.

The photo above shows the treatment train set up. The MPPE unit is in the middle of the photo (just left of the yellow generator) and the DAF is located to the left of the MPPE unit.

The green Baker storage tank is located just behind the yellow generator in the lower right side of the photo.

Due to fluctuations in the refinery waste water characteristics, the MPPE pilot study was conducted over a three (3) week period to check the overall performance of the MPPE unit and verify its ability to treat fluctuations in influent water characteristics.

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During the pilot plant trial, the unit was periodically sampled by Western Refining. Each morning and evening the unit was switched from fire water to process waste water and vice versa. Samples of both the influent (after pre-filter) and the effluent were taken.

The samples were sent to an independent certified laboratory, Analytical Resources, Inc., for the analysis of BTEX, VPH (volatile petroleum hydrocarbons) and EPH (extractable petroleum hydrocarbons).

The following characteristics hold for the MPPE Pilot Unit installed at the Western Refining, Gallup, New Mexico refinery.

Trailer Mounted Unit

Trailer Footprint	8' X 28' X 11' (off the ground)		
Construction	Stainless Steel		
Interface	Graphical Man-Machine via Notebook Computer		
Panel Construction	Weather Proof		
Pre-Filters	Bag Type, Inline Solids Filtration		
Max. influent flow	50 gpm (15 gpm for pilot study)		
Min. influent flow	03 gpm (09 gpm for pilot study)		
Column Dimensions	Diameter	32	inches
	Height	80	inches (packed bed height = 64")
Total unit weight	7	tons	

Table: Shows operational parameters of the MPPE pilot unit

Connection	Pilot Unit
Influent water flow (intermittent)	03-50 gpm
Effluent discharge (manual) and disposal,	03-50 gpm
Organics discharge and disposal (manual)	
Cooling water supply	10-20 gpm
Cooling water return	10-20 gpm
Plant steam (P < 15 psig, T < 230°F)	max. 400 lb/hr
Or water for steam generator (> 25 psig)	1-2 gpm
Condensate/drain from boiler (atmospheric)	1-2 gpm
Power (voltage transformer, diesel gen., etc.)	3 phase, 60 Amp 480V
Compressed DRY air (intermittent), min. 70 psig	2 scfm (80 psig)

The MPPE process is controlled by a Siemens S7-300 PLC. Using the iFIX Intellution software it is possible to visualize the status of the process and to intervene in the process. In combination with the software package PC-Anywhere and a wireless internet connection from Verizon, the unit can be fully operated remotely.

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3 Results

The obtained analytical results for the influent and effluent samples taken from the unit are listed in the following tables. Samples taken by either Western Refining or Whittier Filtration. All results are analyzed by the certified lab, Analytical Resources, Inc.

Is it important to note that many of the results were below the detection range of the test method and lab equipment. This is important as the values indicated with the (>) symbol are depicting a worse case scenario. It is unknown as to exactly how far the effluent result is below the detection limit. Therefore, the range could vary from say 9% to as great as 99.99% removal efficiency. However, the removal efficiencies are calculated for informational purposes.

It is important to note that there were several upsets that occurred during the study. The DAF unit had difficulty delivering treated water to the MPPE unit due to problems with the chemical dosing. These problems were solved, to some degree, by the DAF technician however, the MPPE unit did receive poorly treated water on several occasions. The water from the DAF was still fed to the MPPE unit and the unit performed excellent. The results for benzene still continuously fell well below the required limit of <0.5 ppm. This was a good test of the MPPE unit should an upset occur in actual operation.

3.1 Summary of analytical results of samples, November 20, 2009. **Benzene** concentrations.

ID		Time	Inlet	Outlet	Removal
Inlet	Outlet		[ug/l]	[ug/l]	Efficiency [%]
PZ44K	PZ45B	9.30 AM	7100	<4.0	> 99.9
PZ44A	PZ44B	10.00 AM	6200	<2.0	> 99.9
PZ45C	PZ45D	10.30 AM	4200	<2.0	> 99.9
PZ44L	PZ45H	12.00 AM	3700	<4.0	> 99.9
PZ44C	PZ45A	1.00 PM	9200	2.4	> 99.9
PZ44D	PZ44E	2.30 PM	8600	<2.0	> 99.9
PZ44I	PZ44E	2.30 PM	4500	<2.0	> 99.9
PZ44M	PZ45I	2.30 PM	10000	<4.0	> 99.9
PZ44N	PZ45J	4.30 PM	9400	<4.0	> 99.9
PZ44F	PZ44G	4.30 PM	7500	<4.0	> 99.9
PZ44J	PZ45F	5.00 PM	4800	0.2	> 99.9
PZ44H	PZ45B	12.30 AM	3700	<2.0	> 99.9

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3.2 Volatiles, concentrations in mg/l. Inlet and outlet alternating

Date	ID	Time	Component				
			benzene	toluene	ethylbenzene	m.p-xylene	o-xylene
11-30-2009	QA24L	1:30 AM	7.2	12.0	.89	3.8	1.4
11-30-2009	QA24E	1:30 AM	.0018	.0019	<0.001	<0.002	<0.001
12-02-2009	QA24D	11:30 AM	5.5	9.6	.71	3.0	1.2
12-02-2009	QA24O	11:30 AM	<0.001	<0.001	<0.001	<0.002	<0.001
12-02-2009	QA24K	1:00 PM	4.8	9.2	.76	3.2	1.3
12-02-2009	QA24J	1:00 PM	0.0027	0.0014	<0.001	<0.002	<0.001
11-30-2009	QA24I	3:00 PM	8.1	13.0	.87	3.6	1.5
11-30-2009	QA24F	3:00 PM	.002	<0.001	<0.001	<0.002	<0.001
12-02-2009	QA24C	3:00 PM	5.5	9.6	.74	3.2	1.3
12-02-2009	QA24A	3:00 PM	.0053	.003	<0.001	<0.002	<0.001
11-30-2009	QA24G	4:00 PM	14	21	1.3	5.1	2.0
11-30-2009	QA24H	4:00 PM	.0063	.0012	<0.001	<0.002	<0.001
12-02-2009	QA24M	5:00 PM	7.2	12	1.0	4.2	1.7
12-02-2009	QA24B	5:00 PM	.0025	.0013	<0.001	<0.002	<0.001

3.3 Volatiles, Removal efficiency in % for table above.

Date	ID	Time	Component				
			benzene	toluene	ethylbenzene	m.p-xylene	o-xylene
11-30-2009	QA24E	1:30 AM	99.98%	99.98%	>99.89%	>99.95%	>99.93%
12-02-2009	QA24O	11:30 AM	>99.97%	>99.98%	>99.86%	>99.93%	>99.92%
12-02-2009	QA24J	1:00 PM	99.98%	99.99%	>99.86%	>99.93%	>99.92%
11-30-2009	QA24F	3:00 PM	99.98%	>99.99%	>99.87%	>99.94%	>99.92%
12-02-2009	QA24A	3:00 PM	99.90%	99.97%	>99.86%	>99.94%	>99.92%
11-30-2009	QA24H	4:00 PM	99.97%	99.99%	>99.89%	>99.94%	>99.93%
12-02-2009	QA24B	5:00 PM	99.98%	99.99%	>99.89%	>99.94%	>99.93%

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3.4 VPH-1, Concentrations in µg/l, inlet and outlet alternating

Date	ID	Time	Component					
			MTBE	pentane	hexane	octane	decane	dodecane
11-30-2009	QA24L	1:30 AM	<500	<500	<500	<500	<500	<500
11-30-2009	QA24E	1:30 AM	5.7	<5	<5	<5	<5	<5
12-02-2009	QA24D	11:30 AM	<500	<500	<500	<500	<500	<500
12-02-2009	QA24O	11:30 AM	6.1	<5	<5	<5	<5	<5
12-02-2009	QA24K	1:00 PM	NA	NA	NA	NA	NA	NA
12-02-2009	QA24J	1:00 PM	9.0	<5	<5	<5	<5	<5
11-30-2009	QA24I	3:00 PM	<500	<500	<500	<500	<500	<500
11-30-2009	QA24F	3:00 PM	<5	<5	<5	<5	<5	<5
12-02-2009	QA24C	3:00 PM	<500	<500	<500	<500	<500	<500
12-02-2009	QA24A	3:00 PM	21	<5	<5	7.5	<5	<5
11-30-2009	QA24G	4:00 PM	<750	<750	<750	<750	<750	<750
11-30-2009	QA24H	4:00 PM	5.4	<5	<5	<5	<5	<5
12-02-2009	QA24M	5:00 PM	<500	<500	<500	<500	<500	<500
12-02-2009	QA24B	5:00 PM	19	<5	<5	<5	<5	<5

NA – Results not available from lab. Concentrations out of range of instrumentation.

NOTE: Not able to calculate removal efficiency of the table above due to the inlet concentrations falling under the detection limits.

3.5 VPH-2-Aromatics, Concentrations in µg/l, inlet and outlet alternating

Date	ID	Time	Component		
			C8-C10	C10-C12	C12-C13
11-30-2009	QA24L	1:30 AM	8700	<5000	<5000
11-30-2009	QA24E	1:30 AM	<50	<50	<50
12-02-2009	QA24D	11:30 AM	8700	<5000	<5000
12-02-2009	QA24O	11:30 AM	<50	<50	<50
12-02-2009	QA24K	1:00 PM	NA	NA	NA
12-02-2009	QA24J	1:00 PM	<50	<50	<50
11-30-2009	QA24I	3:00 PM	8500	<5000	<5000
11-30-2009	QA24F	3:00 PM	<50	<50	<50
12-02-2009	QA24C	3:00 PM	8500	<5000	<5000
12-02-2009	QA24A	3:00 PM	<50	<50	<50
11-30-2009	QA24G	4:00 PM	13,000	<7500	<7500
11-30-2009	QA24H	4:00 PM	<50	<50	<50
12-02-2009	QA24M	5:00 PM	10000	<5000	<5000
12-02-2009	QA24B	5:00 PM	<50	<50	<50

NA – Results not available from lab. Concentrations out of range of instrumentation.

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3.6 VPH-2-Aromatics, Removal efficiency in %

Date	ID	Time	Component		
			C8-C10	C10-C12	C12-C13
11-30-2009	QA24E	1:30 AM	>99.43%	n.c.	n.c.
12-02-2009	QA24O	11:30 AM	>99.43%	n.c.	n.c.
12-02-2009	QA24J	1:00 PM	NA	NA	NA
11-30-2009	QA24F	3:00 PM	>99.41%	n.c.	n.c.
12-02-2009	QA24A	3:00 PM	>99.41%	n.c.	n.c.
11-30-2009	QA24H	4:00 PM	>99.62%	n.c.	n.c.
12-02-2009	QA24B	5:00 PM	>99.50%	n.c.	n.c.

n.c.; cannot be calculated due to the fact that both influent and effluent concentrations are below detection limit or just influent

NA – Results not available from lab. Concentrations out of range of instrumentation

3.7 VPH-3-Aliphatics, Concentrations in µg/l, inlet and outlet alternating

Date	ID	Time	Component			
			C5-C6	C6-C8	C8-C10	C10-C12
11-30-2009	QA24L	1:30 AM	<5000	6400	15000	<5000
11-30-2009	QA24E	1:30 AM	120	80	<50	<50
12-02-2009	QA24D	11:30 AM	<5000	5500	14000	<5000
12-02-2009	QA24O	11:30 AM	240	130	<50	<50
12-02-2009	QA24K	1:00 PM	NA	NA	NA	NA
12-02-2009	QA24J	1:00 PM	230	180	<50	<50
11-30-2009	QA24I	3:00 PM	<5000	6500	17000	<5000
11-30-2009	QA24F	3:00 PM	110	78	<50	<50
12-02-2009	QA24C	3:00 PM	<5000	5200	13000	<5000
12-02-2009	QA24A	3:00 PM	120	120	<50	<50
11-30-2009	QA24G	4:00 PM	<7500	12000	30000	<7500
11-30-2009	QA24H	4:00 PM	140	84	<50	<50
12-02-2009	QA24M	5:00 PM	<5000	7600	17000	<5000
12-02-2009	QA24B	5:00 PM	86	100	<50	<50

NA – Results not available from lab. Concentrations out of range of instrumentation.

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3.8 VPH-3-Aliphatics, Removal efficiency in % for above table

Date	ID	Time	Component			
			C5-C6	C6-C8	C8-C10	C10-C12
11-30-2009	QA24E	1:30 AM	n.c.	98.75%	>99.67%	n.c.
12-02-2009	QA24O	11:30 AM	n.c.	97.64%	99.64%	n.c.
12-02-2009	QA24J	1:00 PM	NA	NA	NA	n.c.
11-30-2009	QA24F	3:00 PM	n.c.	98.80%	>99.71%	n.c.
12-02-2009	QA24A	3:00 PM	n.c.	97.69%	>99.62%	n.c.
11-30-2009	QA24H	4:00 PM	n.c.	99.30%	>99.83%	n.c.
12-02-2009	QA24B	5:00 PM	n.c.	98.68%	>99.71%	n.c.

n.c. - cannot be calculated due to the fact that both influent and effluent concentrations are below detection limit or just influent

NA – Results not available from lab. Concentrations out of range of instrumentation.

3.9 EPH-1-Aliphatics, Concentrations in µg/l, inlet and outlet alternating

Date	ID	Time	Component				
			C8-C10	C10-C12	C12-C16	C16-C21	C21-C34
11-30-2009	QA24L	1:30 AM	100	230	420	240	<40
11-30-2009	QA24E	1:30 AM	<40	<40	<40	<40	<40
12-02-2009	QA24D	11:30 AM	42	<40	66	58	<40
12-02-2009	QA24O	11:30 AM	NA	NA	NA	NA	NA
12-02-2009	QA24K	1:00 PM	120	210	420	290	<40
12-02-2009	QA24J	1:00 PM	<40	<40	<40	<40	<40
11-30-2009	QA24I	3:00 PM	76	110	220	150	<40
11-30-2009	QA24F	3:00 PM	<40	<40	<40	<40	<40
12-02-2009	QA24C	3:00 PM	160	250	670	510	60
12-02-2009	QA24A	3:00 PM	<40	<40	90	46	<40
11-30-2009	QA24G	4:00 PM	250	260	530	350	<40
11-30-2009	QA24H	4:00 PM	<40	<40	<40	<40	<40
12-02-2009	QA24M	5:00 PM	50	44	100	80	<40
12-02-2009	QA24B	5:00 PM	<40	<40	<40	<40	<40

NA – Results not available from lab. Concentrations out of range of instrumentation.

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3.1.0 EPH-1-Aliphatics, Removal efficiency in %

Date	ID	Time	Component				
			C8-C10	C10-C12	C12-C16	C16-C21	C21-C34
11-30-2009	QA24E	1:30 AM	>60.00%	>82.61%	>90.48%	>83.33%	n.c.
12-02-2009	QA24O	11:30 AM	NA	NA	NA	NA	NA
12-02-2009	QA24J	1:00 PM	>66.67%	>80.95%	>90.48%	>86.21%	n.c.
11-30-2009	QA24F	3:00 PM	>47.37%	>63.64%	>81.82%	>73.33%	n.c.
12-02-2009	QA24A	3:00 PM	>75.00%	>84.00%	86.57%	90.98%	>33.33%
11-30-2009	QA24H	4:00 PM	>84.00%	>84.62%	>92.45%	>88.57%	n.c.
12-02-2009	QA24B	5:00 PM	>20.00%	>9.09%	>60.00%	>50.00%	n.c.

n.c.: cannot be calculated due to the fact that both influent and effluent concentrations are below detection limit or just influent

NA: Results not available from lab. Concentrations out of range of instrumentation.

3.1.1 EPH-1-Aromatics, Concentrations in µg/l, inlet and outlet alternating

Date	ID	Time	Component				
			C8-C10	C10-C12	C12-C16	C16-C21	C21-C34
11-30-2009	QA24L	1:30 AM	4300	1100	1400	440	<40
11-30-2009	QA24E	1:30 AM	<40	<40	<40	52	<40
12-02-2009	QA24D	11:30 AM	4300	1500	1400	260	<40
12-02-2009	QA24O	11:30 AM	NA	NA	NA	NA	NA
12-02-2009	QA24K	1:00 PM	4800	1700	1900	410	<40
12-02-2009	QA24J	1:00 PM	52	<40	40	66	<40
11-30-2009	QA24I	3:00 PM	5600	1100	1200	310	<40
11-30-2009	QA24F	3:00 PM	<40	<40	<40	<40	<40
12-02-2009	QA24C	3:00 PM	4800	1300	1500	570	60
12-02-2009	QA24A	3:00 PM	<40	<40	<40	<40	<40
11-30-2009	QA24G	4:00 PM	12000	1300	1300	420	48
11-30-2009	QA24H	4:00 PM	50	<40	62	<40	<40
12-02-2009	QA24M	5:00 PM	6500	970	910	240	<40
12-02-2009	QA24B	5:00 PM	<40	<40	<40	58	<40

NA – Results not available from lab. Concentrations out of range of instrumentation.

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3.1.2 EPH-1-Aromatics, Removal efficiency in %

Date	ID	Time	Component				
			C8-C10	C10-C12	C12-C16	C16-C21	C21-C34
11-30-2009	QA24E	1:30 AM	>99.07%	>96.36%	>97.14%	88.18%	n.c.
12-02-2009	QA24O	11:30 AM	NA	NA	NA	NA	NA
12-02-2009	QA24J	1:00 PM	98.92%	>97.65%	97.89%	83.90%	n.c.
11-30-2009	QA24F	3:00 PM	>99.29%	>96.36%	>96.67%	>87.10%	n.c.
12-02-2009	QA24A	3:00 PM	>99.17%	>96.92%	>97.33%	>92.98%	>33.33%
11-30-2009	QA24H	4:00 PM	99.58%	>96.92%	95.23%	>90.48%	>16.67%
12-02-2009	QA24B	5:00 PM	>99.38%	>95.88%	>95.60%	75.83%	n.c.

n.c.: cannot be calculated due to the fact that both influent and effluent concentrations are below detection limit or just influent

NA: Results not available from lab. Concentrations out of range of instrumentation.

3.1.3 Volatiles, Concentrations in mg/l, inlet and outlet alternating

Date	ID	Time	Component				
			benzene	toluene	ethylbenzene	m.p-xylene	o-xylene
03-12-2009	QA69A	16:30	4.3	9.4	0.84	3.9	1.5
03-12-2009	QA69B	16:30	<0.005	<0.005	<0.005	<0.01	<0.005
03-12-2009	QA64A	12:05	5.2	10	0.67	2.8	1.2
03-12-2009	QA64B	12:05	<0.01	<0.01	<0.01	<0.02	<0.01
03-12-2009	QA64C	15:00	6.7	12	0.69	3	1.2
03-12-2009	QA64D	15:00	<0.015	<0.015	<0.015	<0.030	<0.015
03-12-2009	QA64E	13:30	6.5	12	0.68	3	1.2
03-12-2009	QA64F	13:30	<0.015	<0.015	<0.015	<0.03	<0.015
04-12-2009	QA64G	12:00	6.6	14	0.78	3.6	1.4
04-12-2009	QA64H	12:00	<0.003	<0.003	<0.003	<0.006	<0.003
04-12-2009	QA64I	14:10	6.8	15	0.84	3.7	1.4
04-12-2009	QA64J	14:10	0.0069	<0.003	<0.003	<0.006	<0.003
04-12-2009	QA64K	3:00	8.4	18	1	4.6	1.6
04-12-2009	QA64L	3:00	<0.003	<0.003	<0.003	<0.006	<0.003
04-12-2009	QA64M	16:30	8.1	17	0.96	4.6	1.6
04-12-2009	QA64N	16:30	0.018	<0.003	<0.003	<0.006	<0.003
05-12-2009	QA64O	16:30	4.6	10	0.77	3.2	1.3
05-12-2009	QA64P	16:30	<0.005	<0.005	<0.005	<0.01	<0.005
05-12-2009	QA64Q	15:15	6	12	0.87	4	1.6
05-12-2009	QA64R	15:15	<0.01	<0.01	<0.01	<0.02	<0.01
05-12-2009	QA64S	16:30	6	11	0.7	3	1.3
05-12-2009	QA64T	16:30	<0.01	<0.01	<0.01	<0.02	<0.01

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3.1.4 Volatiles, Removal efficiency in % of above table 3.1.1

Date	ID	Time	Component				
			benzene	toluene	ethylbenzene	m.p-xylene	o-xylene
03-12-2009	QA69B	16:30	>99.8	>99.9	>99.4	>99.7	>99.6
03-12-2009	QA64B	12:05	>99.8	>99.9	>98.5	>99.3	>99.2
03-12-2009	QA64D	15:00	>99.7	>99.8	>97.8	>99	>98.7
03-12-2009	QA64F	13:30	>99.7	>99.8	>97.7	>99	>98.7
04-12-2009	QA64H	12:00	>99.9	>99.9	>99.6	>99.8	>99.7
04-12-2009	QA64J	14:10	>99.8	>99.9	>99.6	>99.8	>99.7
04-12-2009	QA64L	3:00	>99.9	>99.9	>99.7	>99.8	>99.8
04-12-2009	QA64N	16:30	>99.7	>99.9	>99.6	>99.8	>99.8
05-12-2009	QA64P	16:30	>99.8	>99.9	>99.3	>99.6	>99.6
05-12-2009	QA64R	15:15	>99.8	>99.9	>98.8	>99.5	>99.3
05-12-2009	QA64T	16:30	>99.8	>99.9	>98.5	>99.3	>99.2

3.1.5 VPH-1, Concentrations in µg/l, inlet and outlet alternating

Date	ID	Time	Component					
			MTBE	pentane	hexane	octane	decane	dodecane
03-12-2009	QA69A	16:30	<750	<750	<750	<750	<750	<750
03-12-2009	QA69B	16:30	<5	<5	14	<5	<5	<5
03-12-2009	QA64A	12:05	<500	930	<500	<500	<500	<500
03-12-2009	QA64B	12:05	<5	1100	16	<5	<5	<5
03-12-2009	QA64C	15:00	<500	36000	<500	<500	<500	<500
03-12-2009	QA64D	15:00	<5	<5	25	<5	<5	<5
03-12-2009	QA64E	13:30	<500	35000	<500	<5000	<500	<500
03-12-2009	QA64F	13:30	<5	2000	29	<5	<5	<5
04-12-2009	QA64G	12:00	<500	2800	<500	<500	<500	<500
04-12-2009	QA64H	12:00	6.8	97	<5	<5	<5	8
04-12-2009	QA64I	14:10	<500	1500	<500	<500	<500	<500
04-12-2009	QA64J	14:10	5	<5	<5	<5	<5	<5
04-12-2009	QA64K	3:00	<500	1400	<500	<500	<500	<500
04-12-2009	QA64L	3:00	5	<5	<5	<5	<5	7.9
04-12-2009	QA64M	16:30	<500	1100	<500	<500	<500	<500
04-12-2009	QA64N	16:30	6.3	<5	5.5	<5	<5	9.1
05-12-2009	QA64O	16:30	<500	1400	<500	<500	<500	<500
05-12-2009	QA64P	16:30	6.5	<5	18	<5	<5	<5
05-12-2009	QA64Q	15:15	<500	1100	<500	<500	<500	<500
05-12-2009	QA64R	15:15	7.9	<5	14	<5	<5	<5
05-12-2009	QA64S	16:30	<500	520	<500	<500	<500	<500
05-12-2009	QA64T	16:30	23	<5	19	<5	<5	<5

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3.16 VPH-1, Removal efficiency in %

Date	ID	Time	Component					
			MTBE	pentane	hexane	octane	decane	dodecane
03-12-2009	QA69B	16:30	n.c.	n.c.	n.c.	n.c.	n.c.	n.c.
03-12-2009	QA64B	12:05	n.c.	n.c.	n.c.	n.c.	n.c.	n.c.
03-12-2009	QA64D	15:00	n.c.	>99.9	n.c.	n.c.	n.c.	n.c.
03-12-2009	QA64F	13:30	n.c.	94.3	n.c.	n.c.	n.c.	n.c.
04-12-2009	QA64H	12:00	n.c.	96.5	n.c.	n.c.	n.c.	n.c.
04-12-2009	QA64J	14:10	n.c.	>99.7	n.c.	n.c.	n.c.	n.c.
04-12-2009	QA64L	3:00	n.c.	>99.6	n.c.	n.c.	n.c.	n.c.
04-12-2009	QA64N	16:30	n.c.	>99.5	n.c.	n.c.	n.c.	n.c.
05-12-2009	QA64P	16:30	n.c.	>99.6	n.c.	n.c.	n.c.	n.c.
05-12-2009	QA64R	15:15	n.c.	>99.5	n.c.	n.c.	n.c.	n.c.
05-12-2009	QA64T	16:30	n.c.	>99.0	n.c.	n.c.	n.c.	n.c.

n.c.; cannot be calculated due to the fact that both influent and effluent concentrations are below detection limit

3.1.7 VPH-2-Aromatics, Concentrations in µg/l, inlet and outlet alternating

Date	ID	Time	Component		
			C8-C10	C10-C12	C12-C13
03-12-2009	QA69A	16:30	12000	<7500	<7500
03-12-2009	QA69B	16:30	<50	<50	<50
03-12-2009	QA64A	12:05	7900	<5000	<5000
03-12-2009	QA64B	12:05	<50	<50	<50
03-12-2009	QA64C	15:00	8000	<5000	<5000
03-12-2009	QA64D	15:00	<50	<50	<50
03-12-2009	QA64E	13:30	8200	<5000	<5000
03-12-2009	QA64F	13:30	<50	<50	<50
04-12-2009	QA64G	12:00	9000	<5000	<5000
04-12-2009	QA64H	12:00	<50	<50	<50
04-12-2009	QA64I	14:10	9000	<5000	<5000
04-12-2009	QA64J	14:10	<50	<50	<50
04-12-2009	QA64K	3:00	11000	<5000	<5000
04-12-2009	QA64L	3:00	<50	<50	<50
04-12-2009	QA64M	16:30	12000	<5000	<5000
04-12-2009	QA64N	16:30	<50	52	<50
05-12-2009	QA64O	16:30	8700	<5000	<5000
05-12-2009	QA64P	16:30	<50	<50	<50
05-12-2009	QA64Q	15:15	11000	<5000	<5000
05-12-2009	QA64R	15:15	62	<50	<50
05-12-2009	QA64S	16:30	8400	<5000	<5000
05-12-2009	QA64T	16:30	76	<50	<50

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3.1.8 VPH-2-Aromatics, Removal efficiency in %

Date	ID	Time	Component		
			C5-C6	C6-C8	C8-C10
03-12-2009	QA69B	16:30	>99.5	n.c.	n.c.
03-12-2009	QA64B	12:05	>99.3	n.c.	n.c.
03-12-2009	QA64D	15:00	>99.3	n.c.	n.c.
03-12-2009	QA64F	13:30	>99.3	n.c.	n.c.
04-12-2009	QA64H	12:00	>99.4	n.c.	n.c.
04-12-2009	QA64J	14:10	>99.4	n.c.	n.c.
04-12-2009	QA64L	3:00	>99.5	n.c.	n.c.
04-12-2009	QA64N	16:30	>99.5	n.c.	n.c.
05-12-2009	QA64P	16:30	>99.4	n.c.	n.c.
05-12-2009	QA64R	15:15	99.4	n.c.	n.c.
05-12-2009	QA64T	16:30	99	n.c.	n.c.

n.c.; cannot be calculated due to the fact that both influent and effluent concentrations are below detection limit

3.1.9 VPH-3-Aliphatics, Concentrations in µg/l, inlet and outlet alternating

Date	ID	Time	Component			
			C5-C6	C6-C8	C8-C10	C10-C12
03-12-2009	QA69A	16:30	<7500	17000	18000	<7500
03-12-2009	QA69B	16:30	200	130	<50	<50
03-12-2009	QA64A	12:05	5300	6200	20000	<5000
03-12-2009	QA64B	12:05	1700	310	<50	<50
03-12-2009	QA64C	15:00	46000	9000	20000	<5000
03-12-2009	QA64D	15:00	1800	360	<50	<50
03-12-2009	QA64E	13:30	45000	9100	21000	<5000
03-12-2009	QA64F	13:30	2700	410	<50	<50
04-12-2009	QA64G	12:00	5700	7800	26000	<5000
04-12-2009	QA64H	12:00	390	59	<50	<50
04-12-2009	QA64I	14:10	<5000	7700	26000	<5000
04-12-2009	QA64J	14:10	450	83	<50	<50
04-12-2009	QA64K	3:00	<5000	12000	30000	<5000
04-12-2009	QA64L	3:00	570	58	<50	<50
04-12-2009	QA64M	16:30	<5000	13000	30000	<5000
04-12-2009	QA64N	16:30	420	110	<50	<50
05-12-2009	QA64O	16:30	6300	5700	18000	<5000
05-12-2009	QA64P	16:30	580	150	<50	<50
05-12-2009	QA64Q	15:15	5400	7800	21000	<5000
05-12-2009	QA64R	15:15	750	220	<50	<50
05-12-2009	QA64S	16:30	<5000	7000	20000	<5000
05-12-2009	QA64T	16:30	1000	400	<50	<50

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3.2.0 VPH-3-Aliphatics, Removal efficiency in %

Date	ID	Time	Component			
			C5-C6	C6-C8	C8-C10	C10-C12
03-12-2009	QA69B	16:30	n.c.	99.2	>99.7	n.c.
03-12-2009	QA64B	12:05	67.9	95	>99.7	n.c.
03-12-2009	QA64D	15:00	96.1	96	>99.7	n.c.
03-12-2009	QA64F	13:30	94	95.4	>99.7	n.c.
04-12-2009	QA64H	12:00	93.1	99.2	>99.8	n.c.
04-12-2009	QA64J	14:10	n.c.	98.9	>99.8	n.c.
04-12-2009	QA64L	3:00	n.c.	99.5	>99.8	n.c.
04-12-2009	QA64N	16:30	n.c.	99.1	>99.8	n.c.
05-12-2009	QA64P	16:30	90.8	97.3	>99.7	n.c.
05-12-2009	QA64R	15:15	86.1	97.1	>99.7	n.c.
05-12-2009	QA64T	16:30	n.c.	94.2	>99.7	n.c.

n.c.; cannot be calculated due to the fact that influent, effluent or both concentrations are below detection limit

3.2.1 EPH-1-Aliphatics, Concentrations in µg/l, inlet and outlet alternating

Date	ID	Time	Component				
			C8-C10	C10-C12	C12-C16	C16-C21	C21-C34
03-12-2009	QA69A	16:30	4400	5800	9900	7500	3100
03-12-2009	QA69B	16:30	<40	<40	58	<40	<40
03-12-2009	QA64A	12:05	1400	230	230	150	<40
03-12-2009	QA64B	12:05	<40	<40	<40	<40	<40
03-12-2009	QA64C	15:00	1400	430	700	560	180
03-12-2009	QA64D	15:00	<40	<40	<40	<40	<40
03-12-2009	QA64E	13:30	440	88	150	96	<40
03-12-2009	QA64F	13:30	<40	<40	<40	<40	<40
04-12-2009	QA64G	12:00	n.a.	n.a.	n.a.	n.a.	n.a.
04-12-2009	QA64H	12:00	<40	<40	160	150	<40
04-12-2009	QA64I	14:10	650	390	730	540	150
04-12-2009	QA64J	14:10	<40	<40	56	52	<40
04-12-2009	QA64K	3:00	1800	1600	3100	2400	810
04-12-2009	QA64L	3:00	<40	<40	120	76	<40
04-12-2009	QA64M	16:30	n.a.	n.a.	n.a.	n.a.	n.a.
04-12-2009	QA64N	16:30	<40	<40	110	76	<40
05-12-2009	QA64O	16:30	960	540	870	720	200
05-12-2009	QA64P	16:30	<40	<40	<40	<40	<40
05-12-2009	QA64Q	15:15	1800	1400	2400	1700	660
05-12-2009	QA64R	15:15	<40	<40	<40	<40	<40
05-12-2009	QA64S	16:30	1200	640	1000	700	250
05-12-2009	QA64T	16:30	<40	<40	<40	<40	<40

n.a.; not analyzed

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3.2.3 EPH-1-Aliphatics, Removal efficiency in %

Date	ID	Time	Component				
			C8-C10	C10-C12	C12-C16	C16-C21	C21-C34
03-12-2009	QA69B	16:30	>99.0	>99.3	99.4	>99.4	>98.7
03-12-2009	QA64B	12:05	>97.1	>82.6	>82.6	>73.3	n.c.
03-12-2009	QA64D	15:00	>97.1	>90.6	>94.2	>92.8	>77.7
03-12-2009	QA64F	13:30	>90.9	>54.5	>73.3	>58.3	n.c.
04-12-2009	QA64H	12:00	n.c. 1	n.c. 1	n.c. 1	n.c. 1	n.c. 1
04-12-2009	QA64J	14:10	>93.8	>89.7	92.3	90.3	>73.3
04-12-2009	QA64L	3:00	>97.7	>97.5	96.1	96.8	>95.0
04-12-2009	QA64N	16:30	n.c. 1	n.c. 1	n.c. 1	n.c. 1	n.c. 1
05-12-2009	QA64P	16:30	95.8	>92.5	>95.4	>94.4	>80
05-12-2009	QA64R	15:15	>97.7	>97.1	>98.3	>97.6	>93.9
05-12-2009	QA64T	16:30	>96.6	>93.7	>96	>94.2	>84

n.c.; cannot be calculated due to the fact that influent, effluent or both concentrations are below detection limit

n.c. 1; cannot be calculated due to absence of influent concentrations

3.2.4 EPH-2-Aromatics, inlet and outlet alternating

Date	ID	Time	Component				
			C8-C10	C10-C12	C12-C16	C16-C21	C21-C34
03-12-2009	QA69A	16:30	6700	4300	7000	5800	1400
03-12-2009	QA69B	16:30	56	66	130	88	<40
03-12-2009	QA64A	12:05	3900	1500	1600	660	90
03-12-2009	QA64B	12:05	60	74	110	68	<40
03-12-2009	QA64C	15:00	3800	1300	1500	850	110
03-12-2009	QA64D	15:00	54	62	110	96	<40
03-12-2009	QA64E	13:30	5500	1400	1500	700	82
03-12-2009	QA64F	13:30	<40	48	62	44	<40
04-12-2009	QA64G	12:00	n.a.	n.a.	n.a.	n.a.	n.a.
04-12-2009	QA64H	12:00	<40	<40	<40	<40	<40
04-12-2009	QA64I	14:10	5300	740	810	420	94
04-12-2009	QA64J	14:10	88	<40	<40	<40	<40
04-12-2009	QA64K	3:00	4800	1200	1800	1400	350
04-12-2009	QA64L	3:00	66	<40	<40	<40	<40
04-12-2009	QA64M	16:30	n.a.	n.a.	n.a.	n.a.	n.a.
04-12-2009	QA64N	16:30	44	<40	<40	<40	<40
05-12-2009	QA64O	16:30	4400	1700	2000	970	250
05-12-2009	QA64P	16:30	<40	<40	78	56	<40
05-12-2009	QA64Q	15:15	5500	2100	2600	1600	450
05-12-2009	QA64R	15:15	76	80	140	70	<40
05-12-2009	QA64S	16:30	6800	1700	1800	900	140
05-12-2009	QA64T	16:30	74	76	110	62	<40

n.a.; not analyzed

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3.2.5 EPH-2-Aromatics, Removal efficiency in %

Date	ID	Time	Component				
			C8-C10	C10-C12	C12-C16	C16-C21	C21-C34
03-12-2009	QA69B	16:30	99.1	98.4	98.1	98.4	>97.1
03-12-2009	QA64B	12:05	98.4	95	93.1	89.6	>55.5
03-12-2009	QA64D	15:00	98.5	95.2	92.6	88.7	>63.6
03-12-2009	QA64F	13:30	>99.2	96.5	95.8	93.7	>51.2
04-12-2009	QA64H	12:00	n.c. 1	n.c. 1	n.c. 1	n.c. 1	n.c. 1
04-12-2009	QA64J	14:10	98.3	>94.5	>95.0	>90.4	>57.4
04-12-2009	QA64L	3:00	98.6	>96.6	>97.7	>99.7	>88.5
04-12-2009	QA64N	16:30	n.c. 1	n.c. 1	n.c. 1	n.c. 1	n.c. 1
05-12-2009	QA64P	16:30	>99.0	>97.6	96.1	94.2	>84
05-12-2009	QA64R	15:15	98.6	96.1	94.6	95.6	>91.1
05-12-2009	QA64T	16:30	98.9	95.5	93.8	93.1	>71.4

n.c. 1; cannot be calculated due to absence of influent concentrations

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4 Conclusion

From the MPPE pilot plant trial at Western Refining, the following can be concluded:

Separation performance

- The MPPE technology is able to remove Benzene to any level required; >99.9% removal efficiency was measured to even below detection limits
- During the 3 week trial, the Benzene level of the treated water was continuously below 0.5 ppm, with varying Benzene inlet concentrations from 3.7 to 14.0 ppm, at an average flow rate of 15 gpm
- The MPPE technology is able to remove BTEX to any level required; >99.9% removal efficiency was measured
- The MPPE technology is able to remove the indicated VPH (Volatile Petroleum Hydrocarbons) aliphatics and aromatics to any level required
- The MPPE technology is able to remove the indicated EPH (Extractable Petroleum Hydrocarbons) aliphatics and aromatics to any level required
- The MPPE technology will remove the necessary aromatic and aliphatic hydrocarbons in order to meet the "no sheen" requirement at the evaporation pond

Operational performance

- The unit was operated 24 hours a day, 7 days a week, fully automated
- During day time the unit was run on process waste water
- During this period the unit was sampled by Western Refining
- During the night time the unit was switched from process waste water to fire water
- During running hours minimal shut down of the unit occurred
- Some minor difficulties with the steam pressure reducer inside the MPPE unit and the instrument air from the external compressor were met without having any influence on the performance of the unit
- The inlet bag filters had to be changed several times due to high solids loading
- The unit was successfully observed remotely without the necessity of changing parameters
- At the start up, some freezing problems occurred and were met. These were solved rapidly by installing some extra insulation and electrical tracing inside the unit and some steam tracing on external pipelines going to the unit

Overall conclusion:

- **The MPPE technology proves to be very capable of lowering the Benzene concentration well below the by EPA required level of 0.5 mg/l**
- **The MPPE technology can also remove other dissolved hydrocarbons like Toluene, Ethylbenzene, Xylenes, VPH and EPH (both aliphatics and aromatics) to any level required.**

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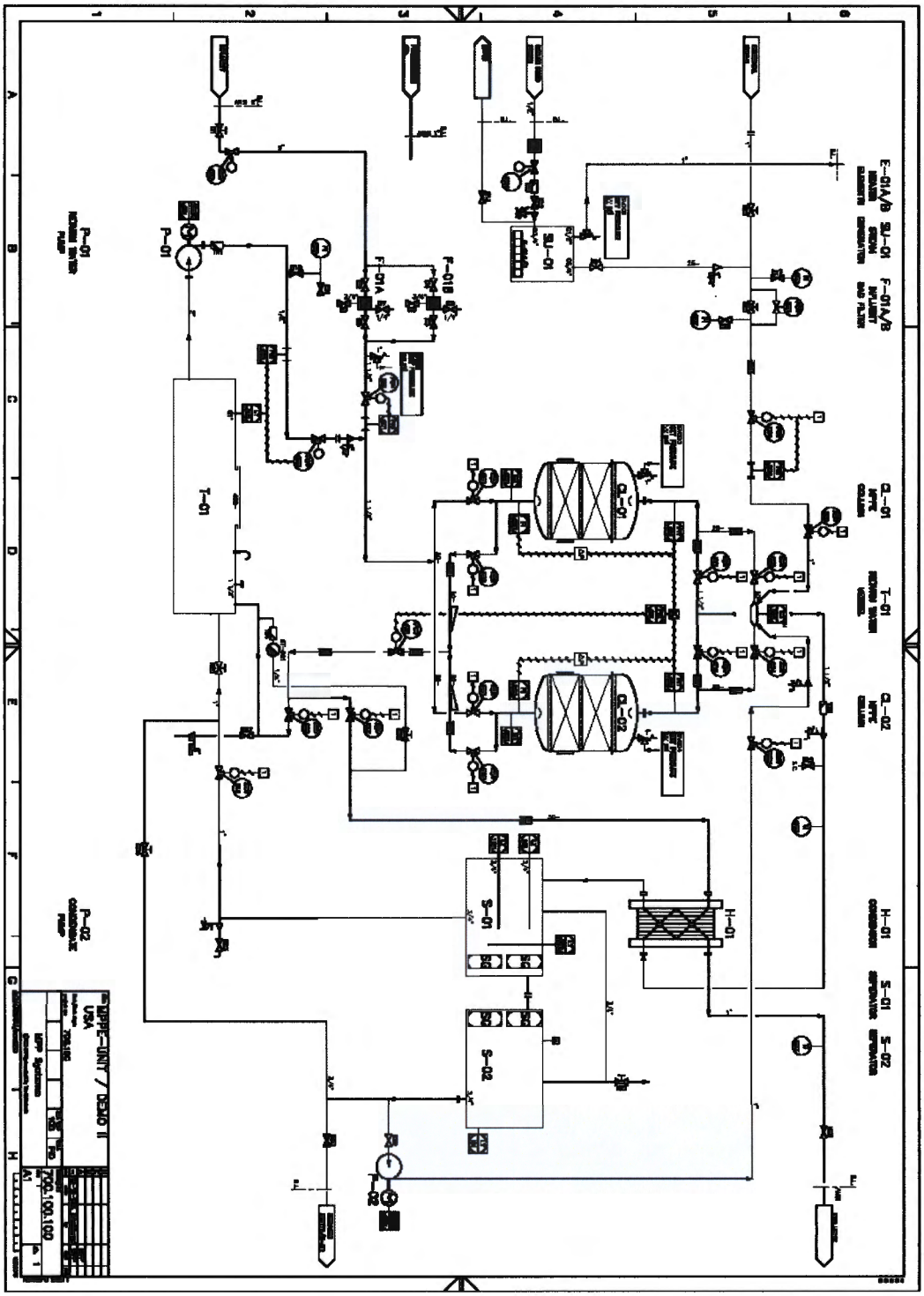
Appendix 1: P&ID



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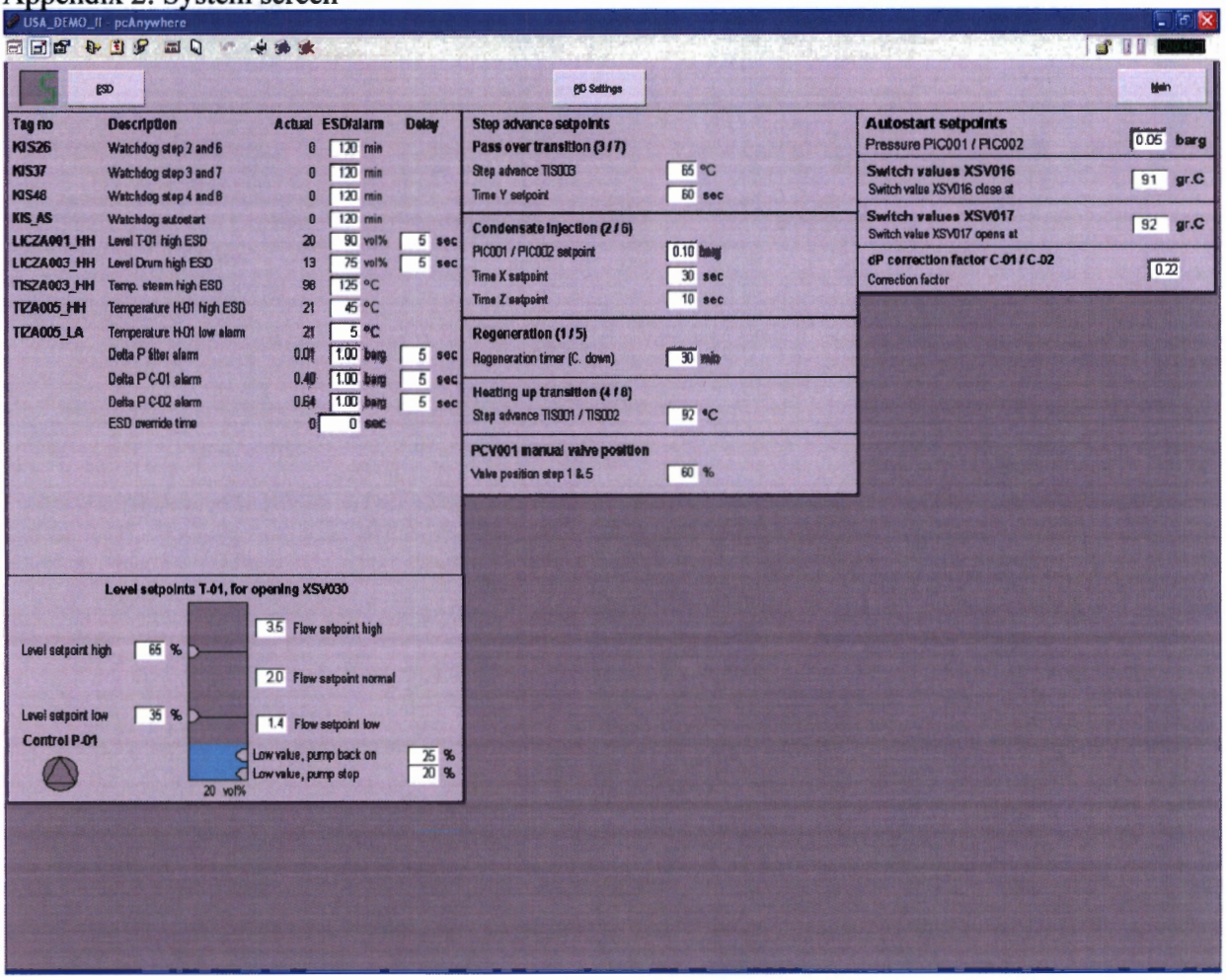
Appendix 2: System screen



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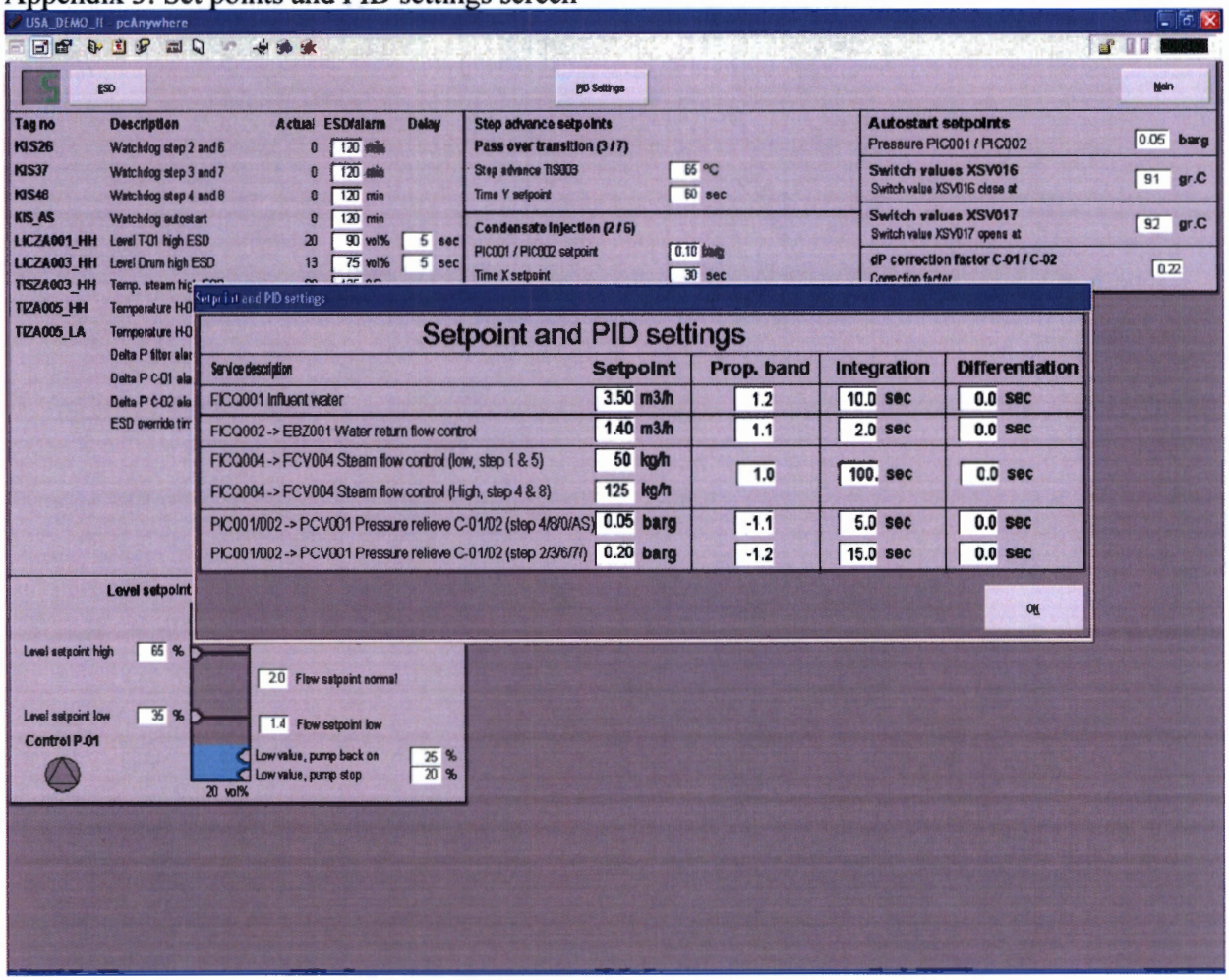
Appendix 3: Set points and PID settings screen



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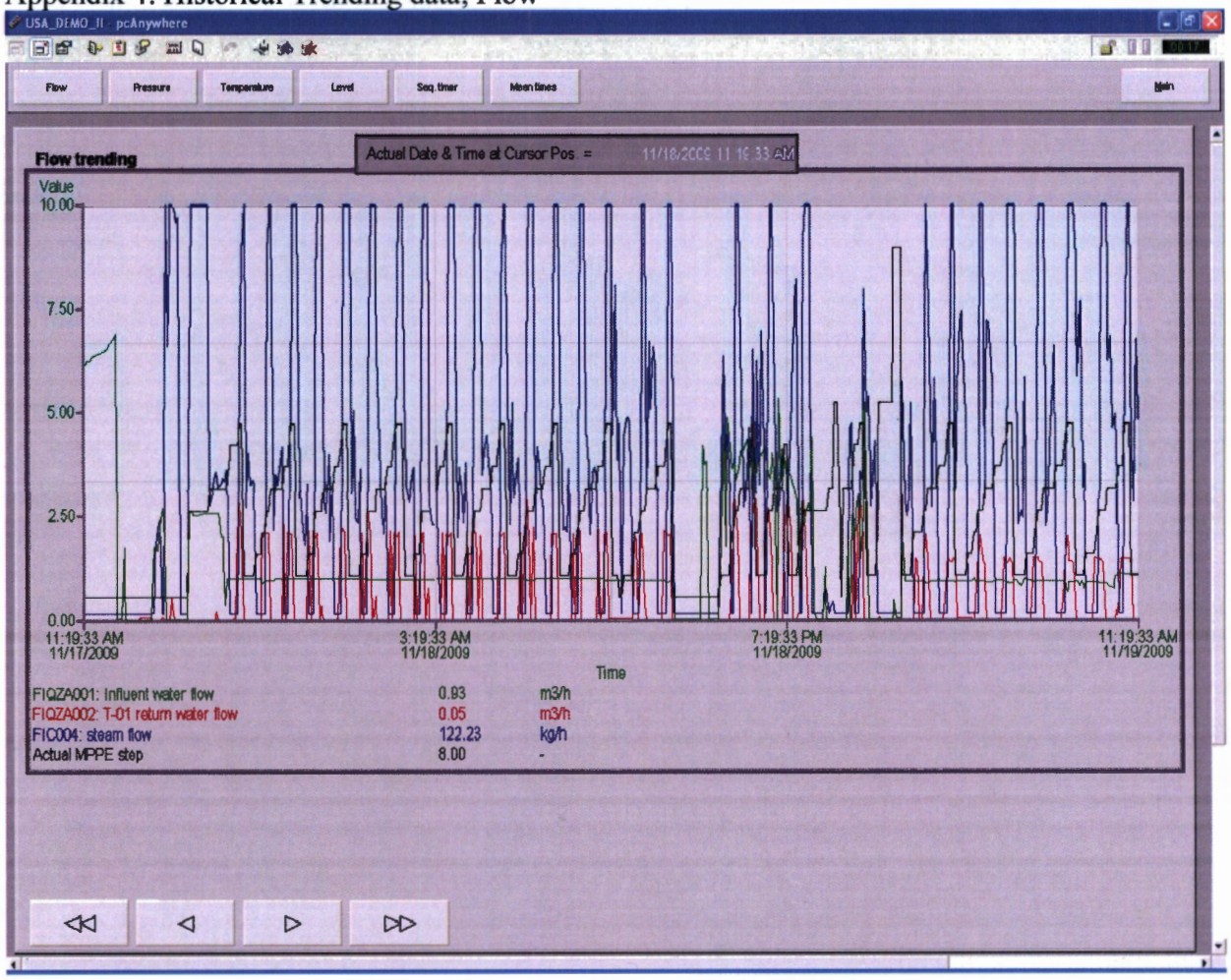
Appendix 4: Historical Trending data; Flow



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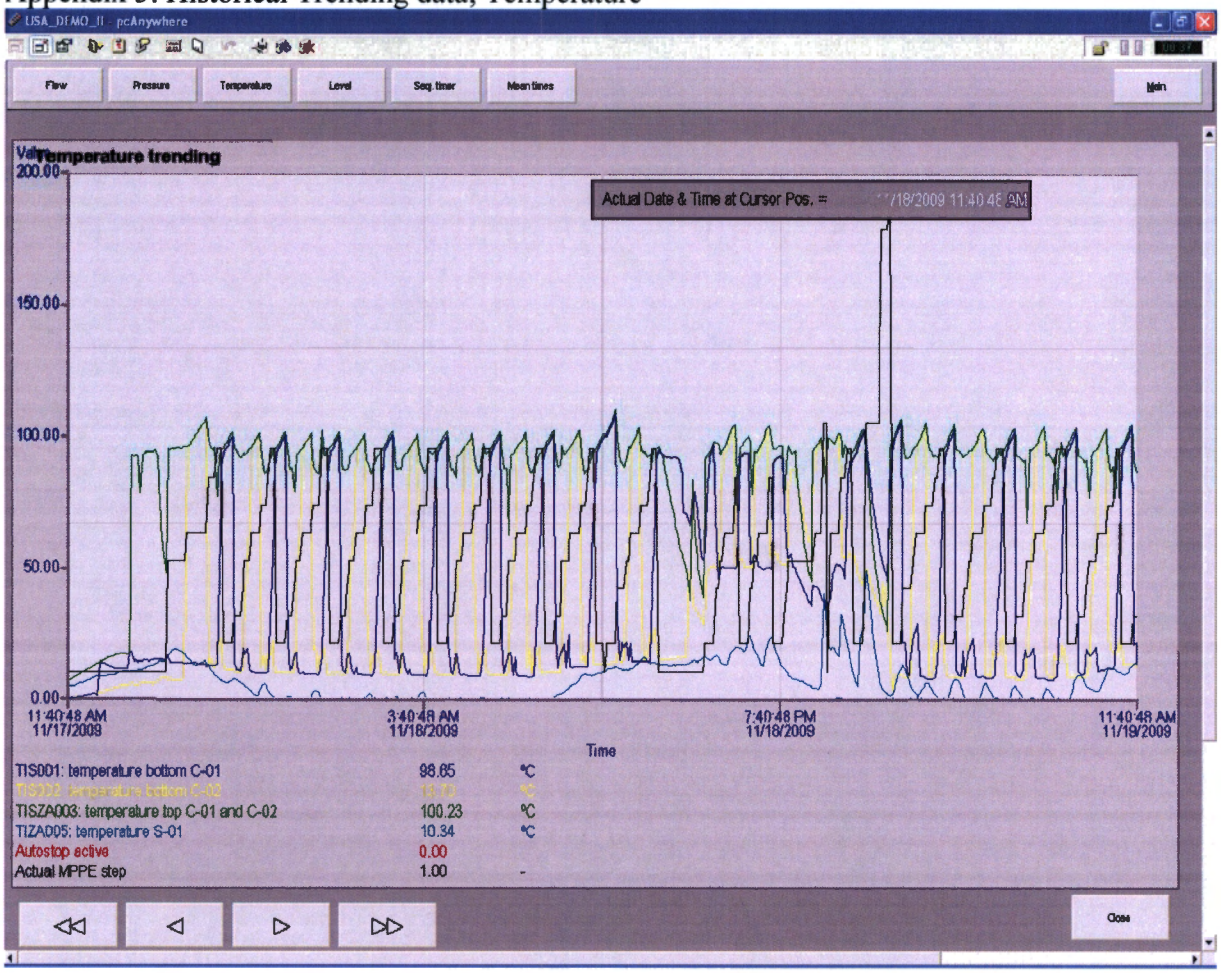
Appendix 5: Historical Trending data; Temperature



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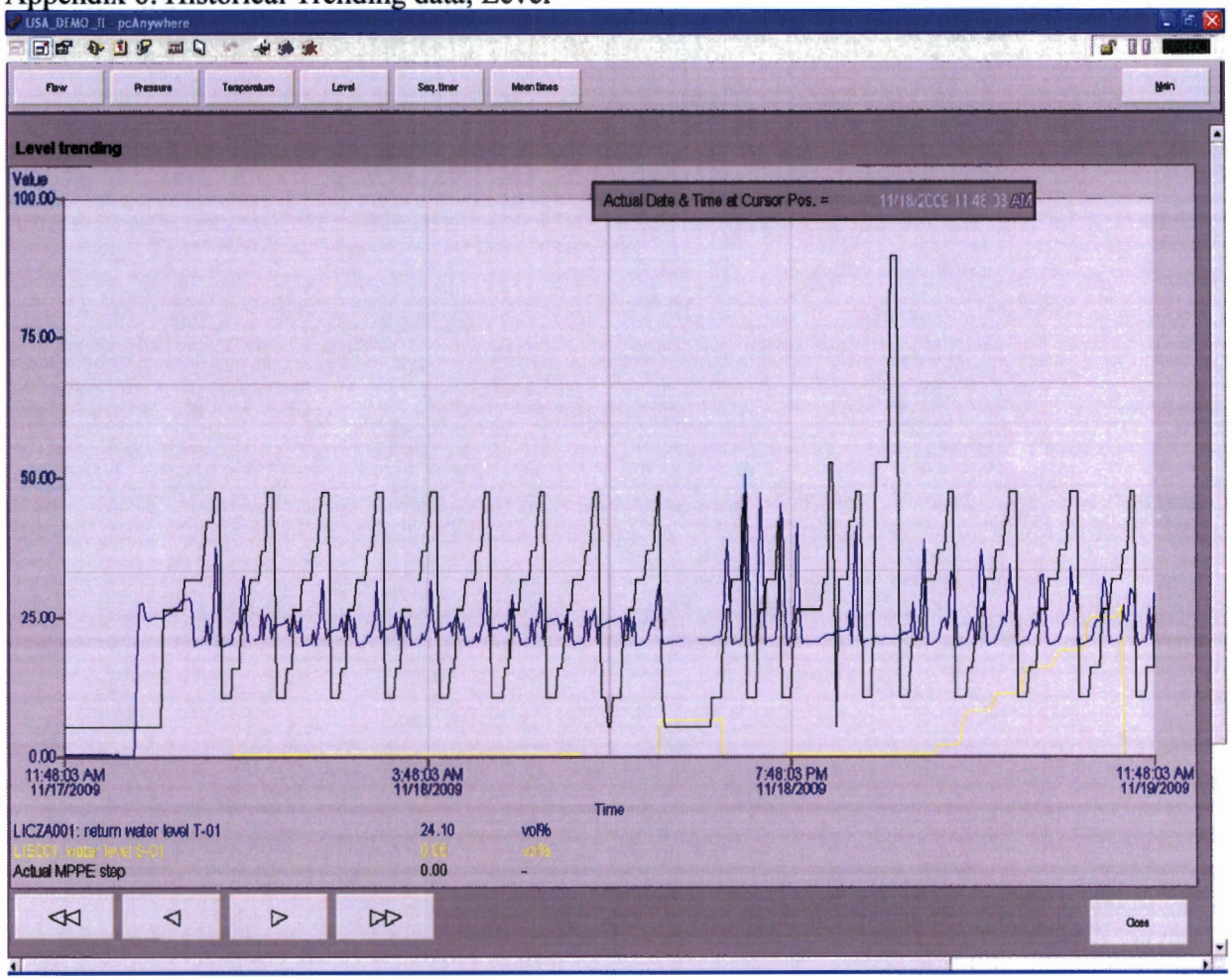
Appendix 6: Historical Trending data; Level



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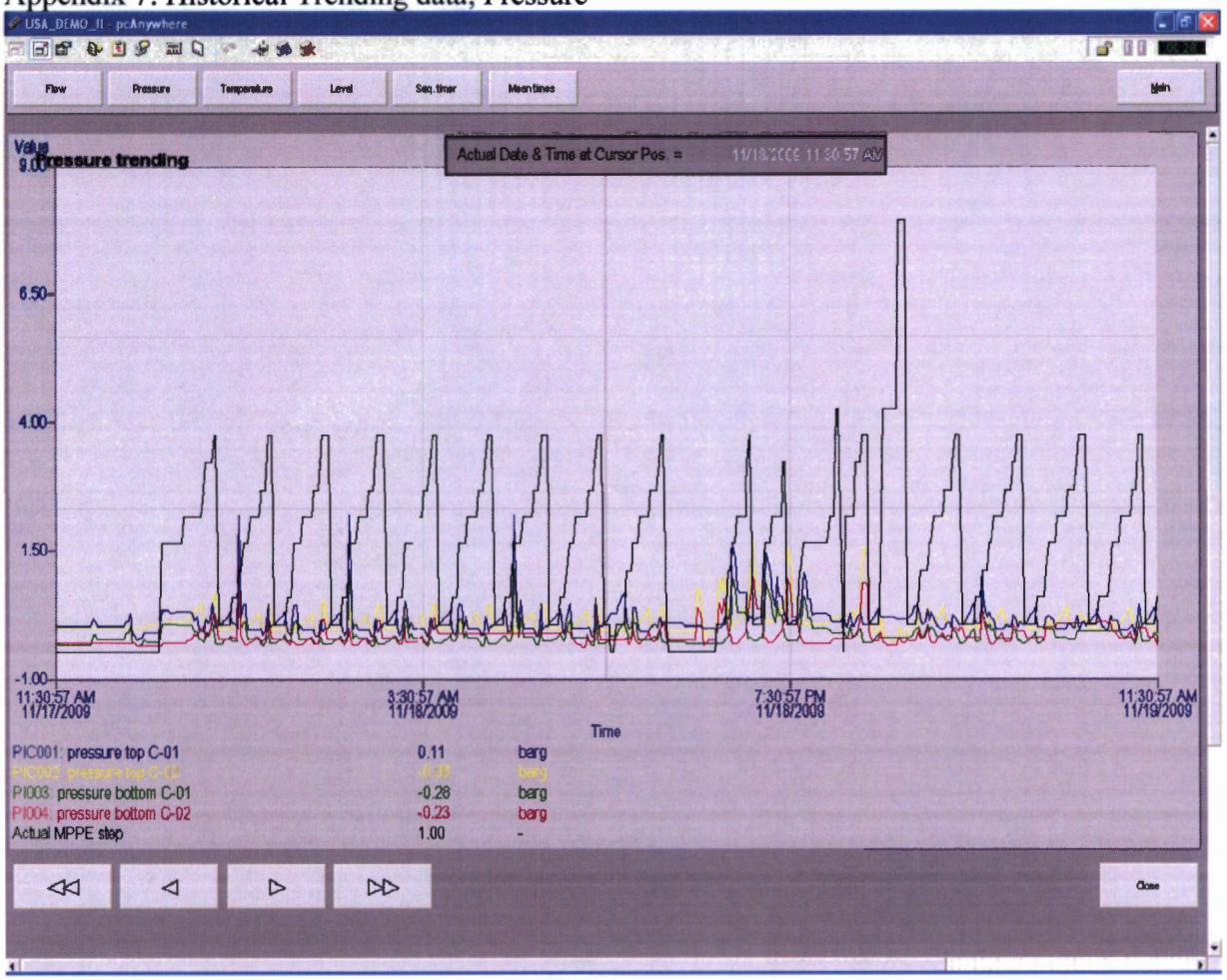
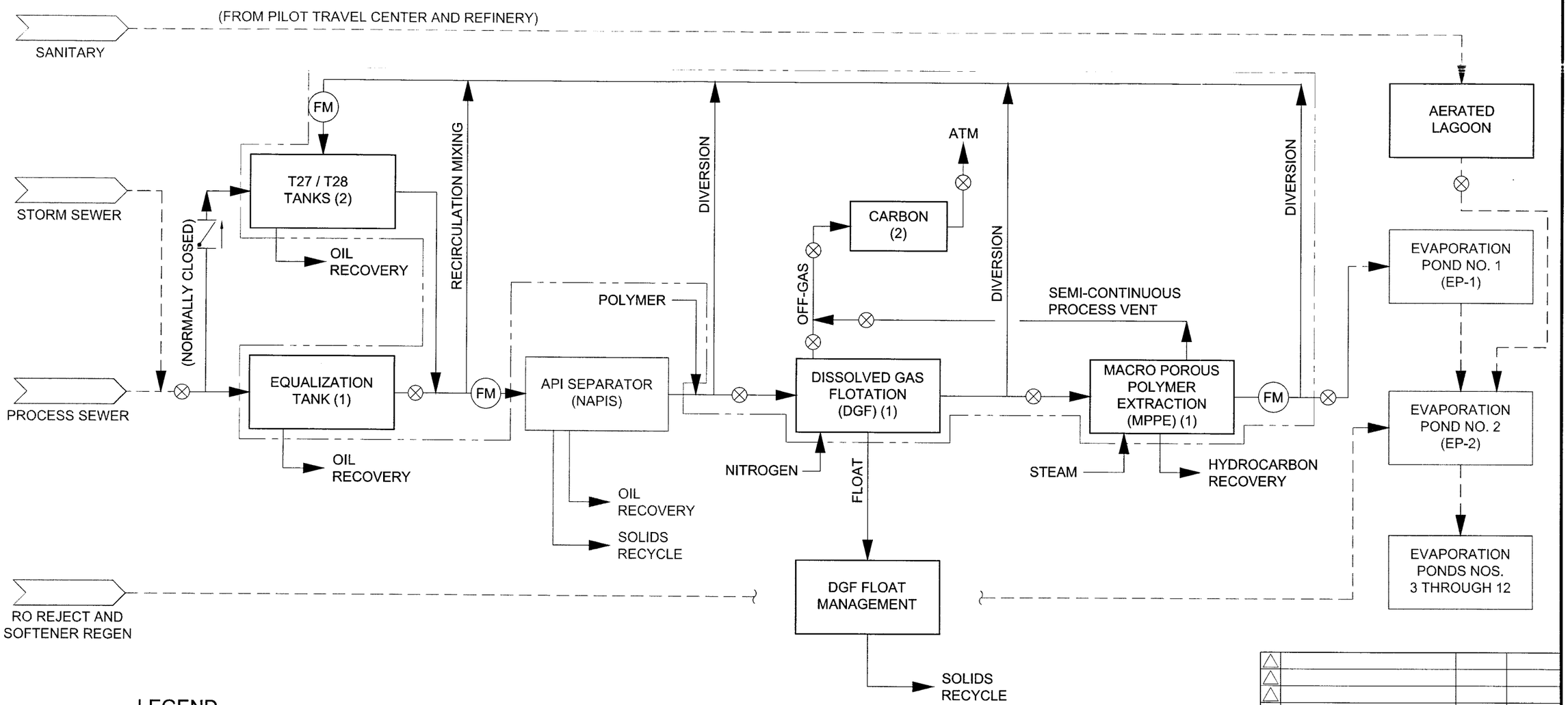
Appendix 7: Historical Trending data; Pressure



VEOLIA WATER
Solutions & Technologies



LEGEND

- (FM) FLOW METER
- ⊗ SAMPLE POINT
- CHECK VALVE
- EXISTING
- UNDERGROUND
- TO BE DESIGNED IN ACCORDANCE WITH 40 CFR 265 SUBPART J

NOTES:

1. PUMPING SYSTEMS NOT SHOWN.
2. NUMBERS IN PARENTHESIS INDICATE THE QUANTITY OF TANKS / SYSTEMS.
3. THE MPPE IS ONE SYSTEM OF TWO COLUMNS.

REV.	REVISION DESCRIPTION	RFC No.	DATE
△			
△			
△			

P&ID DWG. REV.

PIPING ORTHO. DWG. REV.

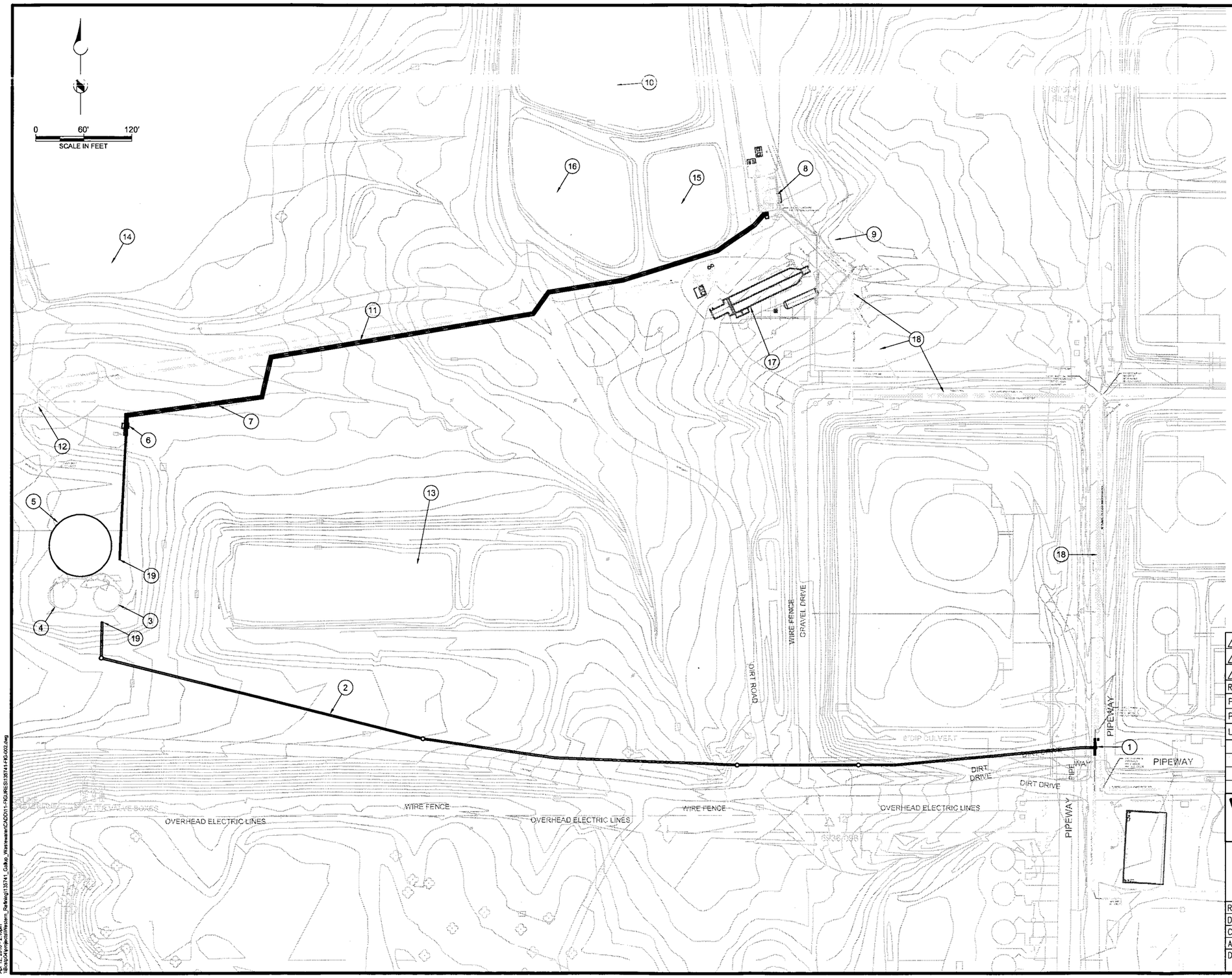
LINE No.	SIZE	SPEC	OPER. TEMP'T	OPER. PRESS	DESIGN TEMP.'T	DESIGN PRESS	HYDRO TEST	INSULATION THK.	INSULATION TYPE	STRESS RELIEF

Western Refining
Gallup Refinery

WASTEWATER TREATMENT PLANT
WORK PLAN
FLOW DIAGRAM

RFE No:		INSP/RT/UT:
DRN. BY: RAC	DATE: 09/23/2009	WELD SPEC:
CHK'D. BY:	DATE:	PAINT:
APP'D. BY:	DATE:	CAD REF:
DRAWING NO. FIGURE 1		SHEET 1 / REV 0

Apr 29, 2010 - 2:15pm
\\Bcstp04\projects\Western_Refining\135741_Gallup_Wastewater\CADD\11-FIGURES\135741 F-1-flow diagram.dwg



GENERAL NOTES:

1. ROUTING OF NEW PIPING SHOWN IS CONCEPTUAL, NOT ALL INCLUSIVE, AND SUBJECT TO FINAL DESIGN.

KEY NOTES:

1. TIE-IN POINT TO EXISTING PROCESS SEWER AND EXISTING PROCESS AREA STORM SEWER.
2. NEW COMMON GRAVITY SEWER TO EQ TANK / T27 / T28.
3. T27 (EXISTING; NOT IN SERVICE).
4. T28 (EXISTING; NOT IN SERVICE).
5. EQ TANK (NEW).
6. API SEPARATOR INFLUENT PUMP STATION (NEW).
7. NEW FORCE MAIN FROM EQ TANK / T27 / T28 TO API SEPARATOR.
8. API SEPARATOR (EXISITNG; A.K.A. NAPIS).
9. APPROXIMATE LOCATION OF NEW DGF AND MPPE SYSTEMS (SYSTEMS NOT SHOWN).
10. EP-1 (EXISTING).
11. DIVERSION LINE FROM MPPE TO T27 / T28.
12. EXISTING PIPING FROM PILOT TRAVEL CENTER LIFT STATION.
13. AREA OF NEW AERATED LAGOON SYSTEM.
14. EP-2 (EXISTING).
15. AL-1 (EXISTING; TO BE DECOMMISSIONED).
16. AL-2 (EXISTING; TO BE DECOMMISSIONED).
17. OAPIS (EXISTING; TO BE DECOMMISSIONED).
18. EXISTING SEWER PIPING TO BE ABANDONED IN PLACE.
19. INTERCONNECTING PIPING NOT SHOWN.

REV.	REVISION DESCRIPTION	RFC No.	DATE
△			
△			
△			

P&ID DWG. REV.

PIPING ORTHO. DWG. REV.

LINE No.	SIZE	SPEC	OPER. TEMP'F	OPER. PRESS	DESIGN TEMP.'F	DESIGN PRESS	HYDRO TEST	INSULATION THK.	INSULATION TYPE	STRESS RELIEF

Western Refining
Gallup Refinery

WASTEWATER TREATMENT PLANT
WORK PLAN
SITE LAYOUT

RFE No:		INSP/RT/UT:	
DRN. BY: LDF	DATE: 04/09/10	WELD SPEC:	
CHK'D. BY:	DATE:	PAINT:	
APP'D. BY:	DATE:	CAD REF:	
DRAWING NO. FIGURE 2		SHEET 1	REV 0

Apr 12, 2010 - 2:10pm
\\Gallup\projects\Western_Refining\135741_Gallup_Wastewater\CADD\11-FIGURES\135741-FIG-002.dwg

NEW MEXICO ENVIRONMENT DEPARTMENT

Hazardous Waste Bureau

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BILL RICHARDSON
Governor

DIANE DENISH
Lieutenant Governor

RON CURRY
Secretary

SARAH COTTRELL
Deputy Secretary

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

May 24, 2010

Mr. Ed Riege
Environmental Manager
Western Refining, Southwest Inc., Gallup Refinery
Route 3, Box 7
Gallup, New Mexico 87301

RE: APPROVAL WITH MODIFICATIONS
PROCESS DESIGN REPORT FOR THE WASTEWATER TREATMENT PLANT WORK PLAN (ALTERNATIVE DESIGN, REVISION A)
WESTERN REFINING COMPANY SOUTHWEST INC., GALLUP REFINERY
EPA ID # NMD000333211
HWB-GRCC-09-006

Dear Mr. Riege:

The New Mexico Environment Department (NMED) has completed its review of the *Response to Notice of Disapproval Process Design Report for the Wastewater Treatment Plant Work Plan (Alternative Design, Revision A)* (Work Plan), dated April, 30, 2010, submitted on behalf of Western Refining Company Southwest Inc., Gallup Refinery (the Permittee). NMED hereby approves this Work Plan with the following modifications.

Comment 1

In Section 2.2 (Refinery Wastewaters), page 4, the Permittee states "[i]n addition, two non-oil refinery wastewaters are discharged directly to Evaporation Pond No. 2 (EP-2). These sources are the water softener system and the reverse osmosis (RO) system."

NMED Response
The water softener and reverse osmosis effluent entering into EP-2 must be routed through the wastewater treatment system upstream of the API separator. Any alternatives that would discharge these waste streams to a location other than the wastewater treatment system must be approved by the New Mexico Energy, Minerals and Natural Resource Department Oil Conservation Division (OCD).

Comment 2
In Section 1.4 (Treatment Objectives), page 3, the Permittee states "[t]he treatment objectives for the WWTP upgrade are to provide water quality that is suitable for discharge to the unlined EP-1. Specifically, the objectives are for there to be no visible free oil, <0.5 mg/L benzene, and a wastewater quality that meets the definition of EPA RCRA non-hazardous."

NMED Response
Effluent entering into Evaporation Pond 1 (EP-1) must be compliant with both the surface and groundwater quality regulations in accordance the NMAC 20.6.2 and 20.6.4. The effluent must meet the total petroleum hydrocarbon (TPH) levels found in Table 2a (TPH Screening Guidelines for Potable Groundwater (GW-1)) of NMED's TPH Screening Guidelines (October 2006 and as updated). The Permittee must also comply with any other applicable state and federal regulations.

Comment 3
In Section 4.2.1 (Combined Process Sewer and Process Area Storm Sewer), page 8, the Permittee states "[c]leanouts will be installed on the gravity sewer to T27 and T28. Cleaning events will be scheduled on a regular, recurring basis with collected material managed along with similar material collected from the API Separator."

NMED Response
The Permittee did not provide the frequency of regular cleaning (e.g., weekly, monthly, quarterly). The Permittee must notify NMED and OCD in writing of the cleanout details and schedule once they have been determined. The Permittee is responsible for documenting the cleanout operations and demonstrating they comply with the regulations. The documentation must be kept in the Facility operating record and be available for NMED and OCD review upon request.

Comment 4
The Permittee addresses the Equalization Tank (EQ) in Section 4.2.3 and on page 11, states "[s]olids entering the EQ tank will accumulate as a sludge layer, which will require removal periodically, currently expected to be every three to five years."

NMED Response
All sludges removed from the Equalization Tank must be managed as hazardous waste.

Comment 5
In Section 4.2.5 (DGR System), page 12, the Permittee states "[t]he [Dissolved Gas Flotation] DGF float material will be skimmed from the top of the DGF using a variable speed scraping mechanism. The skimmed float will be sent to the DGF float management system, which will consist of "Float Tanks." The purpose of the tanks will be to provide storage capacity and reduce the volume of oily solids through gravity separation. Oily solids collected in the Float Tanks will be recycled to the refining process (on-site or off-site)."

NMED Response
The DGF float is K048 listed waste. Therefore, any float from the DGF management system that is not recycled through the refining process must be managed as a hazardous waste.

Comment 6
In Section 4.2.7 (Pilot Travel Center Pretreatment), page 13, the Permittee discusses biologically treating the sanitary wastewater in an aeration lagoon system that will discharge by gravity to Evaporation Pond 2.

NMED Response
As part of this Approval with Modifications, the Permittee must provide documentation that demonstrates the Permittee has obtained approval from the NMED Liquid Waste Program to operate the aeration basins and discharge the treated sanitary wastewater to the Evaporation Ponds. This documentation must be provided in the Response Letter. In addition, the Permittee must comply with their Biohazard Plan and update the plan as necessary to reflect any changes resulting from the new wastewater treatment system.

Comment 7
In Section 4.2.8 (Evaporation Pond1), page 13, the Permittee states "[t]he [Macro Porous Polymer Extraction] MPPE clean wastewater effluent will be free of floating oil and will have a benzene concentration of 0.5 mg/L and will be RCRA non-hazardous."

NMED Response
The benzene concentration of the MPPE effluent must be less than 0.5 mg/L and meet the water quality standards discussed in Comment 2.

Comment 8
In Section 4.4 (Management of Off-Spec Wastewater), page 14, the Permittee states "[t]he MPPE process monitoring will consist primarily of two daily measurements (at approximately 7:00 am

and 7:00 pm) of benzene in samples of wastewater. These samples will be analyzed at Gallup Refinery's on-site testing laboratory using Gas Chromatograph/Mass Spectrometer (GC/MS). The results will be available almost immediately – that is, within a few hours of sample collection. To account for the fact that our on-site method is not identical to the EPA-approved method, and to divert proactively, we will use 0.4 Mg/L of benzene as a trigger for diversion."

NMED Response
In addition to the sample collection described above, the Permittee must also collect one duplicate sample a week, selected at random for analysis by an off-site certified laboratory for diesel range organics (DRO extended), benzene, toluene, ethylbenzene, total xylenes (BTEX), general chemistry parameters as defined by OCD, and pH (pH can be analyzed either by the laboratory or in the field). The Permittee must submit laboratory results received by the last Friday of each month to NMED and OCD (submittal by e-mail is acceptable). If any effluent sample results detect hazardous waste, the Permittee must notify NMED within one business day of this discovery. If the sample results exceed the cleanup standard referenced in Comment 1, NMED and OCD must be notified within five business days of discovery. See also Comment 17 for sampling and monitoring startup requirements.

Comment 9
In Section 5 (Project Schedule), the Permittee provides a schedule to complete the construction of the Wastewater Treatment Plant upgrade. The schedule indicates the system will take 24 months to install.

NMED Response
NMED does not approve the proposed schedule. The Wastewater Treatment System must be installed and operational on or before September 4, 2010 as required by NMED's September 1, 2009 *Approval with Modification Process Design Report for Wastewater Treatment Plant Upgrade (REV. A)*. As a reminder, the Permittee submitted a work plan *Process Design Report For Wastewater Treatment Plant Upgrade* dated February 26, 2009, which was revised (*Process Design Report For Wastewater Treatment Plant Upgrade (REV. A)*, dated May 26, 2009) and approved by NMED and OCD on September 1, 2009 and September 3, 2009, respectively. It was the Permittee's choice to propose an alternate design to the wastewater treatment system rather than the system already approved by NMED; therefore, this is not good cause to propose a two-year extension. Further, the Permittee could have taken immediate action upon the September 1 and 3, 2009 approvals, but instead submitted an alternative design on September 25, 2009. NMED provided the Permittee with a Notice of Disapproval on October 27, 2009; again, the Permittee could have taken immediate action subsequent to receiving the comments, but submitted a response to this NOD over six months later (received by NMED on May 3, 2010). The Permittee's delay in providing NMED and OCD the appropriate documents for the wastewater treatment system does not constitute reason to extend the deadline.

Comment 10
In Attachment D (Process Design Report, Western Refining Southwest Inc., January 21, 2010), Section 1 (Introduction), page 3, the Permittee discusses how effluent from the MPPE system contained benzene concentrations less than 0.5 mg/l.

NMED Response
The Permittee must clarify in the Response Letter if samples were analyzed by the on-site laboratory or a certified off-site laboratory, identify the analytical method and provide the final laboratory report.

Comment 11
In Attachment D (Process Design Report, Western Refining Southwest Inc., January 21, 2010), page 5, the Permittee states "[t]his historical data is visually displayed in appendices 7-10."

NMED Response
Attachment D does not contain Appendices 8-10. The Permittee must submit the missing Appendices 8-10 to complete the record.

Comment 12
In Attachment D (Process Design Report, Western Refining Southwest Inc., January 21, 2010), page 7, Section 2.1 (MPPE process description), the Permittee states "[d]uring the pilot plant trial, the unit was periodically sampled by Western Refining. Each morning and evening the unit was switched from fire water to process waste water and vise versa."

NMED Response
It is not clear why the Permittee used fire water in this pilot study instead of a continuous use of process wastewater. In the response letter, the Permittee must provide an explanation for the use of fire water instead of process wastewater.

Comment 13
In Attachment D (Process Design Report, Western Refining Southwest Inc., January 21, 2010), page 21, the Permittee provides the conclusions of the MPPE pilot study. The Permittee concluded the "MPPE technology proved to be very capable of lowering the benzene concentrations well below the by EPA required level of 0.5 mg/l" and "can also remove other dissolved hydrocarbons like Toluene, Ethylbenzene, Xylenes, VPH and EPH (both aliphatics and aromatics) to any level required." NMED has the following concerns regarding Appendix D:

a. Page 8 states, "[i]s it important to note that many of the results were below the detection range of the test method and lab equipment. This is important as the values with the (>) symbol are depicting a worse case scenario." This statement cannot be

verified because the detection range of the test method and laboratory instrument was not provided, nor was the laboratory results.

b. Page 8 states "[i]t is unknown as to exactly how far the effluent result is below the detection limit. Therefore, the range could vary from say 9% to as great as 99% removal efficiency. However, the removal efficiencies are calculated for informational purposes." Again, the detection limit was not provided. The range of 9% to 99 % removal of hydrocarbons is broad and implies the system capabilities are variable in the extent of removal of hydrocarbons. The calculations used to determine the removal efficiencies were not included and it is not clear how the percentages were determined.

c. The summary tables are not presented in a clear manner. For example, Table 3.2 provides volatiles in concentrations in mg/l with alternating inlet and outlet results. The alternating inlet and outlet data is not clear, and the rows should be labeled accordingly. In addition, Table 3.4 provides alternating VPH-1 inlet and outlet data; the outlet concentrations are higher than the inlet concentration (e.g., the inlet sample QA24L collected on 11-30-09 states <500 µg/L MTBE and the outlet samples QA24E collected on 11-30-09 states 5.7 µg/L; this data would imply the system was not operating correctly).

It is the Permittee's responsibility to install a system that is capable of meeting the effluent discharge requirements and all other applicable regulations. The Permittee must demonstrate that the MPPE system treats the process wastewater in compliance with established standards and is protective of human health and the environment. No revision is necessary; however, the Permittee must take the above comments into consideration when designing and installing the system.

Comment 14

Page 6 of the Permittee's *Response to Notice of Disapproval Process Design Report for the Wastewater Treatment Plant Work Plan (Alternative Design)*, dated April 30, 2010, the Permittee's response to Comment 8, item d states "[w]e do not understand NMED's basis for limiting the accumulation of solids in the bottom of T27/T28 to less than 2 feet. The res-suspension mixing described under Item b and in the revised Work Plan will ensure that the 90-day accumulation period is not exceeded. Therefore, the amount of sludge that accumulates in the interim is not relevant to complying with this requirement. We request relief from the requirement that solids accumulation be limited to less than 2 feet."

NMED Response

The Permittee is relieved of the two foot accumulation. If Tanks T27 and T28 are cleaned out by

any method other than the mixing method described in the Work Plan, all removed solids accumulated in the bottom of the Tanks must be managed as hazardous waste.

Comment 15

Page 11 of the Permittee's *Response to Notice of Disapproval Process Design Report for the Wastewater Treatment Plant Work Plan (Alternative Design)*, dated April 30, 2010, Comment 18 states "[i]n Section 4.5 9Tank Design, Secondary Containment, and Leak Detection, page 11, the Permittee states "In the event that there are new tank(s) or ancillary equipment not covered by the CAFO, such as those upstream of the API separator, those systems will be designed to the standards in accordance with GW-032 and related OCD requirements."

NMED Response

The secondary containment must be able to contain a volume equal to 1 1/3 of the tank capacity and/or volume of all interconnected tanks. The Permittee must comply with all OCD requirements.

Comment 16

Page 10 of NMED's *Notice of Disapproval Process Design Report for the Wastewater Treatment Plant Work Plan (Alternative Design)*, dated October 27, 2009, NMED states "[i[n addition, an electronic version of the revised Work Plan must be submitted with all changes shown in red-line strikeout."

NMED Response

An electronic version with red-line strikeout was not submitted. The Permittee is required to submit an electronic version in red-line strikeout and this was not provided; an explanation for not providing the documentation must be included in the Response Letter.

Comment 17

System Startup Requirements: The Permittee must implement the following sampling requirements upon initial startup to the wastewater treatment system:

a. The Permittee must collect daily duplicate effluent samples from the MPPE for the first fifteen days from startup. One sample must be sent to a certified offsite laboratory for the analyses of DRO extended, BTEX, general chemistry parameters as defined by OCD, and pH (pH can either be analyzed by the laboratory or in the field). The other effluent sample must be analyzed for the same constituents at the refinery on-site laboratory for comparison purposes.

b. The Permittee must collect duplicate effluent samples from the MPPE two times a week for 90 days after the initial 15 day period of continuous operation. One sample

must be sent to a certified offsite laboratory for analyses of DRO extended, BTEX, general chemistry parameters as defined by OCD, and pH (pH can either be analyzed by the laboratory or in the field). The other effluent sample must be analyzed at the refineries on-site laboratory for comparison purposes. In addition, the Permittee must also analyze an effluent sample once a month during this 90-day period for priority pollutant metals and semi-volatile organics (SVOCs) by a certified off-site laboratory.

c. After the 90-day sampling period, the Permittee may collect duplicate samples weekly for chemical analyses specified in Comment 7. NMED will evaluate the need for additional analysis after the 90-day startup period, see item h of this Comment.

d. The Permittee must collect flow rate measurements from the flow meters at the influent location to the API separator and effluent from downstream of the MPPE daily for the first 15 days of startup, two times a week during the following 90 days and weekly thereafter.

e. The Permittee must collect air samples two times a month for the initial two months, once a month for the third month, and quarterly thereafter. The samples must be collected from the sample location labeled "ATM" from the "carbon" box located in Figure 1 (Wastewater Treatment Plan Work Plan Flow Diagram). The samples must be analyzed for VOCs using EPA Method TO15.

f. The Permittee must submit all received laboratory results and flow meter data by the last Friday of each month beginning with the initial system startup to NMED and OCD (submittal by e-mail is sufficient). NMED and OCD must be notified within one business day of discovery if the effluent samples are determined to be hazardous. NMED and OCD must be notified within five business days if the effluent samples exceed the cleanup standards as referenced in Comment 1.

g. The Permittee must monitor and record all occasions when the Surge Tanks (Tanks T27 and T28) are used and describe the event that caused these Tanks to be used. This information must also be submitted on the last Friday of each month.

h. Following the initial 90 days of startup, NMED and OCD will establish long-term monitoring and sampling requirements and a schedule for submittal of monitoring reports for the wastewater treatment system.

The Permittee must respond to all comments requiring a response in a response letter. The response letter must be submitted to NMED on or before **June 18, 2010**. OCD must be copied on all correspondence. As indicated in Comment 8, the Permittee must have the upgrade to the wastewater treatment system in operation on or before **September 4, 2010**.

If you have questions regarding this letter please contact Hope Monzeglio of my staff at 505-476-6045.

Sincerely,

John E. Kieling
Program Manager
Permits Management Program
Hazardous Waste Bureau

cc: D. Cobrain NMED HWB
K. Van Horn, NMED HWB
H. Monzeglio, NMED HWB
D. McElroy, NMED AQB
C. Chavez, OCD
J. Dougherty, EPA Region 6
D. Edelstein, EPA Region 6
A. Allen, Western Refining Southwest, Inc.
File: Reading File and WRG 2010 File
HWB-GRCC-09-006