Western Refining
GALLUP

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June 15, 2011

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Mr. John E. Kieling
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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. Kieling,

In May 2010 Western received Approval With Modifications for the Wastewater Treatment Plant Work Plan (Alternate Design, Revision A) from both NMED HWB and OCD.

Gallup has made great progress in the design and construction of the upgraded wastewater treatment plant at the Gallup Refinery. Gallup is on track to meet the next CAFO Milestone (6) of July 31, 2011 to complete site preparation and foundations for the DGF and MPPE equipment as well as the remaining milestones. The project has evolved over the past year and the purpose of this communication is to update you and seek your approval of updates to the Work Plan. Two copies of the work plan are attached with one indicating where changes were made.

The primary purpose of this Work Plan revision is to address:

- Diversion and management of off-spec wastewater
- Replacement of Evaporation Pond #1 with a new lined sanitary treatment pond (STP-1)
- Factual Updates

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: Carl Chavez OCD
Ed Riege Western Refining
Frank Keys Western Refining

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

Western Refining
Gallup, New Mexico

Revised June 2011

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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.*"
5. Paragraph 100J – "*...Respondent shall meet the following discharge limits for <u>any and all</u> wastewater discharged to any surface impoundments: benzene concentration in wastewater shall always be less than 0.5mg/L; wastewater shall have no RCRA hazardous characteristics...*"

1.1 Project Scope

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

- The oily refinery sewer and stormwater sewer have been combined into a single process sewer (hereafter referred to as Combined Process Sewer), as described in Section 4.1.1.
- A new equalization tank (Z84-T35, hereafter referred to as T35) has been installed that functions as the primary vessel into which the combined process sewer flows, as described in Section 4.1.2.
- Two existing tanks (Z84-T27 and Z84-T28, hereafter referred to as T27 and T28) have been refurbished and put in service. These tanks will provide additional equalization storage and emergency overflow capacity for T35, as described in Section 4.1.3. T35, T27 and T28 are all upstream of the existing "new" American Petroleum Institute (API) separator, (Z84-T5 and Z84-T6, hereafter referred to the API separator.)

- A Dissolved Gas Flotation (DGF) system, downstream of the API Separator, will be used to remove oil & grease and total suspended solids from the combined process sewer. The DGF system is described in Sections 3.1 and 4.1.5.
- A Macro Porous Polymer Extraction (MPPE) system, downstream of the DGF system will be used to remove dissolved benzene and other hydrocarbons from the combined process sewer, as described in Sections 3.2 and 4.1.6.
- A Sanitary treatment Pond (STP-1), with double liner and leak detection, will be used to remove BOD-5 from Pilot Travel Center and refinery sanitary sewers, as described in Section 4.1.7.

The following equipment and facilities will be decommissioned after WWTP upgrades:

- Benzene Stripper 1, 2 and 3
- Aeration Lagoons 1 and 2 (AL-1 and AL-2)
- Evaporation Pond 1 (EP-1)
- The Old API Separator (hereafter referred to as OAPIS) that was used to collect and treat refinery storm sewer. The OPAIS was decommissioned by March 01, 2011, as required by the CAFO.

The following equipment will continue to operate after WWTP upgrades:

- New API Separator (NAPIS)
- Evaporation Ponds 2 through 12 (EP-2 through EP-12)

The upgraded WWTP process flow diagram of is shown in Figure 1. A site plot plan is shown in Figure 2.

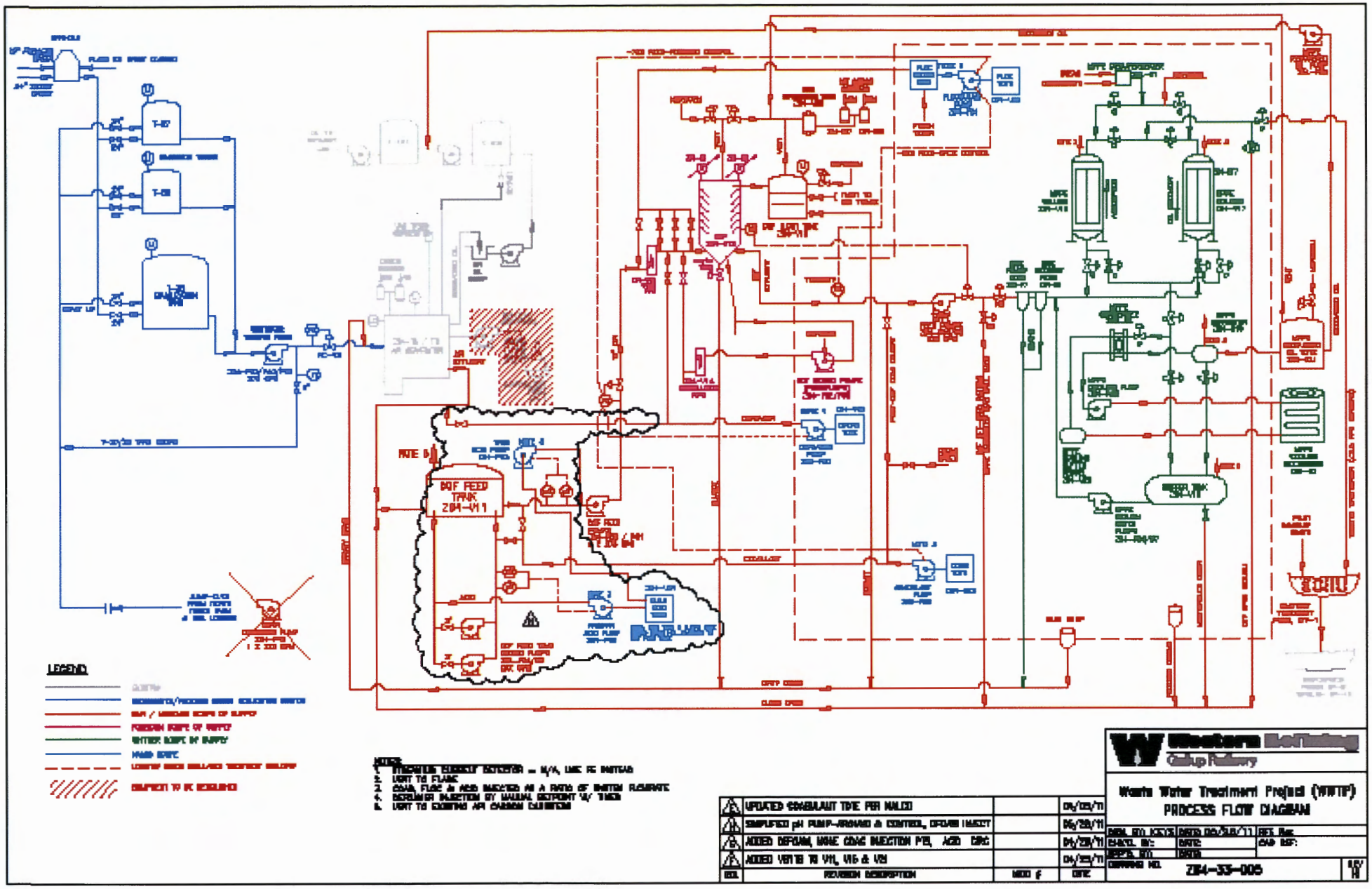

Figure 1, Process Flow Diagram

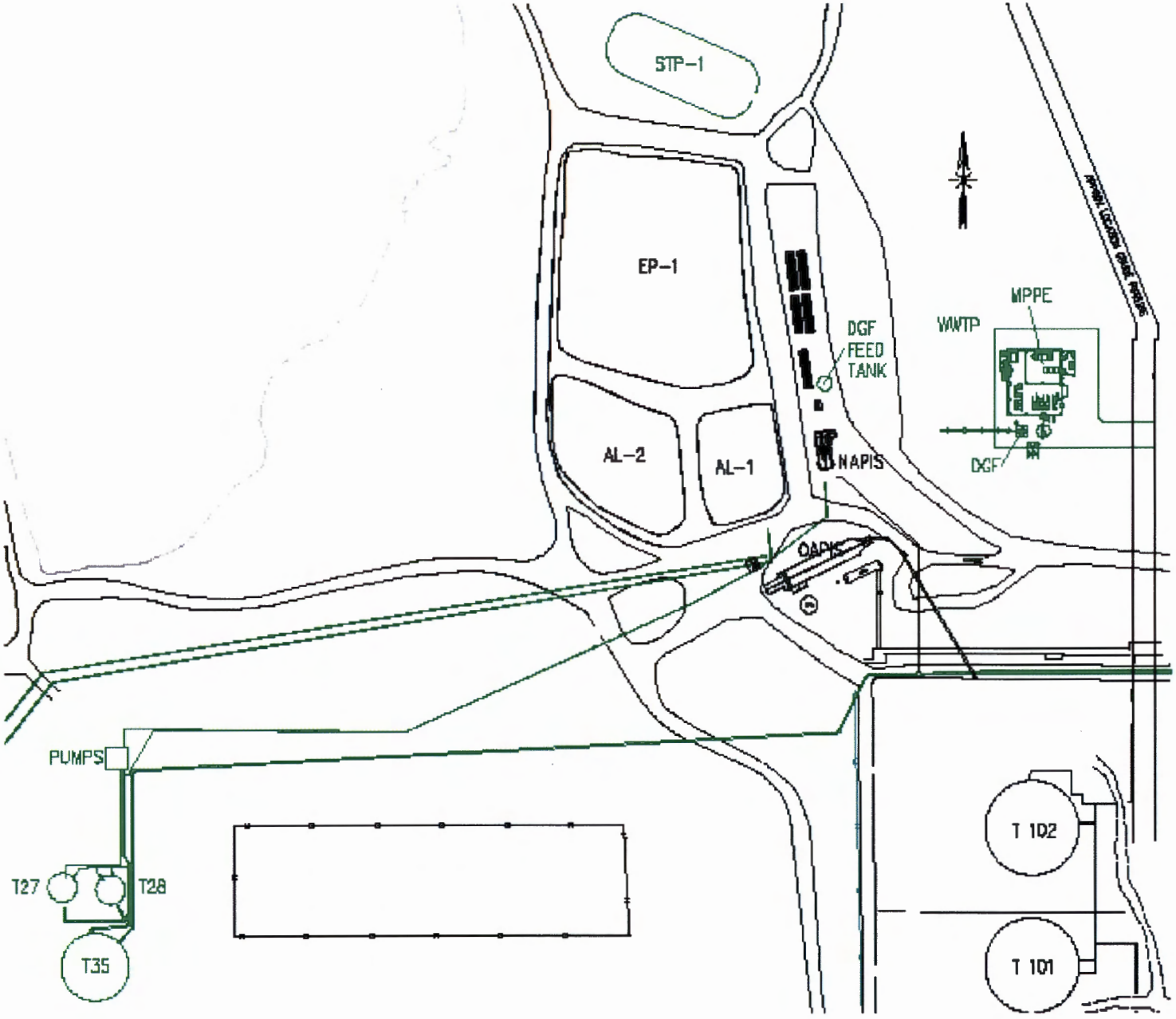

Figure 2, Site Plot Plan

1.2 Related Project - Pilot Travel Center Lift Station

A lift station to collect, screen and pump the sanitary/restaurant wastewater from the Pilot Travel Center has recently been installed and put into service. A force main conveys the wastewater to the WWTP, where it will be treated in a new Sanitary Treatment Pond (STP-1), before being discharged into EP-2.

1.3 Treatment Objectives

The ultimate objective of the upgraded WWTP is to meet the discharge limits defined in the CAFO. To achieve this, two state-of-the-art technologies have been selected, as described in Section 3.0. Each of these technologies will remove specific components from the combined process sewer. The upgraded WWTP will discharge into a new double lined aerated pond (STP-1) with no visible free oil, <0.5 mg/L benzene and no RCRA hazardous characteristics.

1.4 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.

2.0 Wastewater Source

This section describes the sources of wastewater generated at the refinery and fall into two broad categories: those generated at the refinery and those generated at the adjacent Pilot Travel Center.

2.1 Refinery Wastewater

The refinery generates four different wastewater streams. They are:

- Oily process sewer resulting from normal refinery operations,
- Non-oily process sewer resulting from operations of the Reverse Osmosis (RO) unit, water softeners, cooling tower blowdown and boiler blowdown,
- Stormwater runoff from the refinery units, and
- Sanitary sewer from various restroom and kitchen facilities within the refinery and seven adjacent company-owned homes.

The oily process sewer, non-oily process sewer and stormwater runoff flow into a new combined process sewer, as described in Section 4.1.1. This combined process sewer then flows into T35.

The sanitary wastewater flows into the refinery's newly constructed lift station, as described in Section 2.2. This lift station will then flow to the new STP-1 to be constructed.

2.2 Pilot Travel Center Wastewater

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 first passes through a Pilot-owned grease trap system that was installed in 2008. This grease trap effluent along with sanitary/restaurant wastewater from the rest of the Pilot Travel Center then flows into a Pilot-owned septic tank system. Septage is pumped out of this septic system on a scheduled quarterly basis for off-site disposal (as reported by Pilot Travel Center staff). Liquid effluent from this septic system gravity flows to a Pilot-owned lift station, located on their property. The lift station's submersible pumps then transfer the wastewater through a pipeline to the refinery for further treatment. Western Refining now operates 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.

2.3 Design Flow

The design flowrates for the individual wastewater sources are summarized below.

Design Flow Rates		
	Average, gpm	**Maximum, gpm**
API Separator Effluent[1]	250	500
Pilot Travel Center	50	120
RO Reject	100	150
Refinery Sanitary	4	--

1. API Separator effluent is the combined process sewer, which contains the oily and non-oily sewers, cooling tower blowdown and boiler blowdown.

The design flowrate for the API Separator effluent was set at an average of 250 gallons per minute (gpm) and a maximum of 500gpm. These flowrates were based on historical data with allowances for future expansion. The maximum flowrate for the upgraded WWTP is equal to the maximum flowrate of the API Separator with both bays in service, which is 500gpm.

The contract between Western Refining and the Pilot Travel Center limits their maximum sanitary sewer flowrate to 50gpm. However, the refinery's new lift station pumps are capable of handling a combined flowrate of 120gpm.

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

3.0 Technology Selection

This section describes the two major technologies selected for the upgraded WWTP: a Dissolved Gas Flotation (DGF) system and s Macro Porous Polymer Extraction (MPPE) system. The DGF system described in Section 3.1 replaces Oil and Grease (O/G) and Total Suspended Solids (TSS) removal capabilities of the tank-based separator concept from the prior versions of this PDR. The MPPE system described in Section 3.2 replaces the benzene removal capabilities of the bioreactor concept from the prior versions of this PDR. Details on implementation of these technologies at the Gallup Refinery are contained in Section 4.0.

3.1 Dissolved Gas Flotation (DGF)

API separators, in general, provide first-stage (i.e. primary) oil-water separation by taking advantage of Stokes' Law. A second-stage oil-water separation is required to provide additional O/G removal beyond what is consistently achievable by API separators. Second-stage oil-water separation must remove the residual O/G and TSS that do not readily separate by gravity (i.e. emulsified O/G) and is required to provide appropriate influent quality to the downstream unit process (MPPE in our case).

A DGF system will provide the second-stage oil-water separation process for the upgraded

WWTP, as it is common refinery technology used downstream of API separators. Emulsified O/G is electrically released from the wastewater by the addition of coagulant and flocculant. After the pH is adjusted, the wastewater is pressurized in the presence of nitrogen, creating a super-saturated solution. When pumped into the DGF flotation chamber at atmospheric pressure, micron-sized nitrogen bubbles are released that physically float the flocculated O/G and TSS to the surface. This material is appropriately called "float". The float is thickened and removed from the top of the DGF by mechanical systems and managed in a Float Tank. The clarified water is pumped from the bottom of the DGF where a slip-stream is taken to provide the previously mentioned nitrogen super-saturation. More information on the DGF unit is contained in Section 4.1.5.

3.2 Macro Porous Polymer Extraction (MPPE)

The MPPE technology has been selected to remove all residual dissolved and dispersed hydrocarbons from the wastewater stream. MPPE technology has been successfully applied to the treatment of process water, offshore produced water, industrial wastewater and contaminated groundwater since 1994. It is a highly effective, fully automated, remote controlled and guaranteed method for removing dissolved and dispersed hydrocarbons from water with efficiencies of 99.9999% down to below ppb level by means of extraction in an MPP bed. With over 80 years of accumulated worldwide experience, the MPPE Technology is tested and proven with references by many respected companies.

The Macro Porous Polymer (MPP) acts as a carrier for an immobilized, nontoxic and biodegradable extraction liquid that has a high affinity to the components to be removed. That is, the removed constituents have partition coefficients such that they are guaranteed to have a high affinity to the MPPE extraction liquid. The treated wastewater is then free of the target constituents (i.e. benzene), which now reside only in the extraction liquid.

MPP media have a diameter of 1,000 microns, with pore sizes of 0.1 to 10 microns. These MPP media are capable of reducing contaminant concentrations in water by a factor of more than 1 million, which means that concentrations of thousands ppm (parts per million) can be lowered to below 1 ppb (parts per billion). This is done in only one cycle. The hydrocarbon removal efficiencies result from the high number of mass transfer sites developed in the packed column beds. This is mainly due to the high specific surface area associated with the porous polymer media.

Aside from clean treated water, the unit also yields almost 100% pure hydrocarbons suitable for reuse. Dissolved and dispersed compounds that can be removed with MPPE technology include:

- aromatics (i.e. benzene, toluene, xylenes and ethylbenzene),
- polyaromatic hydrocarbons (PAHs) (i.e naphthalenes, phenanthrenes, dibenzothiophenes),
- aliphatics including halogenated aliphatics.

The extraction liquid must be regenerated at fixed intervals to sustain hydrocarbon removal efficiencies. This regeneration is accomplished by back flowing low pressure steam across the column beds. The hydrocarbon laden stripping steam is condensed and sent to a separator, where recovered hydrocarbon and water are separated by gravity. This essentially 100% pure hydrocarbon phase is recycled to the refinery for reprocessing. The condensed water is recycled back to the MPPE unit, via a buffer tank.

The MPPE system utilizes two columns that cycle between absorption and regeneration,

allowing continuous operation. One column is always extraction hydrocarbons, while the other is being regenerated. This column cycle time is anticipated to be once every hour.

A schematic of the MPPE process is provided in Figure 3.

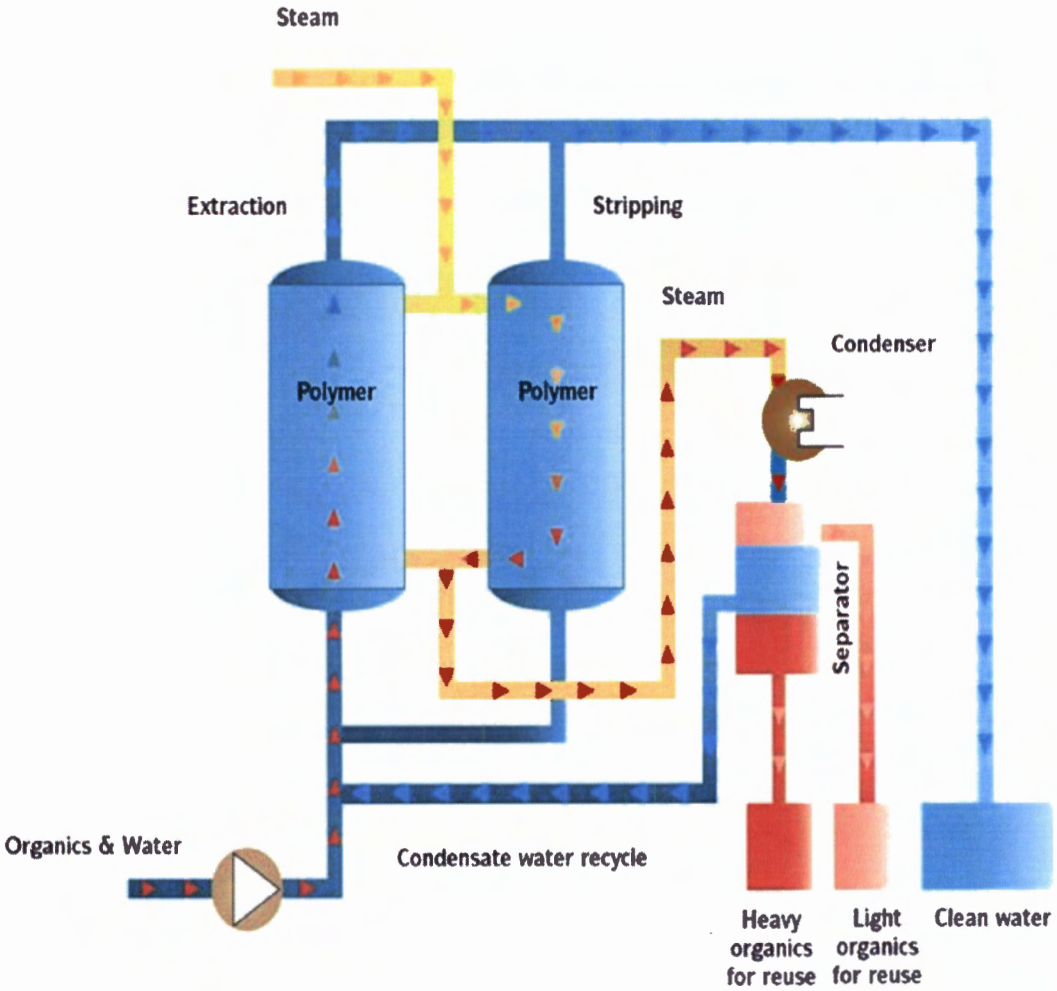

Figure 3, MPPE Schematic
(courtesy: Veolia Water)

4.0 Process Description

This section describes the new systems that will comprise the refinery's upgraded WWTP. The first subsection describes the new systems to be installed during the WWTP upgrades. The second subsection describes the existing systems that will be decommissioned because of the WWTP upgrades. The third subsection describes how the refinery will manage off-spec wastewater that may result from system anomalies. The last subsection describes tank design, secondary containment and leak detection. Please refer to the Process Flow Diagram shown in Figure 1 and the Site Plot Plan shown in Figure 2.

4.1 New Systems

4.1.1 Combined Process Sewer

During WWTP upgrades, two separate sewers were combined into one 24-inch process sewer; the stormwater sewer and the oily refinery sewer (containing RO rejects, water softener

regeneration, boiler blowdown and cooling tower blowdown). This new combined process sewer is constructed of partially buried carbon steel pipe and is approximately 1,200 linear feet long. It flows by gravity to the Equalization Tank (T35) and/or Surge Tanks (T27, T28). T35 is the primary destination of the combined process sewer, but if conditions dictate that wastewater cannot be sent to T35, it can be re-routed to T27and/or T28, by manipulating manual valves. Examples of this situation include when T35 is at its liquid holding capacity or is out of service for maintenance.

Cleanouts are installed in the combined process sewer to allow regularly scheduled clearing of blockages and sedimentation. During cleanouts, the material will be broken-up, fluidized and pushed into T35 by high pressure water and/or steam. The majority of the combined process sewer is buried below the frost line to prevent freezing, but near the tanks, the above ground portion is protected from freezing by electric heat tracing and insulation.

4.1.2 Equalization Tank (T35)

A new Equalization Tank (T35) has been constructed to equalize variability in both flowrate and material concentration before introduction to the API Separator, DGF and MPPE. The operating level of T35 will vary according to fluctuations in the combined process sewer flow, thus providing surge control function. Since the tank will normally operate at one-third to one-half of capacity, the remaining volume is available for surge control capacity.

T35 is equipped with an internal floating roof to minimize and control volatile air emissions. Sample ports are provided to allow for testing of both influent and effluent wastewater. T35 is 78ft in diameter by 32ft high. Maximum fill height is 28ft equating to 882,000 gallons of usable volume. With a routine operating level of one-third to one-half full, T35 will provide 22 to 33 hours of residence time for equalization (500,000 to 333,000 gallons), with 33 to 44 hours of surge capacity (503,000 to 671,000 gallons), based on a 250gpm average flowrate

Oil that accumulates on the water surface of T35 is removed by a skimmer device attached to the tank's floating roof. The skimmed oil is collected by vacuum truck and transferred to the refinery's oil recovery system for recycling back to the refining process. The oil level is checked on a routine basis and skimmed, as required by operating conditions and performance. It is considered undesirable for the floating oil to accumulate to such a level that it would be pumped to the API Separator. We anticipate removing oil from T35 every couple weeks, if not weekly.

Solids entering T35 will settle to the bottom of the tanks as a layer of sludge. To minimize this, provisions for tank mixing is designed into the system. T35 has internal jet nozzle mixers installed that draw a tank volume equal to three times that recirculated back to the tank. For example, if the Wastewater Transfer Pumps (described in Section 4.1.4) circulate 250gpm back to the tank, these jet mixers will induct an additional 750gpm of tank contents. This results in very effective tank mixing. Additional flexibility is designed into the system to allow wastewater transfer to the API Separator, flow from the combined process sewer and recirculatory mixing to occur simultaneously.

Additionally, sludge that settles out in the bottom of the tank will require periodically cleaning. This is expected to occur every three to five years, lasting two to four weeks. Standard refinery tank cleanout and sludge management procedures will be followed. During these periods, equalization of the combined process sewer will be accomplished using T27

and/or T28. Flexibility is designed into the piping system to allow wastewater to be routed to any of the three tanks, as needed.

T35 level will be monitored daily to verify adequate pump rate. If the tank level begins to rise, the transfer flowrate is increased by opening the flow control valve. Similarly, if the tank level begins to drop, the transfer flowrate will be decreased by closing the flow control valve.

4.1.3 Surge Tanks (T27 & T28)

T27 and T28 are existing tanks located near T35 that have been refurbished and put into service to provide additional equalization storage and emergency overflow capacity for T35. These tanks will be used only when T35 is at its liquid holding capacity or is out of service for maintenance.

Like T35, T27 and T28 are also equipped with internal floating roofs to minimize and control volatile air emissions. Sample ports are provided to allow testing of both influent and effluent wastewater. These tanks are 33.5ft in diameter by 32ft high. Both tank's maximum fill heights are 28ft, which equates to 166,000 gallons of usable volume each.

The combined surge capacity of T35, T27 and T28 is 875,000 to 1,042,000 gallons, depending on the operating level of T35. The three tanks will be able to hold 2.5 to 3.0 days worth of flow from the combined process sewer, if the API Separator, DGF and/or MPPE units malfunction or are taken out of service for maintenance.

Oil that accumulates on the liquid surfaces and solids that settle to the bottoms of T27 and T28 will be managed in a manner similar to that described for T35.

In previous version of this PDR, it was anticipated that off-spec wastewater would be returned to T27 and/or T28. This provision has since then been eliminated from the WWTP upgrades. For that reason all references to RCRA 90-day accumulation requirements have been removed. However, the need to periodically re-suspend settled solids in T35, 27 and/or T28 still exists. This re-suspension will be accomplished by recirculation of the tanks, a commonly used method for mixing tank contents. The Wastewater Transfer Pumps, as described in Section 4.1.4, will be used for this purpose.

4.1.4 Wastewater Transfer Pumps

Three 15hp Wastewater Transfer Pumps are used to transfer wastewater from T35, T27 and T28 to the API Separator. Transfer will only occur from one tank at a time. Normally, one pump is in use and pumps 275gpm, with two additional pumps available as installed spares. A flow meter and flow control valve are installed in the system to control the rate of wastewater transfer to the API Separator. Two pumps can operate at the same time to provide a combined flowrate of 500gpm. Overall flowrate to the API Separator is limited to 500gpm.

Approximately 1,300 linear feet of 6-inch diameter piping connects the Wastewater Transfer Pumps to the API Separator. The piping is protected from freezing by electric heat tracing and insulation.

With one pump operating at 275gpm, this pipeline flows nearly continuously at 3.1 feet per second, which is an industry standard for scour velocity. Occasional pressure surveys will be conducted to determine if solids have settled out of the flow. Settled solids will affect flow performance. If settling is determined to have occurred, two Wastewater Transfer pumps will be operated simultaneously. This will increase the flowrate to 500gpm and the corresponding line velocity to 5.6 feet per second, effectively sweeping out any settled solids.

Additionally, CAFO compliance requires that this pipeline to be fully welded with daily inspections.

4.1.5 DGF System

The DGF system is a single, covered, above-ground, stainless steel vessel, with a design flowrate of 275gpm and a maximum flowrate of 500gpm. Wastewater from the API Separator gravity flows to a DGF Feed Tank where coagulant is injected and pH is adjusted. DGF Feed Pumps will the transfer wastewater to the DGF system. Just before entering the DGF, flocculant will be injected into the wastewater. Nitrogen will be used to remove the O/G and TSS, as described in Section 3.1.

The clarified water from the DGF system will then be pumped to the MPPE system (as described in Section 4.1.6) by two pumps - one in operations and one in standby). Each pump has a design flowrate of 275gpm with a maximum flowrate of 500gpm.

The float material removed from the DGF will be sent to a Float Tank, where volume reduction and thickening will occur. Oily solids collected in the Float Tank will be recycled to a refining process (on-site or off-site). Should operating experience indicate that further volume reductions occur; blind-flanged nozzles are included for possible future mechanical dewatering. Water decanted from the Float Tank will be routed back to the API Separator for reprocessing through the DGF system.

It was determined that reliable operations and performance could be achieved by a single DGF, with redundant recirculation pumps. This design configuration is acceptable because the vendor claims that no reasons exist for the unit to be out of service for periods longer than the 2.5 to 3.0 days of storage provided by T25, T27 and T28. The redundant DGF recirculation pump will provide flexibility in operations for the single critical rotating equipment item in the DGF system. Attachment A provides information from the DGF vendor to support this design approach.

4.1.6 MPPE System

The MPPE system consists of two columns operating in parallel, as described in Section 3.2. One column will be in service (absorbing) while the other is being regenerated, and will switch hourly. The absorbing column will receive clarified water from the DGF system and will flow from the bottom to the top. Once benzene and other hydrocarbons are removed by the absorption column, RCRA compliant water will be discharged by gravity to STP-1, as described in Section 4.1.7.

Periodic regeneration will occur automatically every hour. Regeneration requires low pressure saturated steam to flow from the top and to the bottom. The hydrocarbon-laden steam will then be condensed and separated to produce a water stream that is recycled back to the absorbing column and a hydrocarbon stream that is collected and periodically pumped back to the refinery for reprocessing.

Attachment B provides vendor-supplied basic maintenance requirements for the MPPE. Other detailed maintenance instructions include replacement of pump seals and valve seats, instrument recalibration and media replacement; all of which can be accomplished in a matter of hours. This maintenance is anticipated to be able to occur within the 2.5 to 3.0 day wastewater retention window provided by T35, T27 and T28, as discussed in Sections 4.1.2 and 4.1.3.

4.1.7 Sanitary Treatment Pond (STP-1)

Pilot Travel Center and refinery sanitary wastewater will be biologically treated in an aerated treatment pond, before being discharged to the evaporation pond network. All solids in the Pilot wastewater are removed first by a Pilot-owned septic system. Effluent from this septic system is then pumped to a screening system at the refinery lift station. Pumps at the lift station will transfer wastewater to STP-1. Flow meters will be installed to track volumes.

This new Sanitary Treatment Pond (STP-1) will treat BOD-5 and other soluble organics. STP-1 will be designed and installed with double liner and leak detection, in accordance with NM-OCD requirements. For operational flexibility, STP-1 will be partitioned giving two individual and separate compartments that will allow one side to be cleaned and/or inspected, while the other side continues to operate. Treated water from STP-1 will gravity flow into EP-2 and then into the existing evaporation pond network.

MPPE effluent will also gravity flow into STP-1. A flow meter will also be installed on this line to track discharge volumes. MPPE effluent will be free of floating oil, have benzene concentrations less than 0.5 mg/L and will have no RCRA hazardous characteristics, as required in CAFO paragraph 100J. However, STP-1 will provide another layer of protection against unwanted discharges of contaminated water in existing surface impoundments. Evaporation pond influent quality will be assured by the following WWTP upgrades:

- flowrates and waste loadings will be less variable because of T35, T27 and T28,
- Improved oil-water separation and removal because of the DGF system, and
- Robust and reliable removal of benzene and other hydrocarbons because of the MPPE system.

4.2 Decommissioned Systems

Placing the upgraded WWTP system into service will allow the following existing systems to be decommissioned:

4.2.1 Benzene Strippers

The MPPE system will replace the current benzene removal capabilities of the three benzene strippers located near the old API Separator (Z84-V4, V5 and V8) and one stripper located in the refinery units (Z84-V7). These air-strippers and associated equipment will be decommissioned and dismantled.

4.2.2 AL-1, AL-2 and EP-1

The two Aeration Lagoons (AL-1 and AL-2) and Evaporation Pond 1 (EP-1) will be decommissioned and closed in-place, pursuant to the "Closure Plan Aeration Lagoons". The surface aerators used in AL-1 and AL-2 will be reused in STP-1. 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.

4.2.3 Old API Separator (OAPIS)

The OAPIS originally collected stormwater from the process area. Recent work has been completed that removes the stormwater from this OAPIS and combines it with the refinery sewer; both of which now flow into T35 with surge capacity provided by T27 and/or T28. The OAPIS inlet was physically separated and plugged from the old sewer system by March 01, 2011, as required by the CAFO. Because the OAPIS was designated by the NM-EPA as Solid Waste Management Unit #14, it will be demolished in accordance with the Investigation Work Plan Old API Separator (Revised October 2010).

4.3 Management of Off-Spec Wastewater

DGF and MPPE process health will be monitored twice per day, with samples collected at approximately 7:00am and 7:00pm. On-site laboratory Gas Chromatograph/ Mass Spectrometer (GC/MS) analysis will be conducted to determine benzene concentrations in the MPPE effluent. Results will be available within a few hours of sample collection and will be used as process knowledge in determining when to divert flow from STP-1. To account for the fact that our on-site method is not identical to the EPA-approved method, and to act proactively, benzene concentrations of 0.4 mg/L trigger diversion from STP-1.

As discussed in the last paragraph of Section 4.1.3, earlier versions of this PDR stated that off-spec wastewater would be returned to T27 and/or T28. This provision has since then been eliminated from the WWTP upgrades. If effluent from either the DGF or MPPE are found to be off-spec (i.e. > 0.5 mg/L benzene), flows will be diverted to the DGF Feed Tank instead of T27 and/or T28. The design and construction of this DGF Feed Tank will be in accordance with all RCRA standards, as described in Section 4.4.

If wastewater is diverted from STP-1, corrective actions will be taken with respect to the DGF and/or MPPE systems. During the diversion period, no post-API material will be returned to T35, T27 or T28. Wastewater transfer from T35, T27 or T28 to the API Separator will stop until on-site laboratory analysis proves that benzene concentrations in the MPPE effluent are less than 0.4 mg/L. Only then will flow through the WWTP system, and subsequent discharge into STP-1, be returned to normal operating conditions.

4.4 Tank Design, Secondary Containment and Leak Detection

Under the terms of the CAFO, all tanks and ancillary equipment downstream of the API Separator are subject to 40 CFR §262.34(a) which contains language related to 90-day accumulation without a permit. By reference, these systems are therefore subject to 40 CFR §265 Subpart J for tank systems. Accordingly, all 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.

As discussed in Sections 4.1.3 and 4.3, diversion of off-spec DGF/MPPE wastewater will not return to T35, T27 and/or T28. Instead, all off-spec material will be piped to the DGF Feed Tank; which is located after the NAPIS and will comply with 40 CFR §265 Subpart J for tank systems.

The table below shows the components of the upgraded WWTP 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.

There exist instances where above ground "all welded" pipe connections are outside secondary containment areas (i.e. at flow meters and valve locations). In these instances, dedicated secondary containment devices (i.e. fabricated or constructed boxes) will be installed under the non-welded connections.

CAFO Sub Part J Compliance					
Item No.	Name	Description	Covered by CAFO?	Secondary Containment	Leak Detection
1	Buried Combined Process Sewer to T35, T27 & T28	Combines oily process and stormwater sewers into a single pipeline flowing into T35, T27 & T28	No; not downstream of API Separator	None	None
2	Above ground Combined Process Sewer to T35, T27 & T28	As the combined process sewer enters the bermed secondary containment area for T35, T27 & T28, it will be routed above ground	No; not downstream of API Separator	Yes; inside bermed tank containment area with volume to contain 1.3 times largest tank	Yes; Visual
3	T35 (Equalization Tank)	Provides wastewater equalization and surge capacity for combined process sewer	No; not downstream of API Separator	Yes; inside bermed tank containment area with volume to contain 1.3 times largest tank	Yes; Double Bottom with Leak Detection at the Tank Perimeter
4	T27 & T28 (Surge Tanks)	Additional surge & equalizations capacity for combined process sewer	No; not downstream of API Separator. *Note off-spec diversion now only after NAPIS.*	Yes; inside bermed tank containment area with volume to contain 1.3 times largest tank	Yes; Double Bottom with Leak Detection at the Tank Perimeter
5	Above ground piping from T35, T27 & T28 to Wastewater Transfer Pumps	Pump suction from all three tanks	No; not downstream of API Separator	Yes; inside bermed tank containment area with volume to contain 1.3 times largest tank	Yes; Visual (daily)
6	Wastewater Transfer Pumps	Pumps used to transfer wastewater from T35, T27 & T28 to API Separator	No; not downstream of API Separator	Yes; curbed area inside Pump Shed, also inside bermed tank containment area with volume to contain 1.3 times largest tank	Yes; Visual (daily)

CAFO Sub Part J Compliance					
Item No.	Name	Description	Covered by CAFO?	Secondary Containment	Leak Detection
7	Above ground piping from Wastewater Transfer Pumps to API Separator	Single discharge pipeline from the Wastewater Transfer Pumps to API Separator	No; not downstream of API Separator	Yes; essentially all above ground; welded pipe, flanges, joints and connections. Sleeved underground road crossings with leak indication	Yes; Visual (daily)
8	API Separator including skimmed oil and bottom solids systems	Existing; no change	No; no change	Existing; no change	Existing; no change
9	DGF Feed Tank	Surge, pump suction, chemical treatment and pH adjustment between API Separator & WWTP	Yes, Downstream of API separator	Yes; to be installed inside concrete containment area with volume 1.3 times largest tank	Yes; Visual (daily)
10	DGF Feed Pumps	Pumps used to transfer wastewater from DGF Feed Tank to WWTP	Yes, Downstream of API separator	Yes; to be installed inside concrete containment area with volume 1.3 times largest tank	Yes; Visual (daily)
11	Piping from DGF Feed Pumps to DGF system	Single discharge pipeline from the DGF Feed Pumps to DGF system	Yes; downstream of API Separator	Yes; above ground; welded pipe flanges, joints and connections	Yes; Visual (daily)
12	DGF System	Elevated Vessel	Yes; downstream of API Separator	Yes; Inside curbed concrete containment adjacent WWTP bldg with volume1.3 times largest tank	Yes; Visual (daily)
13	MPPE Feed Pumps	Pumps used to transfer wastewater from DGF to MPPE	Yes, Downstream of API separator	Yes; to be installed inside WWTP bldg concrete containment area with volume 1.3 times largest tank	Yes; Visual (daily)
14	Piping from DGF system to MPPE system	Single discharge pipeline from the MPPE Feed Pumps to MPPE system	Yes; downstream of API Separator	Yes; to be installed inside WWTP bldg concrete containment area with volume 1.3 times largest tank	Yes; Visual (daily)

CAFO Sub Part J Compliance					
Item No.	Name	Description	Covered by CAFO?	Secondary Containment	Leak Detection
15	MPPE System	Various elevated vessels	Yes; downstream of API Separator	Yes; to be installed inside WWTP bldg concrete containment area with volume 1.3 times largest tank	Yes; Visual (daily)
16	Treated Effluent from MPPE system	Single discharge pipeline from the MPPE system to STP-1	No; RCRA non-hazardous; <0.5 mg/L benzene	None, but will be installed above ground	None
17	Off-Spec Diversion Piping from WWTP to DGF Feed Tank	Single discharge pipeline from the WWTP to DGF Feed Tank	Yes; downstream of API Separator	No; above ground; welded pipe flanges, joints and connections	Yes; Visual (daily)
18	DGF Float Tank	Elevated vessel for DGF float management	No; oil-bearing residuals exemption per 40 CFR 261.4(a)(12)	Yes; Inside curbed concrete containment adjacent WWTP bldg with volume1.3 times largest tank	Yes; Visual (daily)
19	Recovered Hydrocarbon Piping	Single discharge pipeline from the MPPE Recovered Oil Tank to pump discharge at T105	No; by-product reclaimed and exempt per 40 CFR 261.2 (c)(3)	None, but still above ground; welded pipe flanges, joints and connections	None
20	STP-1	Receives sanitary and treated process wastewater.	No; For treatment of sewage wastewaters	Yes; OCD requirement for double liners	Yes; OCD requirement for leak detection

4.5 Air Emissions Control

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

- Internal floating roofs are used to control air emissions from T35, T27 and T28.
- The existing GAC system (located near the NAPIS) will be used to control emissions from the DGF Feed Tank.
- A new iron-impregnated wood / Granular Activated Carbon (GAC) canister system will be used to control emissions from the DGF, DGF Float Tank and the MPPE Recovered Oil Tank.
- The existing flare system will be used to control emissions from both MPPE Columns, the MPPE Separator and the MPPE Buffer Tank.

Vapor sampling points will be added to the DGF emission point, MPPE emission point, GAC inlets and outlets, as previously requested by the NMED. However, routine sampling of these points are not anticipated, with the exception of the following: GAC performance will be based on results from exhaust vapor (GAC outlet) sampling and carbon replacement will be based on breakthrough calculations.

5.0 Project Schedule

The required project schedule for design and construction of the upgraded WWTP is in accordance with the revised CAFO Milestone Schedule, recreated below.

CAFO Milestone Schedule	
1. Submit proof of procurement including vendor Acknowledgement of Order, vendor's factory order number, and estimated delivery date for DGF and MPPE units to demonstrate Respondent will comply with milestone 7 of this chart.	September 30, 2010
2. Commence construction of Equalization Tank.	September 30, 2010
3. Complete installation of Tanks 27 and 28, and Equalization Tank and ancillary equipment and connect the storm water management system to the current Waste Water Treatment System.	December 31, 2010
4. Commence operation of the storm water management system.	January 15, 2011
5. Complete measures to prevent the Old API Separator from receiving and flows, including removal of segments from, and insertion of cement plugs in, all inlet piping to the Old API Separator.[2]	March 1, 2011
6. Complete site preparation and foundations for DGF and MPPE equipment.	July 31, 2011
7. Complete installation of interconnecting piping and transfer pumps for DGF and MPPE units.	January 31, 2012
8. Complete connection of the storm water management system to the new Waste Water Treatment System and commission and Start-Up of DGF and MPPE units.	February 29, 2012
9. End of system startup grace period for achievement of all discharge limits as required by the CAFO.	May 31, 2012

[2] Such measures shall not be construed to limit the authority of the NMED with respect to corrective action at any solid waste management unit or area of concern at Respondent's facility.

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 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.

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

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.

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

Western Refining
Gallup, New Mexico

Revised June 2011

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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.*"
5. Paragraph 100J – "*...Respondent shall meet the following discharge limits for any and all wastewater discharged to any surface impoundments: benzene concentration in wastewater shall always be less than 0.5mg/L; wastewater shall have no RCRA hazardous characteristics...*"

1.1 Project Scope

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

- The oily refinery sewer and stormwater sewer have been combined into a single process sewer (hereafter referred to as Combined Process Sewer), as described in Section 4.1.1.
- A new equalization tank (Z84-T35, hereafter referred to as T35) has been installed that functions as the primary vessel into which the combined process sewer flows, as described in Section 4.1.2.
- Two existing tanks (Z84-T27 and Z84-T28, hereafter referred to as T27 and T28) have been refurbished and put in service. These tanks will provide additional equalization storage and emergency overflow capacity for T35, as described in Section 4.1.3. T35, T27 and T28 are all upstream of the existing "new" American Petroleum Institute (API) separator, (Z84-T5 and Z84-T6, hereafter referred to the API separator.)

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- A Dissolved Gas Flotation (DGF) system, downstream of the API Separator, will be used to remove oil & grease and total suspended solids from the combined process sewer. The DGF system is described in Sections 3.1 and 4.1.5.
- A Macro Porous Polymer Extraction (MPPE) system, downstream of the DGF system will be used to remove dissolved benzene and other hydrocarbons from the combined process sewer, as described in Sections 3.2 and 4.1.6.
- A Sanitary treatment Pond (STP-1), with double liner and leak detection, will be used to remove BOD-5 from Pilot Travel Center and refinery sanitary sewers, as described in Section 4.1.7.

The following equipment and facilities will be decommissioned after WWTP upgrades:

- Benzene Stripper 1, 2 and 3
- Aeration Lagoons 1 and 2 (AL-1 and AL-2)
- Evaporation Pond 1 (EP-1)
- The Old API Separator (hereafter referred to as OAPIS) that was used to collect and treat refinery storm sewer. The OPAIS was decommissioned by March 01, 2011, as required by the CAFO.

The following equipment will continue to operate after WWTP upgrades:

- New API Separator (NAPIS)
- Evaporation Ponds 2 through 12 (EP-2 through EP-12)

The upgraded WWTP process flow diagram of is shown in Figure 1. A site plot plan is shown in Figure 2.

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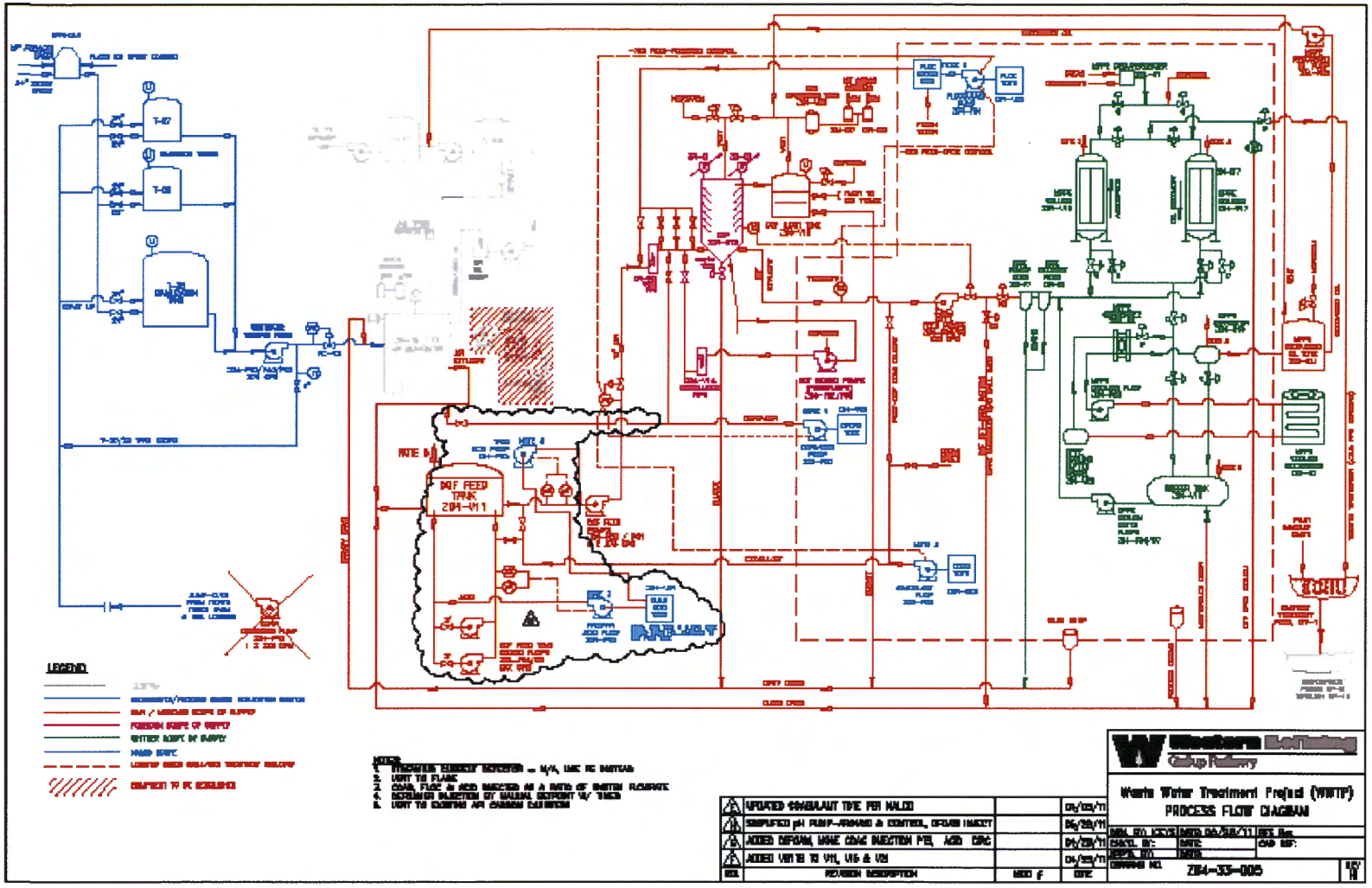

Figure 1, Process Flow Diagram

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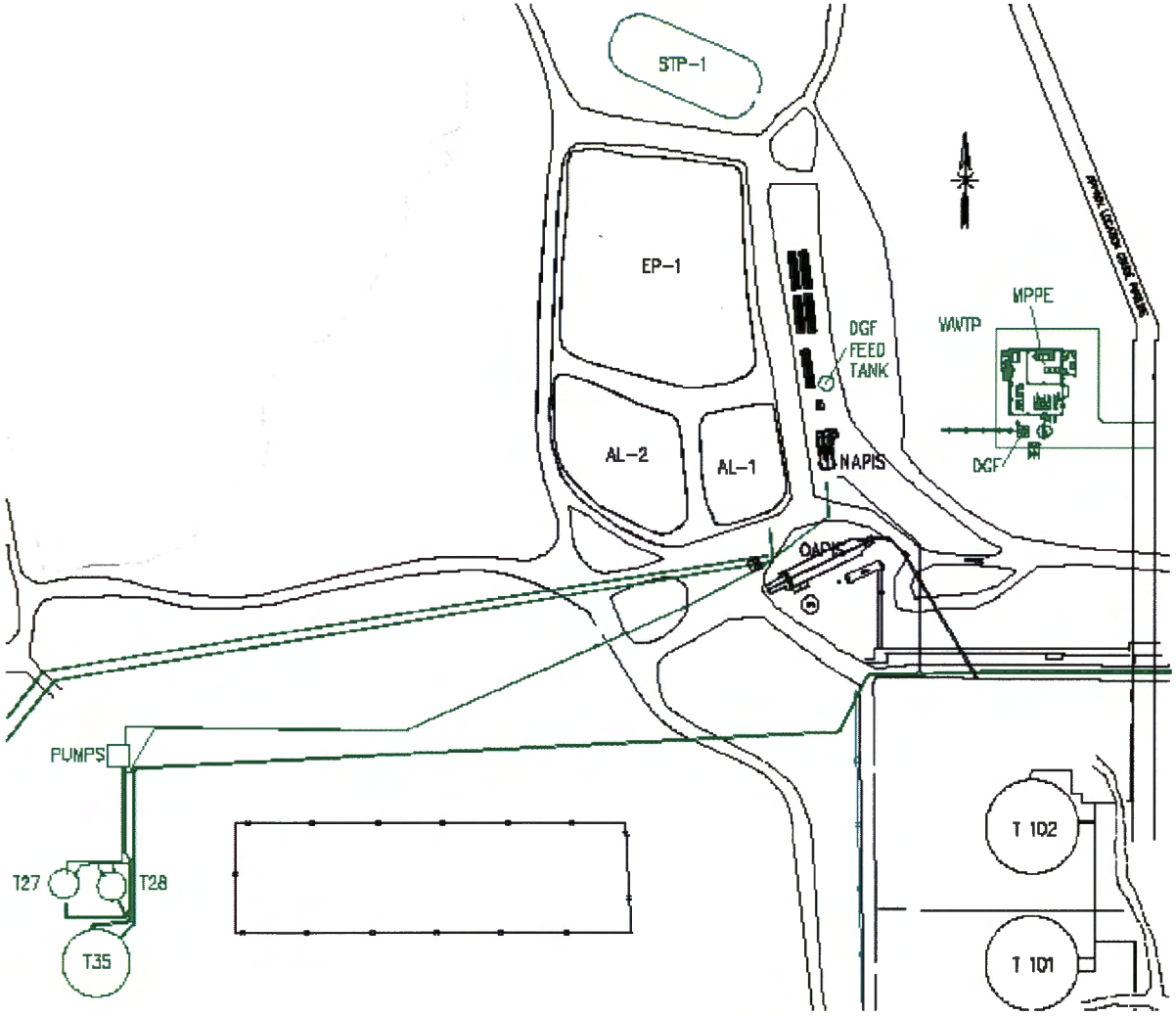

Figure 2, Site Plot Plan

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1.2 Related Project - Pilot Travel Center Lift Station

A lift station to collect, screen and pump the sanitary/restaurant wastewater from the Pilot Travel Center has recently been installed and put into service. A force main conveys the wastewater to the WWTP, where it will be treated in a new Sanitary Treatment Pond (STP-1), before being discharged into EP-2.

1.3 Treatment Objectives

The ultimate objective of the upgraded WWTP is to meet the discharge limits defined in the CAFO. To achieve this, two state-of-the-art technologies have been selected, as described in Section 3.0. Each of these technologies will remove specific components from the combined process sewer. The upgraded WWTP will discharge into a new double lined aerated pond (STP-1) with no visible free oil, <0.5 mg/L benzene and no RCRA hazardous characteristics.

1.4 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.

2.0 Wastewater Source

This section describes the sources of wastewater generated at the refinery and fall into two broad categories: those generated at the refinery and those generated at the adjacent Pilot Travel Center.

2.1 Refinery Wastewater

The refinery generates four different wastewater streams. They are:

- Oily process sewer resulting from normal refinery operations,
- Non-oily process sewer resulting from operations of the Reverse Osmosis (RO) unit, water softeners, cooling tower blowdown and boiler blowdown,
- Stormwater runoff from the refinery units, and
- Sanitary sewer from various restroom and kitchen facilities within the refinery and seven adjacent company-owned homes.

The oily process sewer, non-oily process sewer and stormwater runoff flow into a new combined process sewer, as described in Section 4.1.1. This combined process sewer then flows into T35.

The sanitary wastewater flows into the refinery's newly constructed lift station, as described in Section 2.2. This lift station will then flow to the new STP-1 to be constructed.

2.2 Pilot Travel Center Wastewater

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 first passes through a Pilot-owned grease trap system that was installed in 2008. This grease trap effluent along with sanitary/restaurant wastewater from the rest of the Pilot Travel Center then flows into a Pilot-owned septic tank system. Septage is pumped out of this septic system on a scheduled quarterly basis for off-site disposal (as reported by Pilot Travel Center staff). Liquid effluent from this septic system gravity flows to a Pilot-owned lift station, located on their property. The lift station's submersible pumps then transfer the wastewater through a pipeline to the refinery for further treatment. Western Refining now operates 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.

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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.

2.3 Design Flow

The design flowrates for the individual wastewater sources are summarized below.

Design Flow Rates		
	Average, gpm	**Maximum, gpm**
API Separator Effluent[1]	250	500
Pilot Travel Center	50	120
RO Reject	100	150
Refinery Sanitary	4	--

1. API Separator effluent is the combined process sewer, which contains the oily and non-oily sewers, cooling tower blowdown and boiler blowdown.

The design flowrate for the API Separator effluent was set at an average of 250 gallons per minute (gpm) and a maximum of 500gpm. These flowrates were based on historical data with allowances for future expansion. The maximum flowrate for the upgraded WWTP is equal to the maximum flowrate of the API Separator with both bays in service, which is 500gpm.

The contract between Western Refining and the Pilot Travel Center limits their maximum sanitary sewer flowrate to 50gpm. However, the refinery's new lift station pumps are capable of handling a combined flowrate of 120gpm.

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

3.0 Technology Selection

This section describes the two major technologies selected for the upgraded WWTP: a Dissolved Gas Flotation (DGF) system and s Macro Porous Polymer Extraction (MPPE) system. The DGF system described in Section 3.1 replaces Oil and Grease (O/G) and Total Suspended Solids (TSS) removal capabilities of the tank-based separator concept from the prior versions of this PDR. The MPPE system described in Section 3.2 replaces the benzene removal capabilities of the bioreactor concept from the prior versions of this PDR. Details on implementation of these technologies at the Gallup Refinery are contained in Section 4.0.

3.1 Dissolved Gas Flotation (DGF)

API separators, in general, provide first-stage (i.e. primary) oil-water separation by taking advantage of Stokes' Law. A second-stage oil-water separation is required to provide additional O/G removal beyond what is consistently achievable by API separators. Second-stage oil-water separation must remove the residual O/G and TSS that do not readily separate by gravity (i.e. emulsified O/G) and is required to provide appropriate influent quality to the downstream unit process (MPPE in our case).

A DGF system will provide the second-stage oil-water separation process for the upgraded

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WWTP, as it is common refinery technology used downstream of API separators. Emulsified O/G is electrically released from the wastewater by the addition of coagulant and flocculant. After the pH is adjusted, the wastewater is pressurized in the presence of nitrogen, creating a super-saturated solution. When pumped into the DGF flotation chamber at atmospheric pressure, micron-sized nitrogen bubbles are released that physically float the flocculated O/G and TSS to the surface. This material is appropriately called "float". The float is thickened and removed from the top of the DGF by mechanical systems and managed in a Float Tank. The clarified water is pumped from the bottom of the DGF where a slip-stream is taken to provide the previously mentioned nitrogen super-saturation. More information on the DGF unit is contained in Section 4.1.5.

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3.2 Macro Porous Polymer Extraction (MPPE)

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The MPPE technology has been selected to remove all residual dissolved and dispersed hydrocarbons from the wastewater stream. MPPE technology has been successfully applied to the treatment of process water, offshore produced water, industrial wastewater and contaminated groundwater since 1994. It is a highly effective, fully automated, remote controlled and guaranteed method for removing dissolved and dispersed hydrocarbons from water with efficiencies of 99.9999% down to below ppb level by means of extraction in an MPP bed. With over 80 years of accumulated worldwide experience, the MPPE Technology is tested and proven with references by many respected companies.

The Macro Porous Polymer (MPP) acts as a carrier for an immobilized, nontoxic and biodegradable extraction liquid that has a high affinity to the components to be removed. That is, the removed constituents have partition coefficients such that they are guaranteed to have a high affinity to the MPPE extraction liquid. The treated wastewater is then free of the target constituents (i.e. benzene), which now reside only in the extraction liquid.

MPP media have a diameter of 1,000 microns, with pore sizes of 0.1 to 10 microns. These MPP media are capable of reducing contaminant concentrations in water by a factor of more than 1 million, which means that concentrations of thousands ppm (parts per million) can be lowered to below 1 ppb (parts per billion). This is done in only one cycle. The hydrocarbon removal efficiencies result from the high number of mass transfer sites developed in the packed column beds. This is mainly due to the high specific surface area associated with the porous polymer media.

Aside from clean treated water, the unit also yields almost 100% pure hydrocarbons suitable for reuse. Dissolved and dispersed compounds that can be removed with MPPE technology include:

- aromatics (i.e. benzene, toluene, xylenes and ethylbenzene),
- polyaromatic hydrocarbons (PAHs) (i.e naphthalenes, phenanthrenes, dibenzothiophenes),
- aliphatics including halogenated aliphatics.

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The extraction liquid must be regenerated at fixed intervals to sustain hydrocarbon removal efficiencies. This regeneration is accomplished by back flowing low pressure steam across the column beds. The hydrocarbon laden stripping steam is condensed and sent to a separator, where recovered hydrocarbon and water are separated by gravity. This essentially 100% pure hydrocarbon phase is recycled to the refinery for reprocessing. The condensed water is recycled back to the MPPE unit, via a buffer tank.

The MPPE system utilizes two columns that cycle between absorption and regeneration,

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allowing continuous operation. One column is always extraction hydrocarbons, while the other is being regenerated. This column cycle time is anticipated to be once every hour.

A schematic of the MPPE process is provided in Figure 3.

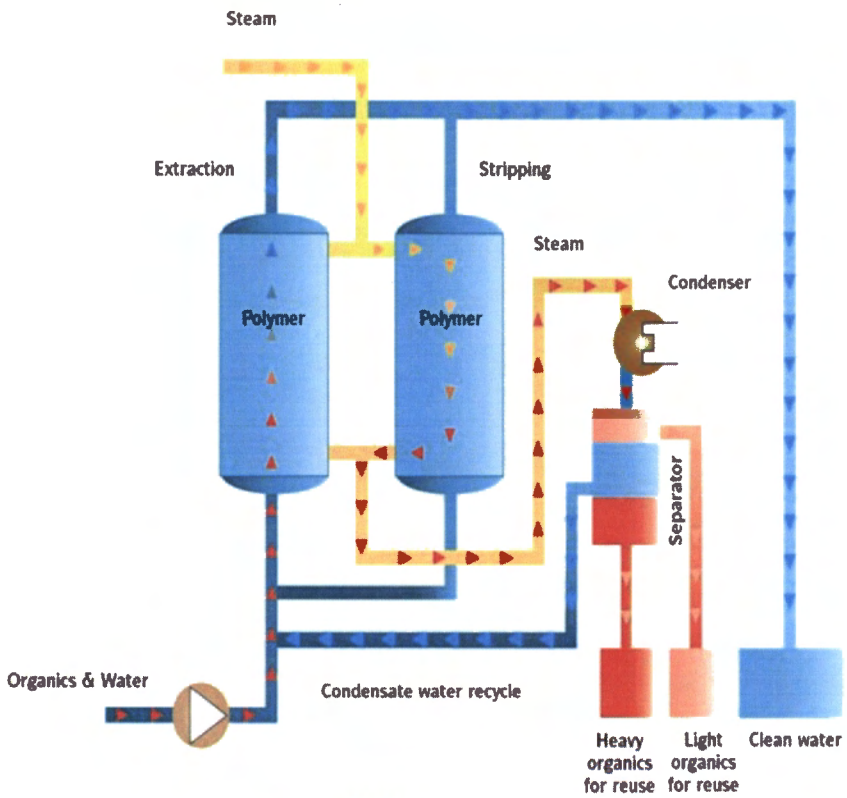

Figure 3, MPPE Schematic
(courtesy: Veolia Water)

4.0 Process Description

This section describes the new systems that will comprise the refinery's upgraded WWTP. The first subsection describes the new systems to be installed during the WWTP upgrades. The second subsection describes the existing systems that will be decommissioned because of the WWTP upgrades. The third subsection describes how the refinery will manage off-spec wastewater that may result from system anomalies. The last subsection describes tank design, secondary containment and leak detection. Please refer to the Process Flow Diagram shown in Figure 1 and the Site Plot Plan shown in Figure 2.

4.1 New Systems

4.1.1 Combined Process Sewer

During WWTP upgrades, two separate sewers were combined into one 24-inch process sewer; the stormwater sewer and the oily refinery sewer (containing RO rejects, water softener

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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), ... [29]

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regeneration, boiler blowdown and cooling tower blowdown). This new combined process sewer is constructed of partially buried carbon steel pipe and is approximately 1,200 linear feet long. It flows by gravity to the Equalization Tank (T35) and/or Surge Tanks (T27, T28). T35 is the primary destination of the combined process sewer, but if conditions dictate that wastewater cannot be sent to T35, it can be re-routed to T27and/or T28, by manipulating manual valves. Examples of this situation include when T35 is at its liquid holding capacity or is out of service for maintenance.

Cleanouts are installed in the combined process sewer to allow regularly scheduled clearing of blockages and sedimentation. During cleanouts, the material will be broken-up, fluidized and pushed into T35 by high pressure water and/or steam. The majority of the combined process sewer is buried below the frost line to prevent freezing, but near the tanks, the above ground portion is protected from freezing by electric heat tracing and insulation.

4.1.2 Equalization Tank (T35)

A new Equalization Tank (T35) has been constructed to equalize variability in both flowrate and material concentration before introduction to the API Separator, DGF and MPPE. The operating level of T35 will vary according to fluctuations in the combined process sewer flow, thus providing surge control function. Since the tank will normally operate at one-third to one-half of capacity, the remaining volume is available for surge control capacity.

T35 is equipped with an internal floating roof to minimize and control volatile air emissions. Sample ports are provided to allow for testing of both influent and effluent wastewater. T35 is 78ft in diameter by 32ft high. Maximum fill height is 28ft equating to 882,000 gallons of usable volume. With a routine operating level of one-third to one-half full, T35 will provide 22 to 33 hours of residence time for equalization (500,000 to 333,000 gallons), with 33 to 44 hours of surge capacity (503,000 to 671,000 gallons), based on a 250gpm average flowrate.

Oil that accumulates on the water surface of T35 is removed by a skimmer device attached to the tank's floating roof. The skimmed oil is collected by vacuum truck and transferred to the refinery's oil recovery system for recycling back to the refining process. The oil level is checked on a routine basis and skimmed, as required by operating conditions and performance. It is considered undesirable for the floating oil to accumulate to such a level that it would be pumped to the API Separator. We anticipate removing oil from T35 every couple weeks, if not weekly.

Solids entering T35 will settle to the bottom of the tanks as a layer of sludge. To minimize this, provisions for tank mixing is designed into the system. T35 has internal jet nozzle mixers installed that draw a tank volume equal to three times that recirculated back to the tank. For example, if the Wastewater Transfer Pumps (described in Section 4.1.4) circulate 250gpm back to the tank, these jet mixers will induct an additional 750gpm of tank contents. This results in very effective tank mixing. Additional flexibility is designed into the system to allow wastewater transfer to the API Separator, flow from the combined process sewer and recirculatory mixing to occur simultaneously.

Additionally, sludge that settles out in the bottom of the tank will require periodically cleaning. This is expected to occur every three to five years, lasting two to four weeks. Standard refinery tank cleanout and sludge management procedures will be followed. During these periods, equalization of the combined process sewer will be accomplished using T27

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will be…on …gravity …to T27 and T28. Cleaning events will be…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….will be ... [36]

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and/or T28. Flexibility is designed into the piping system to allow wastewater to be routed to any of the three tanks, as needed.

T35 level will be monitored daily to verify adequate pump rate. If the tank level begins to rise, the transfer flowrate is increased by opening the flow control valve. Similarly, if the tank level begins to drop, the transfer flowrate will be decreased by closing the flow control valve.

4.1.3 Surge Tanks (T27 & T28)

T27 and T28 are existing tanks located near T35 that have been refurbished and put into service to provide additional equalization storage and emergency overflow capacity for T35. These tanks will be used only when T35 is at its liquid holding capacity or is out of service for maintenance.

Like T35, T27 and T28 are also equipped with internal floating roofs to minimize and control volatile air emissions. Sample ports are provided to allow testing of both influent and effluent wastewater. These tanks are 33.5ft in diameter by 32ft high. Both tank's maximum fill heights are 28ft, which equates to 166,000 gallons of usable volume each.

The combined surge capacity of T35, T27 and T28 is 875,000 to 1,042,000 gallons, depending on the operating level of T35. The three tanks will be able to hold 2.5 to 3.0 days worth of flow from the combined process sewer, if the API Separator, DGF and/or MPPE units malfunction or are taken out of service for maintenance.

Oil that accumulates on the liquid surfaces and solids that settle to the bottoms of T27 and T28 will be managed in a manner similar to that described for T35.

In previous version of this PDR, it was anticipated that off-spec wastewater would be returned to T27 and/or T28. This provision has since then been eliminated from the WWTP upgrades. For that reason all references to RCRA 90-day accumulation requirements have been removed. However, the need to periodically re-suspend settled solids in T35, 27 and/or T28 still exists. This re-suspension will be accomplished by recirculation of the tanks, a commonly used method for mixing tank contents. The Wastewater Transfer Pumps, as described in Section 4.1.4, will be used for this purpose.

4.1.4 Wastewater Transfer Pumps

Three 15hp Wastewater Transfer Pumps are used to transfer wastewater from T35, T27 and T28 to the API Separator. Transfer will only occur from one tank at a time. Normally, one pump is in use and pumps 275gpm, with two additional pumps available as installed spares. A flow meter and flow control valve are installed in the system to control the rate of wastewater transfer to the API Separator. Two pumps can operate at the same time to provide a combined flowrate of 500gpm. Overall flowrate to the API Separator is limited to 500gpm.

Approximately 1,300 linear feet of 6-inch diameter piping connects the Wastewater Transfer Pumps to the API Separator. The piping is protected from freezing by electric heat tracing and insulation.

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With one pump operating at 275gpm, this pipeline flows nearly continuously at 3.1 feet per second, which is an industry standard for scour velocity. Occasional pressure surveys will be conducted to determine if solids have settled out of the flow. Settled solids will affect flow performance. If settling is determined to have occurred, two Wastewater Transfer pumps will be operated simultaneously. This will increase the flowrate to 500gpm and the corresponding line velocity to 5.6 feet per second, effectively sweeping out any settled solids.

Additionally, CAFO compliance requires that this pipeline to be fully welded with daily inspections.

4.1.5 DGF System

The DGF system is a single, covered, above-ground, stainless steel vessel, with a design flowrate of 275gpm and a maximum flowrate of 500gpm. Wastewater from the API Separator gravity flows to a DGF Feed Tank where coagulant is injected and pH is adjusted. DGF Feed Pumps will the transfer wastewater to the DGF system. Just before entering the DGF, flocculant will be injected into the wastewater. Nitrogen will be used to remove the O/G and TSS, as described in Section 3.1.

The clarified water from the DGF system will then be pumped to the MPPE system (as described in Section 4.1.6) by two pumps - one in operations and one in standby). Each pump has a design flowrate of 275gpm with a maximum flowrate of 500gpm.

The float material removed from the DGF will be sent to a Float Tank, where volume reduction and thickening will occur. Oily solids collected in the Float Tank will be recycled to a refining process (on-site or off-site). Should operating experience indicate that further volume reductions occur; blind-flanged nozzles are included for possible future mechanical dewatering. Water decanted from the Float Tank will be routed back to the API Separator for reprocessing through the DGF system.

It was determined that reliable operations and performance could be achieved by a single DGF, with redundant recirculation pumps. This design configuration is acceptable because the vendor claims that no reasons exist for the unit to be out of service for periods longer than the 2.5 to 3.0 days of storage provided by T25, T27 and T28. The redundant DGF recirculation pump will provide flexibility in operations for the single critical rotating equipment item in the DGF system. Attachment A provides information from the DGF vendor to support this design approach.

4.1.6 MPPE System

The MPPE system consists of two columns operating in parallel, as described in Section 3.2. One column will be in service (absorbing) while the other is being regenerated, and will switch hourly. The absorbing column will receive clarified water from the DGF system and will flow from the bottom to the top. Once benzene and other hydrocarbons are removed by the absorption column, RCRA compliant water will be discharged by gravity to STP-1, as described in Section 4.1.7.

Periodic regeneration will occur automatically every hour. Regeneration requires low pressure saturated steam to flow from the top and to the bottom. The hydrocarbon-laden steam will then be condensed and separated to produce a water stream that is recycled back to the absorbing column and a hydrocarbon stream that is collected and periodically pumped back to the refinery for reprocessing.

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Attachment B provides vendor-supplied basic maintenance requirements for the MPPE. Other detailed maintenance instructions include replacement of pump seals and valve seats, instrument recalibration and media replacement; all of which can be accomplished in a matter of hours. This maintenance is anticipated to be able to occur within the 2.5 to 3.0 day wastewater retention window provided by T35, T27 and T28, as discussed in Sections 4.1.2 and 4.1.3.

4.1.7 Sanitary Treatment Pond (STP-1)

Pilot Travel Center and refinery sanitary wastewater will be biologically treated in an aerated treatment pond, before being discharged to the evaporation pond network. All solids in the Pilot wastewater are removed first by a Pilot-owned septic system. Effluent from this septic system is then pumped to a screening system at the refinery lift station. Pumps at the lift station will transfer wastewater to STP-1. Flow meters will be installed to track volumes.

This new Sanitary Treatment Pond (STP-1) will treat BOD-5 and other soluble organics. STP-1 will be designed and installed with double liner and leak detection, in accordance with NM-OCD requirements. For operational flexibility, STP-1 will be partitioned giving two individual and separate compartments that will allow one side to be cleaned and/or inspected, while the other side continues to operate. Treated water from STP-1 will gravity flow into EP-2 and then into the existing evaporation pond network.

MPPE effluent will also gravity flow into STP-1. A flow meter will also be installed on this line to track discharge volumes. MPPE effluent will be free of floating oil, have benzene concentrations less than 0.5 mg/L and will have no RCRA hazardous characteristics, as required in CAFO paragraph 100J. However, STP-1 will provide another layer of protection against unwanted discharges of contaminated water in existing surface impoundments. Evaporation pond influent quality will be assured by the following WWTP upgrades:

- flowrates and waste loadings will be less variable because of T35, T27 and T28,
- Improved oil-water separation and removal because of the DGF system, and
- Robust and reliable removal of benzene and other hydrocarbons because of the MPPE system.

4.2 Decommissioned Systems

Placing the upgraded WWTP system into service will allow the following existing systems to be decommissioned:

4.2.1 Benzene Strippers

The MPPE system will replace the current benzene removal capabilities of the three benzene strippers located near the old API Separator (Z84-V4, V5 and V8) and one stripper located in the refinery units (Z84-V7). These air-strippers and associated equipment will be decommissioned and dismantled.

4.2.2 AL-1, AL-2 and EP-1

The two Aeration Lagoons (AL-1 and AL-2) and Evaporation Pond 1 (EP-1) will be decommissioned and closed in-place, pursuant to the "Closure Plan Aeration Lagoons". The surface aerators used in AL-1 and AL-2 will be reused in STP-1. 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.

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4.2.3 Old API Separator (OAPIS)

The OAPIS originally collected stormwater from the process area. Recent work has been completed that removes the stormwater from this OAPIS and combines it with the refinery sewer; both of which now flow into T35 with surge capacity provided by T27 and/or T28. The OAPIS inlet was physically separated and plugged from the old sewer system by March 01, 2011, as required by the CAFO. Because the OAPIS was designated by the NM-EPA as Solid Waste Management Unit #14, it will be demolished in accordance with the Investigation Work Plan Old API Separator (Revised October 2010).

4.3 Management of Off-Spec Wastewater

DGF and MPPE process health will be monitored twice per day, with samples collected at approximately 7:00am and 7:00pm. On-site laboratory Gas Chromatograph/ Mass Spectrometer (GC/MS) analysis will be conducted to determine benzene concentrations in the MPPE effluent. Results will be available within a few hours of sample collection and will be used as process knowledge in determining when to divert flow from STP-1. To account for the fact that our on-site method is not identical to the EPA-approved method, and to act proactively, benzene concentrations of 0.4 mg/L trigger diversion from STP-1.

As discussed in the last paragraph of Section 4.1.3, earlier versions of this PDR stated that off-spec wastewater would be returned to T27 and/or T28. This provision has since then been eliminated from the WWTP upgrades. If effluent from either the DGF or MPPE are found to be off-spec (i.e. > 0.5 mg/L benzene), flows will be diverted to the DGF Feed Tank instead of T27 and/or T28. The design and construction of this DGF Feed Tank will be in accordance with all RCRA standards, as described in Section 4.4.

If wastewater is diverted from STP-1, corrective actions will be taken with respect to the DGF and/or MPPE systems. During the diversion period, no post-API material will be returned to T35, T27 or T28. Wastewater transfer from T35, T27 or T28 to the API Separator will stop until on-site laboratory analysis proves that benzene concentrations in the MPPE effluent are less than 0.4 mg/L. Only then will flow through the WWTP system, and subsequent discharge into STP-1, be returned to normal operating conditions.

4.4 Tank Design, Secondary Containment and Leak Detection

Under the terms of the CAFO, all tanks and ancillary equipment downstream of the API Separator are subject to 40 CFR §262.34(a) which contains language related to 90-day accumulation without a permit. By reference, these systems are therefore subject to 40 CFR §265 Subpart J for tank systems. Accordingly, all 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.

As discussed in Sections 4.1.3 and 4.3, diversion of off-spec DGF/MPPE wastewater will not return to T35, T27 and/or T28. Instead, all off-spec material will be piped to the DGF Feed Tank; which is located after the NAPIS and will comply with 40 CFR §265 Subpart J for tank systems.

The table below shows the components of the upgraded WWTP 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

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Subpart J Tank Systems

There exist instances where above ground "all welded" pipe connections are outside secondary containment areas (i.e. at flow meters and valve locations). In these instances, dedicated secondary containment devices (i.e. fabricated or constructed boxes) will be installed under the non-welded connections.

CAFO Sub Part J Compliance

Item No.	Name	Description	Covered by CAFO?	Secondary Containment	Leak Detection
1	Buried Combined Process Sewer to T35, T27 & T28	Combines oily process and stormwater sewers into a single pipeline flowing into T35, T27 & T28	No; not downstream of API Separator	None	None
2	Above ground Combined Process Sewer to T35, T27 & T28	As the combined process sewer enters the bermed secondary containment area for T35, T27 & T28, it will be routed above ground	No; not downstream of API Separator	Yes; inside bermed tank containment area with volume to contain 1.3 times largest tank	Yes; Visual
3	T35 (Equalization Tank)	Provides wastewater equalization and surge capacity for combined process sewer	No; not downstream of API Separator	Yes; inside bermed tank containment area with volume to contain 1.3 times largest tank	Yes; Double Bottom with Leak Detection at the Tank Perimeter
4	T27 & T28 (Surge Tanks)	Additional surge & equalizations capacity for combined process sewer	No; not downstream of API Separator. *Note off-spec diversion now only after NAPIS.*	Yes; inside bermed tank containment area with volume to contain 1.3 times largest tank	Yes; Double Bottom with Leak Detection at the Tank Perimeter
5	Above ground piping from T35, T27 & T28 to Wastewater Transfer Pumps	Pump suction from all three tanks	No; not downstream of API Separator	Yes; inside bermed tank containment area with volume to contain 1.3 times largest tank	Yes; Visual (daily)
6	Wastewater Transfer Pumps	Pumps used to transfer wastewater from T35, T27 & T28 to API Separator	No; not downstream of API Separator	Yes; curbed area inside Pump Shed, also inside bermed tank containment area with volume to contain 1.3 times largest tank	Yes; Visual (daily)

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CAFO Sub Part J Compliance					
Item No.	Name	Description	Covered by CAFO?	Secondary Containment	Leak Detection
7	Above ground piping from Wastewater Transfer Pumps to API Separator	Single discharge pipeline from the Wastewater Transfer Pumps to API Separator	No; not downstream of API Separator	Yes; essentially all above ground; welded pipe, flanges, joints and connections. Sleeved underground road crossings with leak indication	Yes; Visual (daily)
8	API Separator including skimmed oil and bottom solids systems	Existing; no change	No; no change	Existing; no change	Existing; no change
9	DGF Feed Tank	Surge, pump suction, chemical treatment and pH adjustment between API Separator & WWTP	Yes, Downstream of API separator	Yes; to be installed inside concrete containment area with volume 1.3 times largest tank	Yes; Visual (daily)
10	DGF Feed Pumps	Pumps used to transfer wastewater from DGF Feed Tank to WWTP	Yes, Downstream of API separator	Yes; to be installed inside concrete containment area with volume 1.3 times largest tank	Yes; Visual (daily)
11	Piping from DGF Feed Pumps to DGF system	Single discharge pipeline from the DGF Feed Pumps to DGF system	Yes; downstream of API Separator	Yes; above ground; welded pipe flanges, joints and connections	Yes; Visual (daily)
12	DGF System	Elevated Vessel	Yes; downstream of API Separator	Yes; Inside curbed concrete containment adjacent WWTP bldg with volume1.3 times largest tank	Yes; Visual (daily)
13	MPPE Feed Pumps	Pumps used to transfer wastewater from DGF to MPPE	Yes, Downstream of API separator	Yes; to be installed inside WWTP bldg concrete containment area with volume 1.3 times largest tank	Yes; Visual (daily)
14	Piping from DGF system to MPPE system	Single discharge pipeline from the MPPE Feed Pumps to MPPE system	Yes; downstream of API Separator	Yes; to be installed inside WWTP bldg concrete containment area with volume 1.3 times largest tank	Yes; Visual (daily)

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CAFO Sub Part J Compliance					
Item No.	Name	Description	Covered by CAFO?	Secondary Containment	Leak Detection
15	MPPE System	Various elevated vessels	Yes; downstream of API Separator	Yes; to be installed inside WWTP bldg concrete containment area with volume 1.3 times largest tank	Yes; Visual (daily)
16	Treated Effluent from MPPE system	Single discharge pipeline from the MPPE system to STP-1	No; RCRA non-hazardous; <0.5 mg/L benzene	None, but will be installed above ground	None
17	Off-Spec Diversion Piping from WWTP to DGF Feed Tank	Single discharge pipeline from the WWTP to DGF Feed Tank	Yes; downstream of API Separator	No; above ground; welded pipe flanges, joints and connections	Yes; Visual (daily)
18	DGF Float Tank	Elevated vessel for DGF float management	No; oil-bearing residuals exemption per 40 CFR 261.4(a)(12)	Yes; Inside curbed concrete containment adjacent WWTP bldg with volume1.3 times largest tank	Yes; Visual (daily)
19	Recovered Hydrocarbon Piping	Single discharge pipeline from the MPPE Recovered Oil Tank to pump discharge at T105	No; by-product reclaimed and exempt per 40 CFR 261.2 (c)(3)	None, but still above ground; welded pipe flanges, joints and connections	None
20	STP-1	Receives sanitary and treated process wastewater.	No; For treatment of sewage wastewaters	Yes; OCD requirement for double liners	Yes; OCD requirement for leak detection

4.5 Air Emissions Control

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

- Internal floating roofs are used to control air emissions from T35, T27 and T28.
- The existing GAC system (located near the NAPIS) will be used to control emissions from the DGF Feed Tank.
- A new iron-impregnated wood / Granular Activated Carbon (GAC) canister system will be used to control emissions from the DGF, DGF Float Tank and the MPPE Recovered Oil Tank.
- The existing flare system will be used to control emissions from both MPPE Columns, the MPPE Separator and the MPPE Buffer Tank.

Vapor sampling points will be added to the DGF emission point, MPPE emission point, GAC inlets and outlets, as previously requested by the NMED. However, routine sampling of these points are not anticipated, with the exception of the following: GAC performance will be based on results from exhaust vapor (GAC outlet) sampling and carbon replacement will be based on breakthrough calculations.

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5.0 Project Schedule

The required project schedule for design and construction of the upgraded WWTP is in accordance with the revised CAFO Milestone Schedule, recreated below.

CAFO Milestone Schedule	
1. Submit proof of procurement including vendor Acknowledgement of Order, vendor's factory order number, and estimated delivery date for DGF and MPPE units to demonstrate Respondent will comply with milestone 7 of this chart.	September 30, 2010
2. Commence construction of Equalization Tank.	September 30, 2010
3. Complete installation of Tanks 27 and 28, and Equalization Tank and ancillary equipment and connect the storm water management system to the current Waste Water Treatment System.	December 31, 2010
4. Commence operation of the storm water management system.	January 15, 2011
5. Complete measures to prevent the Old API Separator from receiving and flows, including removal of segments from, and insertion of cement plugs in, all inlet piping to the Old API Separator.[2]	March 1, 2011
6. Complete site preparation and foundations for DGF and MPPE equipment.	July 31, 2011
7. Complete installation of interconnecting piping and transfer pumps for DGF and MPPE units.	January 31, 2012
8. Complete connection of the storm water management system to the new Waste Water Treatment System and commission and Start-Up of DGF and MPPE units.	February 29, 2012
9. End of system startup grace period for achievement of all discharge limits as required by the CAFO.	May 31, 2012

[2] Such measures shall not be construed to limit the authority of the NMED with respect to corrective action at any solid waste management unit or area of concern at Respondent's facility.

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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 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.

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

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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.

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

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