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July 1, 2016

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Air Protection Division

Re: Monroe Energy, LLC – Trainer Refinery
BWON Sampling and Analysis Plan Revision Submittal
Civil Action No. H-05-0258, As Amended

Per paragraph 211(b) of the Consent Decree, Monroe Energy Trainer Refinery is submitting an updated and revised BWON Sampling and Analysis Plan that includes all uncontrolled waste stream points of generation (POG), and end of line (EOL) sample locations downstream of uncontrolled POGs that contribute towards the 6 BQ calculations and potentially contain greater than 0.05 Mg/yr of benzene.

Section 3, Table 1 of the enclosed BWON Sampling and Analysis Plan provides the updated and detailed information about each of the following proposed EOL sampling locations for water (W), hydrocarbon (H), and solids (S). The EOL sample points are categorized as (1) Routine and (2) Infrequently Generated, based on the frequency of waste generation.

Routinely generated EOL locations account for frequently generated uncontrolled wastes. These EOL points include wastewater, AWWTP recovered slop oil, recovered oil from the ship and barge docks, high benzene concentration samples from the lab tank, recovered hydrocarbon in the fuel recovery tank, and spent caustic.

Infrequently generated EOL locations are intended to account for any infrequently generated uncontrolled wastes which are not otherwise accounted for in the other routine EOL locations. These wastes may include wastes shipped offsite for treatment or disposal (e.g. sludge from the AWWTP), certain uncontrolled releases, and other wastes.

Section 3, Figure 1 identifies waste flow and frequent and infrequent EOL sampling locations.

If you have any questions about this report or need additional information, please contact Stephani Ski Szymanski, Environmental Engineer, at 610-364-8073.

Sincerely,

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Enclosure

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End-of-Line Sampling Plan

Trainer Refinery
Trainer, Pennsylvania

June 2016

Original Submission – June 30, 2006
Updated June 30, 2016

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SECTION 1
INTRODUCTION

1.1 SCOPE OF WORK

Monroe Energy ("Monroe") owns and operates the Trainer Refinery ("Trainer") in Trainer, Pennsylvania. The Trainer Refinery is subject to the ConocoPhillips Company Consent Decree ("CD"), Civil Action No. H-05-0258 filed January 27, 2005. The CD was entered into with the United States Department of Justice for alleged violations of the Clean Air Act (CAA), including the Benzene Waste Operations NESHAP (BWON) under 40 CFR 61, Subpart FF.

The CD includes enhanced benzene waste requirements in addition to the rule requirements. Per CD Section V, Part N, Paragraphs 196 to 218, the Trainer Refinery is required to develop a plan presenting a method for quantifying the waste movements in the refinery and to conduct quarterly sampling for the purpose of calculating quarterly, uncontrolled benzene quantities ("BQ") to verify compliance with the refinery's 6 Mg benzene quantity ("6 BQ") compliance option under 40 CFR §61.342(e).

As part of this requirement, the Trainer Refinery prepared and submitted to the EPA an End-of-Line Sampling Plan ("EOL Plan") designed to identify the uncontrolled benzene waste streams that will be sampled to verify the quarterly benzene quantity. The Trainer Refinery submitted the original EOL Plan on June 30, 2006.

Per Section V, Part N, Paragraph 213(a) of the CD, if changes in process, operations, or other factors lead the Trainer Refinery to conclude that the current Sampling Plan may no longer provide an accurate basis for estimating the Refinery's quarterly or annual TAB or benzene quantity under Section V, Part N, Paragraph 214, then the Trainer Refinery is to submit a revised Sampling Plan for approval. The purpose of this revised plan is to identify EOL sampling points such that, on a quarterly basis, the refinery can quantify the BQ managed by the Refinery.

As set forth in Section V, Part N, Paragraph 211 of the CD, the sampling plan must include:

i. Proposed sampling locations and methods for flow calculations at the "End-of-Line" ("EOL") of uncontrolled benzene waste streams;

ii. A simplified flow diagram that identifies significant, uncontrolled benzene waste streams that feed into each proposed sampling location;

iii. Proposed sampling, at the "point of waste generation" ("POG"), of each waste stream that contributes 0.05 Mg/yr or more (>0.05 Mg/yr POG) to Trainer's uncontrolled Benzene Quantity (BQ); and

iv. Quarterly sampling at all EOL and POG locations identified above.

This EOL Plan includes procedures, QA/QC protocols, scheduling, and methodologies to ensure the accuracy of collected data. Specifically, this EOL Plan includes the following:

- Benzene waste management systems descriptions;
- Proposed EOL and POG sample locations;
- Sampling procedures;
- Health and safety considerations; and,
- Contingency plans.

1.2 FACILITY DESCRIPTION

The Trainer Refinery, located at 4101 Post Road in Trainer, Pennsylvania is a petroleum refinery that processes approximately 185,000 barrels of crude oil per day. The refinery produces a variety of finished and intermediate petroleum products, including finished gasoline, diesel fuel, and jet fuel.

The refining processes are divided into six areas:

- Area 1 – Reforming Unit, Catalytic Hydrocracking Unit, Naphtha Hydrodesulphurization Unit, Benzene Reduction Unit, and a Propane Recovery Unit;
- Area 2 – Diesel Hydrotreater, Amine Treating Unit, Sour Water Stripper, Sulfur Recovery Unit, Tail Gas Treating Unit, Boiler House, Flare System, and Cooling Tower Unit;
- Area 3 – Crude Oil Distillation Units, Brine Treatment Unit, Vacuum Distillation Unit, a Diesel Hydrotreater, and Low Line Compressor Unit;
- Area 4 – Fluidized Catalytic Cracking ("FCC") Unit and HF/Alkylation Unit;
- Area 5 – Wastewater Treatment Operations and Bulk Petroleum Storage; and,
- Area 6 – Gasoline Blending Facilities, Storage and Transfer Systems, and the Marine Facilities.

1.3 COMPLIANCE OPTION STATUS

As set forth in Section V, Part N, Paragraph 172 of the CD, the Trainer Refinery was subject to the 2 Mg/yr Benzene Quantity ("2 BQ") Compliance Option under 40 CFR §61.342(c) and (c)(3)(ii). During the CD-required one-time Review and Verification that was completed on May 30, 2006, it was determined that the refinery exceeded the 2 Mg/yr threshold. On September 28, 2006, the Trainer Refinery submitted a Compliance Plan for complying with the Benzene Waste Operations NESHAP at the site; which included adopting the 6 Mg/yr Benzene Quantity Compliance Option under 40 CFR §61.342(e) in lieu of the 2 Mg/yr option.

This "6 BQ Compliance Option" or "Treat-to-Target Option" allows the Trainer Refinery to manage BWON-regulated aqueous waste that contains up to an aggregate total of 6 Mg per year of benzene in uncontrolled waste management units. The reported Total Annual Benzene ("TAB") and uncontrolled benzene quantity are based on refinery knowledge, maintenance practices, and waste stream sampling.

SECTION 2
WASTE MANAGEMENT SYSTEMS

The following discussions outline the benzene waste collection, treatment, and disposition systems used at the Trainer Refinery. Figure 1 shows the entire system with the proposed EOL and >0.05 Mg/yr uncontrolled POG sampling points.

2.1 SLOP OIL SYSTEM

The majority of slop oil at the refinery is charged to Slop Oil Tanks T-68 and T-184. These tanks contain wet slop oil (i.e., greater than 10% water) produced at the refinery from sources such as knockout drums, process unit slop oil waste, high benzene laboratory samples, and vacuum truck disposal wastes containing greater than 10% oil. Oil from these two tanks is recharged to the Crude Units via Crude Oil Tankage (T-93 and T-94); water from Slop Oil Tanks T-68 and T-184 generally requires treatment, and is routed through the Sour Water System.

2.2 WASTEWATER CONVEYANCE

Wastewater is collected throughout the refinery via an uncontrolled process water sewer system. The process water sewer system consists of the North and South Side systems, which converge at the API Separator. Water from the API Separator is routed to the Advanced Wastewater Treatment Plant ("AWWTP"). The AWWTP includes primary, secondary, and tertiary treatment. The treated water is eventually discharged from the Final Sand Filters in accordance with Trainer Refinery's National Pollution Discharge Elimination System ("NPDES") Permit Number PA0012637.

Oil is skimmed from the API Separator and routed to Slop Oil Tanks T-83, T-312, and T-313 in the emulsion plant. The emulsion plant consists of a series of recovered oil tanks that separate water and solids from oil through the use of emulsion-break chemicals, gravity and heat. Oil recovered from the emulsion tanks is transferred to the slop oil system prior to being sent to the Crude Units via Crude Oil Tankage (T-93 and T-94). Water can be drawn from the Slop Oil Tanks (T-83, T-312, and T-313) and routed back to the API Separators.

2.3 SOUR WATER SYSTEM

Sour water is collected throughout the Refinery and conveyed to the Sour Water Flash Drum (34-V-4) via the Sour Water Charge Tanks (T-113, T-114) or directly to the Sour Water Storage Tank (34-T-1). The overhead from the Sour Water Flash Drum and SW Storage Tank are routed to either the Low Line System or the Flare System. From the Sour Water Flash Drum, sour water is charged to the Sour Water Stripper (34-C-1) via the Sour Water Storage Tank. Stripped sour water is recycled to the Crude Units at the Hotwell (D-405), where it is used as desalter washwater, or it can be sent to the process water sewer system, which is not controlled for BWON purposes. The overhead from the Sour Water Stripper is recycled back into the process at the Stripper Accumulator (34-V-2) via the Stripper Condenser (34-E-2) or it can be routed to

the flare. Hydrocarbons are skimmed from the Sour Water Charge Tanks and routed to the slop oil tanks.

2.4 SPENT CAUSTIC SYSTEM

Spent caustic is generated in the HF/Alkylation Process Unit. Spent caustic collects in the Spent Caustic Tank (T-6020/P7555), which is an uncontrolled fixed roof atmospheric tank that vents to the atmosphere, prior to being sent off site.

2.5 WASTE SHIPPED OFFSITE

Solid waste is shipped offsite for disposal. Hazardous waste is sent offsite to treatment, storage, or disposal facilities (TSDF).

2.6 SEGREGATED STORMWATER CONVEYANCE

Rainwater is collected throughout the refinery in a segregated stormwater sewer system. The non-contact rainwater is discharged in accordance with Trainer Refinery's NPDES Permit Number PA0012637.

SECTION 3
SAMPLING LOCATIONS

The purpose of the CD-mandated sampling is to verify Trainer's estimated uncontrolled benzene quantity and ensure compliance with the 6BQ compliance option. Quarterly sampling of >0.05 Mg/yr POG sampling points and EOL waste streams will help verify the uncontrolled BQ estimated for the sampled streams by allowing a comparison of estimated and sampled values. Quarterly sampling can also help troubleshoot process problems or identify unanticipated benzene sources. Sampled benzene waste quantities exceeding 6 Mg/yr would indicate non-compliance with the 6 BQ compliance option.

The CD requires sampling of all points of waste generation that contribute greater than 0.05 Mg/yr to Trainer's uncontrolled BQ. Point of waste generation is defined in the BWON as, *"the location where the waste stream exits the process unit component or storage tank prior to handling or treatment in an operation that is not an integral part of the production process, or in the case of waste management units that generate new wastes after treatment, the location where the waste stream exits the waste management unit component." [40 CFR §61.341]*

Although "End-of-Line" is not clearly defined in either the BWON or the Consent Decree, EOL locations are understood to be uncontrolled waste stream locations downstream of uncontrolled POGs where one or more waste streams can be sampled at a combined location to quantify the refinery's total, uncontrolled "End-of-Line" benzene waste contribution prior to being shipped offsite, treated, controlled, destroyed, or recycled back to process.

Waste streams that are not conveyed in controlled individual drain systems or treated in controlled waste management units are included as proposed sample points in the plan. Trainer will use sampling data to perform quarterly calculations of the uncontrolled BQ as required by the Consent Decree. The benzene quantity at each sample location will be calculated using sampling data collected during the quarterly sampling event.

3.1 END-OF-LINE SAMPLE LOCATIONS (ROUTINE AND INFREQUENT)

Figure 1 shows the EOL sampling points, as well as a more complete waste flow diagram.

Table 1 provides detailed information about each of the following proposed EOL sampling locations for water (W), hydrocarbon (H), and solids (S). The EOL sample points are categorized as routine or infrequently generated, based on the frequency of waste generation.

- Routine EOL Locations:
    - 1W/H – Equalization Tank;
    - 2W/H – AWWTP Slop Tanks;
    - 3H – Barge Dock Pan;
    - 4H – Ship Dock Pan;

- 5H – Lab Tank;
- 6H – Fuel Recovery Tank; and
- 7W/H – Spent Caustic Tank.

- Infrequently Generated EOL Locations:
  - 8S – API Filter Press;
  - 9S – Biosolids Filter Press;
  - 10S – Miscellaneous Solid Waste; and
  - 11W/H – Spills.

The basis of inclusion or sampling approach for each end of line location is provided in the following sections.

3.1.1 Routine EOL Locations

Routinely generated EOL locations account for frequently generated uncontrolled wastes. These EOL points include wastewater, AWWTP recovered slop oil, recovered oil from the ship and barge docks, high benzene concentration samples from the lab tank, recovered hydrocarbon in the fuel recovery tank, and spent caustic.

Note: Three representative samples of each routine EOL point will be collected and analyzed during each quarter. However, there may be circumstances that prevent the collection of samples at a particular sample location. These situations may include, but are not limited to, insufficient waste quantity to sample, hazardous conditions in the unit, or other health and safety concerns. Due to health and safety concerns, samples will not be collected at the lab tank and spent caustic tank.

3.1.1.1 *Equalization Tank*

The process water sewer system, which is used to convey wastewater throughout Trainer Refinery, converges at the API Separator. At the API Separator, wastewater is routed to AWWTP via the Equalization Tank (90-T-401) and recovered oil is diverted to the slop system via the AWWTP Slop Tanks (T-83, T-312, and T-313) in the emulsion plant. The Equalization Tank sampling location accounts for the benzene quantity from the wastewater leaving the Equalization Tank and entering the BIOX Tank (Aeration Tank). An aqueous and hydrocarbon (when present) sample of the waste stream should be taken prior to the wastewater entering the BIOX Tank.

3.1.1.2 *AWWTP Slop Tanks*

The process water sewer system, which is used to convey wastewater throughout Trainer Refinery, converges at the API Separator. At the API Separator, wastewater is routed to AWWTP via the Equalization Tank (90-T-401) and recovered oil is diverted to the slop system via the AWWTP Slop Tanks (T-83, T-312, and T-313) in the emulsion plant. The AWWTP

Slop Tanks sampling location accounts for benzene quantity from the slop oil recovered in the emulsion plant. An aqueous (when present) and hydrocarbon sample of the waste stream should be taken at a location that is representative of T-83, T-312, and T-313.

3.1.1.3 *Barge Dock Pan*

The Barge Dock Pan collects wastes associated with loading and unloading operations at the barge dock. The material is temporarily stored in the pan prior to being pumped directly to the crude storage tanks. A hydrocarbon sample of the waste stream should be taken when there is sufficient material in the dock pan to collect the sample.

3.1.1.4 *Ship Dock Pan*

The Ship Dock Pan collects wastes associated with loading and unloading operations at the ship dock. The material is temporarily stored in the pan prior to being pumped directly to the crude storage tanks. A hydrocarbon sample of the waste stream should be taken when there is sufficient material in the dock pan to collect the sample.

3.1.1.5 *Lab Tank*

The Lab Tank collects high benzene, light oil fractions that are discarded after analysis from the refinery laboratory. The material is temporarily stored in the tank prior to being removed by vacuum truck and transferred to the slop oil tanks (T-68/T-184).

Note: The Lab Tank does not have a sampling port. As a result, there is no safe way to sample the waste. Therefore, a sample will not be taken at this point. Instead, the flow-weighted annual average benzene concentration will be calculated based on the laboratory sampling schedule.

3.1.1.6 *Fuel Recovery Tank*

The Fuel Recovery Tank (81-V-2) collects gasoline waste in the gasoline blending area. The waste is generated from the blender knock engines, proto fuel tanks, composite sampler, and gas sample filters. The material is temporarily stored in the tank prior to being removed by vacuum truck and transferred to the Slop Oil Tanks (T-68/T-184). A hydrocarbon sample of the waste stream should be taken.

3.1.1.7 *Spent Caustic Tank*

The Spent Caustic Tank (T-6020/P7555) collects spent caustic generated in the HF/Alkylation Unit. The material is temporarily stored in the tank prior to being sent offsite to a TSDF.

Note: The Spent Caustic Tank does not have a sampling port. As a result, there is no safe way to sample the waste. Therefore, a sample will not be taken at this point. Instead, the flow-weighted annual average benzene concentration will be calculated based on process knowledge.

3.1.2 Infrequently Generated EOL Locations

Infrequently generated EOL locations are intended to account for any infrequently generated uncontrolled wastes which are not otherwise accounted for in the other routine EOL locations. These wastes may include wastes shipped offsite for treatment or disposal (e.g. sludge from the AWWTP), certain uncontrolled releases, and other wastes.

Note: Benzene sampling of infrequently generated EOL points occurs as needed, but no less frequent than **annually**, when previous characterization data is not available. However, there may be circumstances that prevent the collection of samples at a particular sample location. These situations may include, but are not limited to, insufficient waste quantity to sample, hazardous conditions in the unit, or other health and safety concerns.

3.1.2.1 *API Filter Press*

Hazardous solid waste from the Sludge Dewatering System that services the API Separator is removed from the AWWTP at the outlet of the API Filter Press. The material is temporarily stored prior to being sent offsite to a hazardous waste treatment, storage, or disposal facility (TSDF). A solid sample of the waste stream should be taken (when available).

3.1.2.2 *Biosolids Filter Press*

Solid waste from the Sludge Dewatering System that services the BIOX Tank and Clarifiers is removed from the AWWTP at the outlet of the Biosolids Filter Press. The material is temporarily stored prior to being sent offsite to a waste treatment, storage, or disposal facility (TSDF). A solid sample of the waste stream should be taken (when available).

3.1.2.3 *Miscellaneous Solid Waste*

Solid wastes that are shipped offsite can be sent to TSDFs that do not meet the BWON control standards. The waste quantity and benzene concentration of these wastes are tracked by the Trainer Environmental Department on a shipment-by-shipment basis. A solid sample of the waste stream should be taken (when available, practicable, and safe).

3.1.2.4 *Spills*

Spills, which occur throughout the refinery, are considered uncontrolled waste streams. An aqueous and hydrocarbon sample of the waste stream should be taken (when available, practicable, and safe).

3.2 UNCONTROLLED POG LOCATIONS CONTRIBUTING > 0.05 MG/YR TO 6 BQ

Five uncontrolled waste streams were identified in the 2015 TAB Report as contributing greater than the trigger level of 0.05 Mg/yr benzene to the BQ. These streams are required to be included in EOL Plan per Section V, Part N, Paragraph 211(c) of the CD. In subsequent years,

the TAB Report should be reviewed to determine if additional streams should be added or removed from the EOL Plan. Figure 1 identifies these sampling points, while Table 2 summarizes each point and the method for flow rate determination for each stream contributing to the BQ. The seven streams include:

- 12H – Light Reformate Product Drainage to Barge Dock Pan;
- 13H – Heavy Reformate Product Drainage to Barge Dock Pan;
- 14W/H – Brine Stripper Effluent;
- 15W/H – Crude Tank (T-95) Water Draw; and
- 16W/H – Crude Tank (T-96) Water Draw.

The basis of inclusion or sampling approach for each POG is provided in the following sections.

3.2.1 Light Reformate Product Drainage to Barge Dock Pan

The Barge Dock Pan collects waste associated with loading operations in light reformate service at the barge dock. The material is temporarily stored in the pan prior to being pumped directly to the crude storage tanks. A hydrocarbon sample of the waste stream should be taken. This sample should be taken at the same location as the Barge Dock Pan EOL Point.

3.2.2 Heavy Reformate Product Drainage to Barge Dock Pan

The Barge Dock Pan collects waste associated with loading operations in heavy reformate service at the barge dock. The material is temporarily stored in the pan prior to being pumped directly to the crude storage tanks. A hydrocarbon sample of the waste stream should be taken. This sample should be taken at the same location as the Barge Dock Pan EOL Point.

3.2.3 Brine Stripper Effluent to Process Water Sewer

Wastewater from the 543 and 544 Crude Unit Desalters is treated in the Brine Treatment Unit prior to being discharged to the process water sewer system. The oil and water phases within the wastewater are separated in the Brine Flash Drum (01-V-10). Oil is recycled back to the Crude Units and the residual volatile organics in the water are removed at the Brine Stripper (01-C-10). The stream should be sampled at the outlet of the Brine Stripper. An aqueous and hydrocarbon sample of the waste stream should be taken.

3.2.4 Crude Tank (T-95) Water Draw

Waste associated with tank water draws from the Crude Storage Tank (T-95) is discharged to the process water sewer system. An aqueous and hydrocarbon sample of the waste stream should be taken.

3.2.5 Crude Tank (T-96) Water Draw

Waste associated with tank water draws from the Crude Storage Tank (T-96) is discharged to the process water sewer system. An aqueous and hydrocarbon sample of the waste stream should be

taken.

3.3 SAMPLING POINTS REMOVED FROM THE EOL PLAN

The TAB Report should be reviewed on an annual basis to determine if additional streams should be added to or removed from the sampling plan. EOL and POG streams that have been removed from the original sampling plan, which was submitted on June 30, 2006, are recorded here for reference. The stream description and justification for removing these streams from the sampling plan are listed below:

3.3.1 AWWTP Influent (North/River Side and South/River Side)

The AWWTP Influent (North/River Side) and AWWTP Influent (South/River Side) sample points were removed from the EOL Sampling Plan in June 2016. These points were replaced with the Equalization Tank and AWWTP Slop Tanks EOL Points, which are aggregated sampling locations for process wastewater and recovered slop oil from the North and South Side Sewer Systems.

3.3.2 Sour Water Stripper Outlet

Process wastewater associated with the Sour Water Stripper (34-C-1) outlet did not exceed the 0.05 Mg/yr threshold in the CY2015 TAB Report. Therefore, the Sour Water Stripper Outlet sample point was removed from the EOL Sampling Plan in June 2016.

3.3.3 Tank 162, 166, 174, 175, and 181 Water Draws

Waste streams associated with T-162, T-166, T-174, T-175, and T-181 did not exceed the 0.05 Mg/yr threshold in the CY2015 TAB Report. According to Area 5 and Area 6 operations staff, waste generated from Crude Tank water draws primarily occurs at T-95 and T-96. Water draws at T-162, T-166, T-174, T-175, and T-181 rarely occur. Therefore, the Tank 162, 166, 174, 175, and 181 water draw sample points were removed from the EOL Sampling Plan in June 2016.

3.3.4 Knock Engines in Laboratory

Waste associated with knock engines in the laboratory did not exceed the 0.05 Mg/yr threshold in the CY2015 TAB Report. According to the laboratory staff, the knock engines in the lab area were replaced in 2014. The new knock engines do not produce residual waste. Therefore, the Knock Engines in Laboratory sample points were removed from the EOL Sampling Plan in June 2016.

SECTION 4
WASTE STREAM FLOW ESTIMATES

4.1 FLOW MONITORING TECHNIQUES

Waste stream flow rates and volumes for the sample locations will be based on direct measurements and process knowledge. One or more of the techniques listed below will be used to determine the waste stream flow rate:

- Direct measurements
  - Flow meters;
  - Marine transfer records;
  - Waste shipped offsite records;
  - Incident reports;
  - Slop oil movement records; or
  - Crude oil movement records.
- Process knowledge
  - Unit operator, engineer, or supervisor interviews;
  - Sampling schedule; or
  - Historical TAB Reports.

As a baseline, 2015 flow rates are listed for each point in Tables 1 and 2. The flow basis, a description, and estimated flow rate is provided.

4.2 FLOW RATE UPDATES

Flow rates for each sampling point will be reviewed on an annual basis and updated as required to reflect changes in processes, operations, or other factors that would affect the waste stream flow rate.

SECTION 5
SAMPLING PROCEDURES

5.1 SAMPLING PROCEDURE OVERVIEW

The Benzene Waste Operations NESHAPs (BWON) Sampling Procedure documents the procedure for obtaining and sampling benzene waste. Individuals tasked with the collection of samples described in this Plan are trained in this procedure for collecting BWON samples. These individuals undergo annual refresher training per CD Section V, Part N, Paragraphs 202 to 205.

At a minimum, three representative samples of each identified waste stream are required to be collected and analyzed during each quarter. There may, however, be circumstances that prevent the collection of all three samples at a particular sample location. Those situations may include, but are not limited to, equipment downtime, infrequently generated waste, insufficient waste quantity to sample, hazardous conditions in the unit, other health and safety concerns, and weather events such as hurricanes, tornadoes, or flooding. In situations where the process stream may not contain the expected aqueous or organic phase, Trainer will use the best available data that represents the benzene quantity for the sampling point. This best available data may include using previous sample results, waste profiles, process data, and/or the next reasonable sampling event as a substitute for the missed sample(s).

As previously mentioned in Section 3.1.1, benzene sampling of waste in the Lab Tank and Spent Caustic Tank will not occur due to health and safety reasons. Furthermore, as mentioned in Section 3.1.2, benzene sampling of infrequently generated EOL points occurs as needed, but no less frequent than **annually**, when previous characterization data is not available.

The variety of waste streams and locations will require different sampling techniques. The recommended sampling technique will be to collect samples in accordance with requirements codified in 40 CFR §61.355(c)(3) and in accordance with USEPA Method 25D. Trainer will use the following techniques for collecting samples:

- Cooler Sampling – Cooler samples will be collected in a condensing cooler equipped with a cooling coil that meets the requirements in the BWON. Samples will be collected prior to the waste being exposed to the atmosphere to minimize the loss of benzene. Prior to the initiation of sampling, sample lines and the cooling coil shall be purged with at least four volumes of waste. After purging and prior to sample collection, ice will be placed in the cooler to chill the sample to less than 10°C (50°F). The sample flow shall then be directed to a sample container and the tip of the sampling tube shall be kept below the surface of the waste (i.e. submerged fill) during sampling to minimize contact with the atmosphere. Samples shall be collected at a flow rate such that the cooling coil is able to maintain a waste temperature less than 10°C. Documentation demonstrating the installation of an in-line static mixer shall be provided for each sample point.
- Grab Sampling – Where cooler sampling is not practicable, samples will be collected in a

manner that minimizes the loss of volatile organic compounds. Samples collected from certain locations will be collected in a disposable bailer. The sample will then be immediately transferred from the bailer to 40 ml VOA vials by funnel. Other grab sample locations may not require the use of a bailer. In this case, the sample container may be directly filled from a sample tap, valve, or by submersion.

- Non-Routine Samples – Non-routine samples will be collected in 40 ml VOA vials or quart sample containers. If quart sample containers are used, both aqueous and organic phases will be transferred to VOA vials prior to being placed into a cooler for transfer to the lab for analysis. Solid samples (e.g., sludge, contaminated soil, etc.) will be collected in quart containers.

5.2 WASTE STREAM CHARACTERISTICS

For each sampling point, the following information should be measured during the sampling process:

- Benzene concentration of the aqueous, hydrocarbon, and solid phases;
- Phase-cut (aqueous, hydrocarbon, and solid fractions); and,
- Density of the aqueous, hydrocarbon, and solid phases.

To estimate the phase-cut of the sample, a graduated cylinder should be filled and left undisturbed for approximately 24 hours at room temperature to allow for gravity separation of the oil and water phases. (Note that this sample should not be the same sample that is analyzed for benzene concentration.)

For sampling events where the hydrocarbon phase is not sampled but is present, a multiplier of 125 may be used to estimate the benzene concentration in the hydrocarbon phase based on the concentration in the aqueous phase. For sampling events where the aqueous phase is not sampled but is present, a multiplier of 1/100 may be used to estimate the benzene concentration in the aqueous phase based on the concentration in the hydrocarbon phase.

5.3 BWON LABORATORIES

Waste stream samples will be analyzed by an audited, approved laboratory. Under Section V, Part N, Paragraphs 196 – 200 of the CD, the Trainer Refinery must perform an initial audit of any new laboratory prior to initial analyses of BWON samples prior to such use. Additionally, Trainer is required to perform subsequent audits of such laboratories once every two (2) years to ensure continuing compliance. The audit will be conducted to verify that proper analytical and quality assurance/quality control procedures are followed.

5.4 LABORATORY ANALYSIS

In accordance with the BWON, waste stream samples may be analyzed by USEPA Methods 8020, 8021, 8240, 8260, 602, or 624.

SECTION 6
EOL CALCULATION METHODOLOGY

The estimated total annual uncontrolled BQ will be calculated as the sum of the aqueous (water), hydrocarbon, and solid phases at each of the EOL sample points, using the following equation:

EOL BQ = 1W + 1H + 2W + 2H + 3H + 4H + 5H + 6H + 7W + 7H + 8S + 9S + 10S + 11W + 11H

These points represent the sampling locations, identified earlier in Section 3, that collectively represent the total uncontrolled EOL benzene quantity for the Trainer Refinery. The EOL BQ for each point shall be calculated using the equation below:

$$EOL\ BQ = \sum_{i=1}^{n} C_i\ x\ Q_i\ \ x\ 10^{-6}$$

Where:

EOL BQ = Total uncontrolled annual waste quantity (Mg/yr);
n = Number of EOL Points;
C_i= Flow-weighted annual average (FWAA) benzene concentration of waste stream "i", ppm_w;
Q_i = Total annual waste stream quantity of waste stream "i", Mg/yr; and,
10^{-6} = ppm_w correction factor.

Per 40 CFR §61.355, the FWAA benzene concentration is calculated by averaging the results of the sample analyses as follows:

$$\bar{C} = \frac{1}{Q_t} \times \sum_{i=1}^{n} (Q_i)(C_i)$$

Where:
C = FWAA benzene concentration for waste stream (ppm_w);
Q_t = Total annual waste quantity for waste stream (kg/yr);
n = Number of waste samples (at least three);
Q_i = Annual waste quantity for waste stream represented by C_i (kg/yr); and,
C_i = Measured concentration of benzene in waste sample i, (ppm_w).

These calculation methodologies do not factor in volatilization of benzene in the oily water sewer system.

SECTION 7
HEALTH AND SAFETY CONSIDERATIONS

Sample collection personnel must meet all current safety requirements of the Trainer Refinery. The Trainer Refinery requires site-specific health and safety training before individuals are allowed on site.

The site-specific health and safety training is conducted initially and requires refresher training to be completed as needed. In addition, samplers must be trained initially, prior to their assumption of duty, and annually thereafter per Section V, Part N, Paragraph 202 and 205 of the CD.

Prior to sample collection, individuals collecting samples must inform the unit operators of the sampler's task, locations of sampling points, and sampling procedures. The collector must not commence work until an authorized unit operator gives permission.

Hazards associated with sample collection can include, but are not limited to, exposure to benzene, hydrofluoric acid, hydrogen sulfide, rotating equipment, high noise, eye and face exposure to hazardous chemicals, and high temperatures and pressures. Appropriate personal protective equipment (PPE), as required by the Trainer Refinery safety procedures, will be used. Examples of PPE and personal exposure monitors to be worn by the sampler include:

- Protective Gloves (Leather and Nitrile);
- Steel-toed work boots;
- Safety glasses with side-shields, safety goggles, or face shield (as necessary);
- Hearing protection;
- Personal H2S Monitor;
- Hard hat;
- Fire retardant clothing (NOMEX); and,
- Respirator and a combination acid gas and organic vapor cartridge.

SECTION 8
CONTINGENCY PLAN

The Trainer Refinery is required to use the quarterly sampling results for BQ verification. The sample results and flow estimates will be used to calculate a quarterly uncontrolled benzene quantity and a projected calendar year uncontrolled benzene quantity.

8.1 CONTINGENCY PLAN

In the event that sample analysis indicates a higher benzene concentration than anticipated during normal operation, the following steps will be taken to confirm that the affected waste stream is properly represented in the quarterly 6 BQ calculations:

- Review the sampling location to determine if the sample is representative of the waste stream;
- Review sample handling to assess the potential for contamination;
- Review the laboratory QA/QC to identify lab error or results outside of method/analytical limits;
- Review other factors that may influence the validity of the measured concentration; and,
- Analyze one or more additional samples to establish a representative benzene concentration. If more than one sample is analyzed, the average benzene concentration will be used.

If analytical results indicate that the quarterly uncontrolled benzene quantity exceeds 1.5 Mg/yr or the projected calendar year uncontrolled benzene quantity exceeds 6 Mg/yr as defined by Section V, Part N, Paragraph 215 of the CD, Trainer Refinery will submit a compliance assurance plan and schedule of corrective actions to ensure the Refinery complies with the BWON regulation for the calendar year, as per Section V, Part N, Paragraph 217 of the CD. In addition, Trainer will take appropriate corrective action, which may include, but not be limited to the following:

- Investigate to identify contributing sources and appropriate controls; and,
- Consider implementing controls on uncontrolled waste streams.

8.2 EOL PLAN UPDATES

The EOL Plan will be reviewed on an annual basis and updated as required to reflect changes in processes, operations, or other factors that would affect the refinery's accuracy in measuring its quarterly BQ in its uncontrolled benzene-containing waste streams. When new construction occurs, benzene waste streams will be evaluated for BWON and CD applicability. Process changes will be reviewed to determine how the changes affect benzene-containing waste streams, and if new waste streams are generated or eliminated. Additionally, the TAB Report

should be reviewed annually to determine if points of waste generation should be added or removed from the EOL Plan, based on the 0.05 Mg/yr uncontrolled benzene quantity threshold.

As per Section V, Part N, Paragraph 213(b) of the CD, if changes in process, operations, or other factors are identified during this review that lead the Trainer Refinery to conclude that the current sampling may no longer provide an accurate basis for estimating the quarterly or annual BQ, then by no later than ninety (90) days, Trainer will submit a revised plan for EPA approval. Trainer will implement this plan in the first full calendar quarter following submittal to the EPA and will continue to implement the plan unless and until EPA disapproves of the revised plan.

TABLES

FIGURES

APPENDIX A
CONSENT DECREE EXCERPTS

The Trainer Refinery is subject to the ConocoPhillips Company CD, Civil Action No. H-05-0258 filed January 27, 2005. The CD was entered into with the United States Department of Justice for alleged violations of the CAA, including the BWON under 40 CFR 61, Subpart FF. The CD includes enhanced benzene waste requirements in addition to the rule requirements. The applicable EOL Plan, training, and sampling requirements are included in CD Section V, Part N, Paragraphs 196 to 218. The requirements are documented below:

196. Laboratory Audits (Paragraphs 196 – 200). COPC will conduct audits of all laboratories that perform analyses of COPC's benzene waste NESHAP samples to ensure that proper analytical and quality assurance/quality control procedures are followed.

197. By no later than September 30, 2005, COPC will complete at least three audits of laboratories used by it. By March 31, 2006, COPC will complete audits of all other laboratories used by it. After March 31, 2006, COPC will audit any new laboratory to be used for analyses of benzene waste NESHAP samples prior to such use.

198. If COPC has completed an audit of any laboratory on or after June 30, 2003, COPC will not be required to perform additional audits of those laboratories pursuant to Paragraph 197, above.

199. During the life of this Consent Decree, COPC will conduct subsequent laboratory audits, such that each laboratory is audited every two (2) years.

200. COPC may retain third parties to conduct these audits or use audits conducted by others as its own, but the responsibility and obligation to ensure that its Refineries comply with this Consent Decree and Subpart PF are solely COPC's.

201. Benzene Spills. Beginning On the Date of Entry, for each spill at each Covered Refinery, COPC will review such spills to determine if more than 10 pounds of benzene waste was generated in any twenty-hour (24) hour period. COPC will include the benzene generated by such spills in the TAB and in the uncontrolled benzene quantity calculations for each Refinery in accordance with the applicable compliance option as required by Subpart FF.

202. Training. By no later than April 1, 2005, COPC will develop and begin implementation of annual (i.e. once each calendar year) training for all employees asked to draw benzene waste samples at each of the Covered Refineries.

203. Training: All but the Rodeo and Santa Maria Refineries. By no later than June 30, 2005, for all Covered Refineries except Rodeo and Santa Maria, COPC will complete the development of standard operating procedures for all control equipment used to comply with the Benzene Waste Operation NESHAP. By no later than March 31, 2006, COPC will complete an initial

training program regarding these procedures for all operators assigned to this equipment. Comparable training will also be provided to any persons who subsequently become operators, prior to their assumption of this duty. Until termination of the Decree, "refresher" training in these procedures will be performed at a minimum on a three (3) year cycle.

204. Training: Rodeo and Santa Maria Refineries. The Rodeo and Santa Maria Refineries will comply with the provisions of Paragraph 203 if and when their TABs reach 10 Mg/yr. COPC will propose a schedule for training at the same time that COPC proposes a plan, pursuant to Paragraph 180, that identifies the compliance strategy and schedule that COPC will implement to come into compliance with the 6 BQ compliance option.

205. Training: Contractors. As part of COPC's training program, COPC must ensure that the employees of any contractors hired to perform the requirements of Paragraphs 202 and 203 are properly trained to implement all applicable provisions of the Section V.N.

206. Waste/Slop/Off-Spec Oil Management: Schematics. By no later than September 30, 2005, for the Bayway, Borger, Ferndale, LAR Carson, Rodeo and Santa Maria Refineries, and by no later than March 31, 2006, for the Alliance, LAR Wilmington, Sweeny, Trainer, and Wood River Refineries, COPC will submit to EPA and the Applicable Co-Plaintiff schematics for each Refinery that: (a) depict the waste management units (including sewers) that handle, store, and transfer waste, slop, or off-spec oil streams; (b) identify the control status of each waste management unit; and (c) show how such oil is transferred within the Refinery. COPC will include with the schematics a quantification of all uncontrolled waste, slop, or off-spec oil movements at the Refinery. If requested by EPA, COPC will submit to EPA within ninety (90) days of the request, revised schematics regarding the characterization of these waste, slop, off-spec oil streams and the appropriate control standards.

207. Waste/Slop/Off-Spec Oil Management: Non-Aqueous Benzene Waste Streams. All waste management units handling non-exempt, non-aqueous benzene wastes, as defined in Subpart FF, will meet the applicable control standards of Subpart FF.

208. Waste/Slop/Off-Spec Oil Management: Aqueous Benzene Waste Streams. For purposes of calculating each Refinery's TAB pursuant to the requirements of 40 C.F.R. §61.342(a), COPC will include all waste/slop/off-spec oil streams that become "aqueous" until such streams are recycled to a process or put into a process feed tank (unless the tank is used primarily for the storage of wastes). Appropriate adjustments will be made to such calculations to avoid the double-counting of benzene. For purposes of complying with the 2 Mg or 6 BQ compliance option, all waste management units handling benzene waste streams will either meet the applicable control standards of Subpart FF or will have their uncontrolled benzene quantity count toward the applicable 2 Mg or 6 BQ limit.

209. Benzene Waste Operations Sampling Plans: General. COPC will. submit to EPA for approval, with a copy to the Applicable Co-Plaintiff, benzene waste operations sampling plans designed to describe the sampling of benzene waste streams that COPC will undertake to estimate quarterly and annual TABs (for the Refineries with TABs of under 10 Mg/yr) or

quarterly and annual uncontrolled benzene quantities (for the Refineries under the 6 BQ or 2 Mg compliance options).

210. Benzene Waste Operations Sampling Plan: Due Dates for Submission. COPC will submit the sampling plans by no later than the following dates for the following Refineries:

Bayway, Borger, Ferndale LAR Carson, Rodeo, Santa Maria	12/31/05
Alliance, LAR Wilmington, Sweeny, Trainer, Wood River	6/30/06

211. Benzene Waste Operations Sampling Plans: Content Requirements.

a) Santa Maria and Rodeo (TABs of under 10 Mg/r). The sampling plans for the Santa Maria and Rodeo Refineries will identify:

i) All waste streams that contributed 0.05 Mg/yr or more to the previous year's TAB calculations; and

ii) The proposed sampling locations and methods for flow calculations to be used in calculating projected quarterly and annual TAB calculations under the terms of Paragraph 214.

The sampling plan will require COPC to take, and have analyzed, in each calendar quarter, at least three representative samples from all waste streams identified in Subparagraph (a)(i) and all locations identified in Subparagraph (a)(ii).

b) Alliance, Borger, LAR Carson, LAR Wilmington, Sweeny, and Wood River (6 BQ Compliance Option). The sampling plans for the Alliance, Borger, LAR Carson, LAR Wilmington, Sweeny and Wood River Refineries will identify:

i) All uncontrolled waste streams that count toward the 6 BQ calculation and contain greater than 0.05 Mg/yr of benzene; and

ii) The proposed sampling locations and methods for flow calculations to be used in calculating projected quarterly and annual uncontrolled benzene quantity calculations under the terms of Paragraph 214.

The sampling plan will require COPC to take, and have analyzed, in each calendar quarter, at least three representative samples from all waste streams identified in Subparagraph (b)(i) and all locations identified in Subparagraph (b)(ii).

c) Bayway, Ferndale, and Trainer (2 Mg. Compliance Option). The sampling plans for the Bayway, Ferndale, and Trainer Refineries will identify:

i) All uncontrolled waste streams that count toward the 2 Mg calculation and contain greater than 0.05 Mg/yr of benzene;

ii) All uncontrolled waste streams that qualify for the 10 ppmw exemption (40 §61.342(c)(2)) and contain greater than 0.1 Mg/yr of benzene; and

iii) The proposed sampling locations and methods for flow calculations to be used in calculating projected quarterly and annual uncontrolled benzene quantity calculations under the terms of Paragraph 214.

The sampling plan will require COPC to take, and have analyzed, in each calendar quarter, at least three representative samples from all waste streams identified in Subparagraphs (c)(i) and (c)(ii) and all locations identified in Subparagraph (c)(iii).

d) Refineries that Must Implement Compliance Plans under Paragraphs 172 and 180. For any Covered Refinery that must implement a compliance plan under either Paragraph 179 or 180, COPC may submit a proposed sampling plan that does not include sampling points in locations within the Refinery that are subject to changes proposed in the compliance plan. To the extent that COPC believes that sampling at a Covered Refinery which will be under a compliance plan will not be effective until COPC completes implementation of the compliance plan, COPC, by no later than sixty (60) days prior to the due date for the submission of the sampling plan, may ask for EPA's approval in postponing submitting a sampling plan and commencing sampling until the compliance plan is completed. Unless EPA provides its approval, COPC will submit a plan by the due date in Paragraph 210

212. Benzene Waste Operations Sampling Plans: Timing for Implementation. COPC will implement the sampling required under each sampling plan during the first full calendar quarter after COPC submits the plan for the Refinery. COPC will continue to implement the sampling plan (i) unless and until EPA disapproves the plan; or (ii) unless and until COPC modifies the plan, with EPA's approval, under Paragraph 213.

213. Benzene Waste Operations Sampling Plans: Modifications.

a) Changes in Processes, Operations, or Other Factors. If changes in processes, operations, or other factors lead COPC to conclude that a sampling plan for a Covered Refinery may no longer provide an accurate basis for estimating that Refinery's quarterly or annual TABs or benzene quantities under Paragraph 214, then by no later than ninety (90) days after COPC determines that the plan no longer provides an accurate measure, COPC will submit to EPA and the Applicable Co-Plaintiff a revised plan for EPA approval. In the first full calendar quarter after submitting the revised plan, COPC will implement the revised plan. COPC will continue to implement the revised plan unless and until EPA disapproves the revised plan.

b) Bayway Refinery. By no later than sixty (60) days after completing implementation of the project identified in Paragraph 268, COPC will notify EPA and the NJDEP about whether a revised sampling plan for the Bayway Refinery is necessary. If a revised plan is necessary, the notice will include the revised plan for approval by EPA. In the first full calendar quarter after submitting the revised plan, COPC will implement the revised plan. COPC will continue to implement the revised plan unless and until EPA disapproves the revised plan.

c) Requests for Modifications. After two (2) years of implementing a sampling plan, COPC may submit a request to EPA for approval, with a copy to the Applicable Co-Plaintiff, to revise a Covered Refinery's sampling plan, including sampling frequency. EPA will not unreasonably withhold its consent. COPC will not implement any proposed revisions under this Subparagraph until EPA provides its approval.

214. Quarterly and Annual Estimations of TABs and Uncontrolled Benzene Quantities. At the end of each calendar quarter and based on sampling results and approved flow calculations, COPC will calculate a quarterly and projected annual: (i) TAB for the Rodeo and Santa Maria Refineries; and (ii) uncontrolled benzene quantity for the remaining Covered Refineries. In making this calculation, COPC will use the average of the three samples collected at each sampling location. If these calculations do not identify any potential violations of the benzene waste operations NESHAP, COPC will submit these calculations in the reports due under Section IX of this Decree.

215. Corrective Measures: Basis. Except as set forth in Paragraph 216, COPC will implement corrective measures at the applicable Covered Refinery if:

a) For the Rodeo or Santa Maria Refineries, the quarterly TAB equals or exceeds 2.5 Mg or the projected annual TAB equals or exceeds 10 Mg for the then-current compliance year;

b) For the Alliance, Borger, LAR Carson, LAR Wilmington, Sweeny, or Wood River Refineries, the quarterly uncontrolled benzene quantity equals or exceeds 1.5 Mg or the projected annual uncontrolled benzene quantity equals or exceeds 6 Mg for the then-current compliance year;

c) For the Bayway, Ferndale, and Trainer Refineries, the quarterly uncontrolled benzene quantity equals or exceeds 0.5 Mg or the projected annual uncontrolled benzene quantity equals or exceeds 2 Mg for the then-current compliance year.

216. Exception to Implementing Corrective Measures. If COPC can identify the reason(s) in any particular calendar quarter that the quarterly and projected annual calculations result in benzene quantities in excess of those identified in Paragraph 215, and COPC can state that it does not expect that reason or reasons to recur, then COPC may exclude the benzene quantity attributable to the identified reason(s) from the projected calendar year quantity. If that exclusion results in no potential violation of the Benzene Waste Operation NESHAP, COPC will not be required to implement corrective measures under Paragraph 217, and COPC may exclude the uncontrolled benzene attributable to the identified reason(s) in determining the applicability of Paragraph 218. At any time that COPC proceeds under this Paragraph, COPC will describe bow it satisfied the conditions in this Paragraph in the reports due under Section IX of this Decree.

217. Compliance Assurance Plan. If COPC meets one or more conditions in Paragraph 215 for implementing corrective measures, then by no later than sixty (60) days after the end of the calendar quarter in which one or more of the conditions were met, COPC will submit a compliance assurance plan to EPA for approval, with a copy to the Applicable Co-Plaintiff. In that compliance assurance plan, COPC will identify the cause(s) of the potentially-elevated benzene quantities, all corrective actions that COPC has taken or plans to take to ensure that the cause(s) will not recur, and the schedule of actions that COPC will take to ensure that the subject refinery complies with the Benzene Waste Operations NESHAP for the calendar year. COPC will implement the plan unless and until EPA disapproves.

218. Third-Party Assistance. If, in two consecutive quarters, at least one of the conditions in Paragraph 215 exists at a particular Refinery, then COPC will retain a third-party contractor during the third calendar quarter to undertake a TAB study and compliance review at that Refinery. By no later than ninety (90) days after COPC receives the results of the third-party TAB study and compliance review, COPC will submit the results to EPA and the Applicable Co-Plaintiff and submit a plan and schedule for remedying any deficiencies identified in the Third-party study and compliance review. COPC will implement the plan unless and until EPA disapproves.