U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION VIII WATER BRANCH, ENFORCEMENT
AND COMPLIANCE ASSURANCE DIVISION
CLEAN WATER ACT
COMPLIANCE INSPECTION REPORT

for

Name of Facility: Suncor Energy (USA) Inc. Commerce City Refinery
Facility Address: 5801 Brighton Blvd., Commerce City, CO 80022
Mailing Address: 5801 Brighton Blvd., Commerce City, CO 80022

Report Prepared on: 8/23/2021 By: _____,
Date Sr. Environmental Scientist (PG Environmental)
Signature

Report Final as of: 9/01/2021 By: _____, EPA
Date NPDES & Wetlands Enforcement Section Chief
Signature

General Information

Type of Inspection:	Industrial Wastewater CEI
Owner:	Suncor Energy (USA) Inc.
Operator:	Suncor Energy (USA) Inc.
Permittee:	Suncor Energy (USA) Inc.
NPDES Permit No:	CO0001147
NPDES Permit Effective Date:	November 1, 2012 (Minor Amendments 2013, 2015, 2017)
NPDES Permit Expiration Date:	October 31, 2017 (administratively extended)
Number of Outfalls	1 external, three internal
Receiving Water:	Sand Creek
Latitude and Longitude:	39° 48' 18" N, 104° 56' 35 " W

On-Site Facility Inspection Overview

Inspection Dates: June 22, 23, and 24, 2021
Approximate Entry Time: 9:00 a.m. (MDT) on June 22, 2021
Approximate Exit Time: 3:40 p.m. (MDT) on June 24, 2021

On June 22-24, 2021, a representative from U.S. Environmental Protection Agency (EPA) Region VIII and EPA's contract inspectors from PG Environmental (the EPA Inspection Team), conducted a compliance evaluation inspection of wastewater discharges from the Suncor Energy (USA) Inc. Commerce City Refinery (Facility) in Commerce City, Colorado. Suncor Energy (USA) Inc. is identified as the Permittee and owns and operates the Facility.

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- Exhibit 2 – Figure 5 – Wastewater and Stormwater Outfalls
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Appendix C: NPDES Permit No. CO0001147

Appendix D: EPA Pre-Inspection Records Request (Completed by Suncor June 3, 2021)

Appendix E: November 30, 2018 Suncor Flume Assessment Technical Memorandum by Brown and Caldwell

I. INTRODUCTION

On June 22-24, 2021, a representative from U.S. Environmental Protection Agency (EPA) Region VIII and EPA's contract inspectors from PG Environmental (hereinafter, collectively referred to as the EPA Inspection Team) inspected the Suncor Energy (USA), Inc. Commerce City Refinery (hereinafter, Facility) in Commerce City, Colorado. Suncor Energy (USA), Inc. (hereinafter, Permittee or Suncor) is identified as the Permittee and owns and operates the Facility. The EPA Inspection Team was joined on the inspection by a representative from EPA Region X for training purposes, as well as a representative from Colorado Department of Public Health and Environment (CDPHE). The primary purpose of the inspection was to review and evaluate Facility operations and wastewater management, to review the accuracy and reliability of the Permittee's self-monitoring and reporting program, and to obtain information that will assist EPA in assessing the Permittee's compliance with the requirements of the Permit. The weather at the time of the inspection each day was warm and mostly sunny.

The Facility is authorized to discharge process wastewater to Sand Creek consistent with the terms and conditions of Colorado Discharge Permit System (CDPS) Permit No. CO0001147 (hereinafter, the Permit). The Permit was issued on November 1, 2012 and was modified on May 28, 2013, February 25, 2015, and January 25, 2017. The Permit expired on October 31, 2017 but has been administratively extended.

Photographs taken during the inspection are maintained on file with EPA Region VIII, some of which are included in this report as Appendix A, Photograph Log. Supporting documentation is included in Appendix B, Exhibit Log. A copy of the Permit is included as Appendix C. Furthermore, a pre-inspection records request submitted by the EPA Inspection Team and completed by Suncor on June 3, 2021 is included in this report as Appendix D.

This inspection was conducted concurrently with an evaluation of the Permittee's compliance with CDPS Permit No. COS000009 associated with industrial stormwater discharges to Sand Creek and a tributary of the South Platte River; observations pertaining to CDPS Permit No. COS0000009 are documented in a separate inspection report.

Facility Description

The Facility is a 98,000-barrel-per-day petroleum refinery producing gasoline, diesel and distillate fuels, paving-grade asphalt, and other petroleum products. The Facility is located in Commerce City, Colorado, in southwestern Adams County.

The Facility is approximately 274 acres and located just south of Sand Creek and Highway 270. The Facility comprises three separate process areas referred to by the Permittee as Plant 1, Plant 2, and Plant 3 (refer to Appendix B, Exhibit 1). Brighton Boulevard bisects the Facility from north to south, with Plant 1 located west and Plants 2 and 3 located east of Brighton Boulevard. Two Suncor-owned buildings are located to the north of Highway 270, the Nelson Property (a contractor-operated maintenance facility) and the ERT building (used to house spill and emergency response equipment). Private businesses border the south and east perimeters of the Facility along 56th Avenue and York Street. Metro Wastewater Reclamation District and Denver Water operate facilities immediately west of Plant 1 and opposite the Burlington Ditch waterway.

Plants 1, 2, and 3 are each bordered by Sand Creek to the north, which flows northwest into the South Platte River approximately 1/3-mile downstream of the Facility's northwest corner. Process wastewater discharges from the Facility are authorized to discharge into Sand Creek through one outfall, Outfall 020A. The Facility has two internal outfalls, Outfalls 002B and 003B which flow to Outfall 020A and subsequently Sand Creek (refer to Appendix B, Exhibit 2).

Wastewater Generation and Treatment

The Facility generates various wastewater streams from the desalters, asphalt unit, tank water draws, hydrostatic testing, loading terminal runoff and truck wash water, process area drains, steam generation, cooling tower blowdown, and stormwater runoff. Wastewater streams are collected and conveyed through oily-water or non-oily water sewer systems to the onsite wastewater treatment plant (WWTP), located in Plant 1. The WWTP utilizes conventional activated sludge treatment technology (refer to Appendix B, Exhibits 3, 4, and 5).

Process wastewater from the desalters, process sewers, and tank water draws flows to the WWTP headworks where it is processed through a grinder and pumped to two American Petroleum Institute (API) oil/water separator units for hydrocarbon removal. From the APIs, wastewater is pumped into a 600,000-gallon equalization tank referred to as T-60. Non-oily water sewers and stormwater runoff from process areas combine with API effluent at T-60. From the T-60 equalization tank, wastewater is routed through three separate trains (referred to as Train A, Train B, and Train C) comprised of dissolved gas flotation (DGF), activated sludge treatment, clarification, and membrane filtration. A dedicated membrane bioreactor (MBR) constructed in 2018 services Train C, exclusively. Trains A and B utilize a (0.02 micron) ultra-filtration system. Facility representatives stated that flow rate for Trains A, B, and C are typically 400 gallons per minute (gpm), 500 gpm, and 1,700 gpm, respectively. Collectively, secondary treated wastewater is referred to by the Permittee as DGF water. At the time of the inspection, all three treatment trains were operational or in standby. The Permittee completed construction of the activated sludge aeration building and membrane bioreactor (MBR) building in 2018. Wastewater from Trains A, B, and C then enters three lagoons in series (Lagoon Nos. 1, 2, and 3). Lagoon No. 1 is not aerated and Lagoon Nos. 2 and 3 are aerated by fountain aerators.

Sour water stripped from de-sulfuring operations is treated through an iron co-precipitation/flocculation process for selenium reduction. Following the iron co-precipitation/flocculation process, the sour water striper flows through a dissolved air flotation (DAF) unit and into Lagoon No. 4. From Lagoon No. 4, this wastewater is then commingled with DGF water in Lagoon Nos. 1, 2, and 3. On April 30, 2019, the Permittee provided written notice to CDPHE that the Permit compliance schedule for cleaning Lagoon No. 4 was completed.

Effluent from Lagoon No. 3 is considered final treated effluent from the WWTP which flows through Outfall 002B and subsequently Outfall 020A. On June 22, 2021 at 10:54 a.m. MDT, flow from Outfall 020A to Sand Creek was documented in the Permittee's Pi system as 1,220 gpm.

Additionally, the Facility operates a groundwater treatment system (GWTS) that treats groundwater pumped from the groundwater recovery system located along the Facility's boundary with Sand Creek. The GWTS consists of oxidation, hydrogen peroxide and polyaluminum chloride (PAC) addition, flocculation, sand filtration, and air stripping. The groundwater recovery system also pumped contaminated groundwater to the WWTP for treatment. Facility representatives estimated that flows from the groundwater recovery system to the GWTS and WWTP were 250 gpm and 265 gpm, respectively. Additionally, Facility representatives stated that certain groundwater wells have shown high levels of benzene (Wells 29-33), and that these wells are routed to the WWTP for biological treatment. Wells 1 through 5 are pumped solely to the GWTS. Treated groundwater is routed through and monitored at Outfall 003B. Treated wastewater from Outfall 002B and treated groundwater from Outfall 003B combine at the Outfall 020A aerated sampling vault. From the vault, combined effluent is piped north and discharged to Sand Creek at Outfall 020A (refer to Appendix A, Photographs 1, 2, and 3).

Wastewater Monitoring and Flow

NPDES compliance self-monitoring activities and samples are conducted by Suncor laboratory staff at Outfall 002B, Outfall 003B, and the Outfall 020A aerated sampling vault using three automatic ISCO

samplers (refer to Appendix B, Exhibit 2, and Appendix A, Photographs 4, 5, and 6). Process control samples are also collected by Facility operators. Sample collection locations and methods appeared to provide representative samples. The samples are analyzed using both on-site and contract laboratories. Analysis for total suspended solids, pH, dissolved oxygen (DO), temperature, biochemical oxygen demand (BOD), chemical oxygen demand (COD), total organic carbon (TOC), n-hexane extractable material oil and grease (Grav), sulfide (H_2S), benzene, BTEX, and methyl tert-butyl ether (MTBE) are conducted at the onsite Suncor laboratory. Analysis for total arsenic, potentially dissolved copper, potentially dissolved lead, potentially dissolved manganese, potentially dissolved selenium, potentially dissolved silver, potentially dissolved uranium, potentially dissolved nickel, potentially dissolved zinc, cyanide, total mercury, total recoverable iron, total chromium, calcium, magnesium, potassium, sodium, and total inorganic nitrogen is conducted by the Permittee's contract laboratory Technology Laboratories in Fort Collins, Colorado. Whole effluent toxicity (WET) testing is conducted by the Permittee's contract laboratory, SeaCrest Group in Louisville, Colorado. Facility discharge monitoring reports (DMRs) for 2018 through 2020 were reviewed as a component of this inspection. The review included a comparison of reported monitoring results versus requirements and limitations contained within the Permit. Permit limit exceedances were identified and are presented in Section III, Observation No. 1 of this report for additional details. The EPA Inspection Team briefly visited the onsite Suncor laboratory and met with lab staff including Jennifer Stapp (Lead Chemist, Commerce City Refinery) and Nick Shelton (NPDES sampler, Commerce City Refinery). During the inspection, lab staff briefly explained NPDES compliance sample collection and analysis procedures and recordkeeping. Sample analysis and equipment calibration records are documented in the Permittee's electronic BLISS database.

Effluent flow at Outfalls 002B, 003B, and 020A are measured with Parshall flumes equipped with ultrasonic transducers. Facility representatives stated the flow meters are calibrated by the Suncor instrumentation team. Based on documentation provided by the Permittee, the Parshall flumes are configured such that the sum of the flow rates from Outfall 002B and Outfall 003B should equal the flowrate measured at Outfall 020A. At the time of the inspection (approximately 10:30 a.m.) flow at Outfalls 002B, Outfall 003B, and Outfall 020A were 899 gpm, 260 gpm, and 1220 gpm, respectively.

Wastewater Solids Handling

Solids generated from the WWTP are stored in two sludge tanks. One tank is used to store hazardous sludge generated from the two API oil/water separation units as well as DGF float solids. This sludge is dewatered by an onsite 3-stage centrifuge that is operated by a contractor. Dry cake is hauled off as hazardous waste. The other sludge tank is used to store non-hazardous DAF skimming solids from selenium treatment, solids from GWTS, and waste activated sludge (WAS) from Trains A, B, and C. This sludge is dewatered at the abovementioned 3-stage centrifuge or dewatering boxes. During the inspection, the EPA Inspection Team briefly observed the dewatering boxes from a vehicle and noted that they drain to the concrete conveyance channel that flows to the Facility's onsite Finger Lake impoundment (refer to Appendix A, Photographs 18 and 22).

WWTP Operation and Maintenance Management

The Permittee utilizes and maintains an SAP maintenance management system to track Facility maintenance refinery-wide, including for the WWTP. Facility representatives provided an overview of the SAP system to the EPA Inspection Team. The SAP system utilizes a risk matrix to identify asset criticality and assign priority to tasks. This risk matrix system was demonstrated during various work orders reviewed with Facility representatives.

II. INSPECTION PROCESS

Inspection Opening Conference

The EPA Inspection Team arrived at the Facility on June 22, 2021 at 9:00 a.m. (MDT) for the inspection. Jared Richardson and Anthony D'Angelo of PG Environmental, and Stephanie Meyers of EPA Region VIII displayed their Clean Water Act inspector credentials to Wes McNeil (Suncor Environmental Team Lead, Commerce City Refinery) at the outset of the inspection and explained the purpose of the inspection was to observe compliance with the Permit. The EPA Inspection Team informed the Permittee that any information that the Facility deemed to be confidential business information ("CBI") should be identified to EPA representatives during the inspection and it would be handled as CBI according to EPA's CBI procedures. No information provided to the EPA Inspection Team was identified as CBI during the course of the inspection. Table 1 describes the individuals that participated in the inspection.

Table 1: Inspection Attendee List

Name	Affiliation	Telephone	Email
EPA Inspectors and Contractors			
Jared Richardson	PG Environmental (EPA Contractor)	(720) 789-8036	Jared.richardson@pgenv.com
Anthony D'Angelo	PG Environmental (EPA Contractor)	(720) 789-8049	Anthony.dangelo@pgenv.com
Stephanie Meyers	EPA Region VIII	(303) 312-6938	Meyers.stephanie@epa.gov
Michelle Lanzoni	EPA Region X	(907) 271-6627	Lanzoni.michelle@epa.gov
Colorado Department of Public Health and Environment (CDPHE) Representatives			
Clayton Moores	Unit Manager, Field Services Unit 1	(303) 241-9296	clayton.moores@state.co.us
Meg Parish*	Permits Section Manager, Water Quality Control Division	--	meg.parish@state.co.us
Suncor Energy (USA), Inc. Representatives			
Eric Marler	Sr. Environmental Advisor	(303) 227-7524	EMarler@Suncor.com
Wes McNeil	Environmental Team Lead	(720) 838-1644	wmcneil@suncor.com
Donald Austin*	Vice President of Commerce City Refinery	--	daustin@suncor.com
Brian Nelson	EHS Manager	(303) 286-5711	bnelson@suncor.com
Brian Lilly	ORC	(303) 286-5748	blilly@suncor.com
Aaron James	CFT Manager	(720) 322-2503	ajames@suncor.com
Chris Mack	WWTP Superintendent	(303) 286-5745	chmack@csuncor.com
Brian Killough	Remediation Advisor	(303) 286-5714	bkillough@suncor.com
Heather Sazdov*	Operations Manager	--	--
Jacy Rock*	Senior Legal Council	--	--
Ana Rodriguez	Document Control	(720) 630-3495	arodriguez@suncor.com
Lisa Kouf	Document Control	(970) 213-5035	lkouf@suncor.com

*only present for closing conference on June 24, 2021

Facility Site Walk

Over the course of June 22, 23, and 24, 2021, the EPA Inspection Team observed various areas of the Facility to observe both stormwater and wastewater collection, conveyance, treatment, and discharge. However, the majority of field observations made pertaining to this inspection report occurred in Plant 1 at the WWTP and GWTS. While at the WWTP, the EPA Inspection Team met with the Facility's Chief WWTP Operator, Chris Mack, to discuss the operation and maintenance (O&M) of the WWTP. Mr. Mack demonstrated significant knowledge and understanding of the WWTP assets and associated O&M. Mr. Mack did acknowledge that the WWTP assets were inherited when Suncor purchased the Facility from Conoco Phillips. During the site walk to the WWTP, the EPA Inspection Team requested to know the purpose and flow pathway of some Facility assets. Mr. Mack stated that not all Facility flow pathways and assets were fully understood and he believed some assets to be historical or decommissioned equipment. This was not verified during the inspection. Mr. Marler explained that Suncor conducted a detailed survey of the Facility's sewer systems in 2013 and that all assets at the WWTP were evaluated at that time.

A WWTP diagram is included in Appendix B, Exhibits 3 and 4.

Records Review

The EPA Inspection Team conducted a records review to evaluate the Permittee's compliance with the Permit. On May 27, 2021, EPA Inspector Stephanie Meyers provided a records request to the Permittee. Additional records were requested during and following the inspection. Most of the records and reports required by the Permit were available for review prior to, during, and after the inspection. However, some records provided by the Permittee were noted as deficient (refer to Section III. Summary of Observations of this report for details). Refer to Appendix D, Suncor Completed EPA Records Request.

III. SUMMARY OF OBSERVATIONS

The following section summarizes the EPA Inspection Team's observations relative to the Permit requirements, including the status of certain treatment units, operation and maintenance practices, and the Permittee's monitoring and reporting documentation.

Part I.A.2, Limitations Monitoring Frequencies and Sample Types, of the Permit identifies effluent limitations, monitoring frequencies and sample type requirements.

Observation 1. The EPA Inspection Team observed that the Permittee experienced four effluent limitation exceedances during the period of review (2018-2020):

- The Permittee experienced a pH effluent limitation (6.5-9.0 s.u.) exceedance at Outfall 020A on January 13, 2018 (reported 6.2 s.u.). Facility representatives stated that this exceedance was a result of additional wash water utilization to remove spent catalyst in a process unit. The Permittee provided notifications of this exceedance to CDPHE as required by Part II.A.4 of the Permit.

- The Permittee experienced a TSS effluent limitation (30-day avg. 30 mg/l) exceedance at Outfall 003B on July 31, 2020 (reported 87 mg/l). Facility representatives stated that this was due to operator error during maintenance activities on the GWTS surge basin. Specifically, the basin was pumped down to a level causing sediment suspension in the surge basin resulting in the TSS exceedance at Outfall 003B. During the inspection, the EPA Inspection Team observed accumulated sediment and vegetative growth in the GWTS surge basin; refer to Observation No. 6 of this report for additional details.

- The Permittee experienced a BOD_5 effluent limitation (daily max. 1575 lbs/day) exceedance at Outfall 002B on November 30, 2020 (reported 1875 lbs/day) and December 31, 2020 (reported 2915 lbs/day). Facility representatives stated that cause of the exceedance was unknown, but it was potentially due to a changeover to citric acid cleaning solutions used on the WWTP membrane filters and/or from Finger Lake cleaning activities during this timeframe.

Part II.A.4.a, Noncompliance Notification, of the Permit states, "If, for any reason, the permittee does not comply with or will be unable to comply with any discharge limitations or standards specified in this permit, the permittee shall, at a minimum, provide the Division and EPA with the following information:

i. A description of the discharge and cause of noncompliance;
ii. The period of noncompliance, including exact dates and times and/or the anticipated time when the discharge will return to compliance; and
iii. Steps being taken to reduce, eliminate, and prevent recurrence of the noncomplying discharge."

Observation 2. The EPA Inspection Team observed that clear and definitive steps or corrective actions (e.g., redundant or dedicated backup power and/or adequate controls for isolation/containment of the aerated sampling vault to inflow) were not planned or implemented to prevent or reduce a recurrence of oil discharges from the Facility.

- On May 7, 2020, the Permittee observed an oil sheen on Sand Creek, approximately 500 feet upstream of Outfall 020A. Notification was provided to CDPHE in accordance with the Permit (CDPHE Case Number 2020-0222). During the inspection, Facility representatives stated that this was most likely caused by seepage from historic groundwater contamination beyond the subsurface slurry barrier wall to Sand Creek.

- On May 22, 2021, the Permittee observed an oil sheen on Sand Creek at end of pipe of Outfall 020A. Notification was provided to CDPHE in accordance with the Permit (CDPHE Case No. 2021-0227). The Permittee provided information to CDPHE that this sheen was attributed to a loss of power at the GWTS and further stated that the sheen was attributed to petroleum-laden stormwater runoff in Plant 1 from a spill associated with fuel powered generators for work in the area that entered the Outfall 020A aerated monitoring basin. During the inspection, Facility representatives informed the EPA Inspection Team that the Facility has mobile generators that can be utilized throughout the Facility; however, the GWTS is not equipped for a mobile or dedicated backup power supply.

- On May 31, 2021, the Permittee observed an oil sheen on Sand Creek at end of pipe of Outfall 020A. Notification was provided to CDPHE in accordance with the Permit (CDPHE Case No. 2021-0243). Facility representatives explained during the inspection that this sheen was attributed to petroleum-laden stormwater runoff in Plant 1 from a spill associated with fuel powered generators for work in the area that entered the Outfall 020A aerated monitoring basin (refer to Appendix A, Photograph 7). They explained that the root cause of the petroleum-laden stormwater runoff was from improper coverage and containment of an upgradient contractor generator set and fuel pack in which a spill occurred during fueling operations. Facility samples taken during this event at Outfall 020A identified a benzene level of 37.97 mcg/l and BTEX level of 458.24 mcg/l. It should be noted that the Permit daily maximum limits for benzene and BTEX are 5 mcg/l and 100 mcg/l, respectively.

- At the time of the inspection, the EPA Inspection Team observed accumulated stormwater on the ground surface immediately upgradient of the Outfall 020A aerated sampling vault, as well as an improperly installed (i.e., unconsolidated) sediment and gravel berm placed upgradient of the Outfall 020A aerated sampling vault in response to the prior May 31 event (refer to Appendix A, Photographs 7 and 8).

Part I.D.3, Analytical and Sampling Methods for Monitoring and Reporting, of the Permit states, "All sampling shall be performed by the permittee according to specified methods in 40 C.F.R. Part 136; methods approved by EPA pursuant to 40 C.F.R. Part 136; or methods approved by the Division, in the absence of a method specified in or approved pursuant to 40 C.F.R. Part 136..."

Observation 3. The EPA Inspection Team observed that the results of Suncor's most recent DMR QA report (dated November 18, 2020) for the contract analytical laboratory, Technology Laboratory, Inc. (USEPA Lab ID CO00064) identified several parameters (total dissolved solids, total hardness, total alkalinity, calcium, magnesium, potassium, sodium) with a rating of "Not Acceptable" and at the time of the inspection a reanalyzation and resubmission of test results ensuring an "acceptable" rating for these parameters at this laboratory had not been conducted (refer to Appendix B, Exhibit 6). The Permittee provided additional documentation after the inspection identifying "Acceptable" ratings for the total dissolved solids, calcium, potassium, sodium (refer to Appendix B, Exhibit 6); however, total alkalinity was still noted as "Not Acceptable" and Total Hardness and Magnesium were noted as "Not Reported."

Observation 4. The EPA Inspection Team observed that both the onsite and contract (Technology Laboratory, Inc.) laboratory chain-of-custody documentation was lacking the minimum information needed to document the sample container type (refer to Appendix B, Exhibit 7), as required by 40 CFR, Part 136.

Observation 5. The EPA Inspection Team observed that the Permittee was not conducting verification and calibration of temperature probes and equipment to ensure proper sample preservation methods in accordance with 40 CFR Part 136. Specifically, during the inspection, the EPA Inspection Team observed that the Permittee's ISCO automatic samplers at Outfalls 002B, 003B, and the 020A aerated sampling vault were not equipped with independently calibrated thermometers, and procedures were not implemented to independently verify the accuracy and calibration of the ISCO samplers' thermometers and temperature readings. Facility laboratory representatives stated that they relied on the temperature reading of the ISCO sampler to document preservation temperature readings and that verification of the sampler readings was not performed.

Part I.B.1, Facilities Operation and Maintenance, of the Permit states, "The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee as necessary to achieve compliance with the conditions of this permit."

Observation 6. The EPA Inspection Team observed accumulated solids and vegetative growth within the GWTS surge basin (refer to Appendix A, Photograph 9). Facility representatives stated that the GWTS surge basin was not on a routine cleaning schedule and admitted to difficulties encountered in cleaning access to all areas of the basin. As noted in Observation No. 1 of this report, the Permittee experienced a TSS effluent limitation

exceedance at Outfall 003B on July 31, 2020, which was attributed to sediment suspension associated with pumping down the GWTS surge basin.

Observation 7. The EPA Inspection Team observed accumulated solids and vegetative growth within WWTP Lagoon Nos. 1, 2, and 3, most notably at the Lagoon 1 forebay from the "Morgan Box." The lagoon weirs were also observed to be visibly deteriorated and corroded (refer to Appendix A, Photographs 10 through 13). Facility representatives stated that they were not aware of the last time cleaning or maintenance activities occurred for the lagoon weirs.

Observation 8. The EPA Inspection Team observed the need for maintenance on the Webber's Pond impoundment, utilized by the Permittee to capture flow prior to pumping influent to the WWTP. Specifically, the EPA Inspection Team observed evidence of erosion and rill formation on the east embankment of Webber's Pond resulting in deposition of sediment into the pond (refer to Appendix A, Photograph 20). Additionally, the EPA Inspection Team observed trash and debris within the pond (refer to Appendix A, Photograph 19) and a torn and deteriorated poly liner on the central-east side of Webber's Pond (refer to Appendix A, Photographs 20 and 21). Furthermore, Mr. Marler explained that to the best of his knowledge, Webber's Pond has never been maintained due to risk associated with tearing the poly liner of the pond.

Observation 9. The EPA Inspection Team observed a hose leading from the WWTP Train B clarifier skimming tank (Tank No. 4513) into the adjacent concrete conveyance channel that flows to Finger Lake (refer to Appendix A, Photographs 16 and 17). Facility representatives stated that it was likely that due to minimal skimmings collected from the clarifier, the skimming tank was most likely full of clarified wastewater and that instead of pumping this wastewater out with a vac truck, Facility operators most likely allowed this water to drain to the adjacent concrete conveyance channel and into Finger Lake.

Part I.D.5, Flow Measuring Device, of the Permit states, "At the request of the Division, the permittee shall show proof of the accuracy of any flow-measuring device used in obtaining data submitted in the monitoring report."

Observation 10. The EPA Inspection Team observed that the flow measurement devices at Outfalls 002B, 003B, and 020A may not be accurate. Specifically, notable turbulence and disturbance was observed in the flow and approach channel upstream of the Outfall 003B Parshall flume (refer to Appendix A, Photographs 14 and 15). Mr. Marler explained that the turbulence was previously noted by Suncor and was investigated in 2018 which did not warrant further action. Upon request following the inspection, the Permittee provided a November 30, 2018 Suncor Flume Assessment Technical Memorandum from Brown and Caldwell (refer to Appendix E) which states that the Parshall flumes associated with Outfalls 002, 003, and 020 "are configured such that the sum of the flow rates from Flume 002 and Flume 003 should equal the flowrate measured at Flume 020. However, data shows that the flowrate measured at Flume 020 is lower than the sum of the two upstream flumes."

Additionally, Section, 1.4, Conclusions, of the memo states, "The analysis of the two data sets indicate that the measured flow rates are generally within the expected range of accuracy at each flume. The recommendations to increase accuracy is to routinely recalibrate the flow measuring devices, monitor the data for increasing deviations, and check for submerged flume conditions." Section 2.2, Models Results, of the November 30, 2018 Suncor Flume Assessment Technical Memorandum states that as long as flow

through Flume 003 remains below 600 gpm, acceptable flow conditions are expected for Flume 003." The EPA Inspection Team requested flow meter calibration records during the inspection; however, these records were not provided by the Permittee by the time this inspection report was finalized.

IV. CLOSING CONFERENCE

At approximately 3:00 p.m. on June 24, 2021, the EPA Inspection Team met with the Facility representatives for a closing conference and shared preliminary observations. The EPA Inspection Team reiterated that all preliminary observations discussed were not compliance determinations. Any preliminary observations shared were subject to further investigation by the EPA Inspection Team upon the additional review of records and documentation. Additional observations may be contained in this inspection report that were not identified at the time of the closing conference.

The inspection concluded on June 24, 2021 at approximately 3:40 p.m. (MDT).

Appendix A
Photograph Log

Photograph 1. View of Outfall 020A to Sand Creek.

Photograph 2. Additional view of Outfall 020A to Sand Creek.

Photograph 3. View of Sand Creek downstream of Outfall 020A. Note the booms installed in the creek by the Permittee.

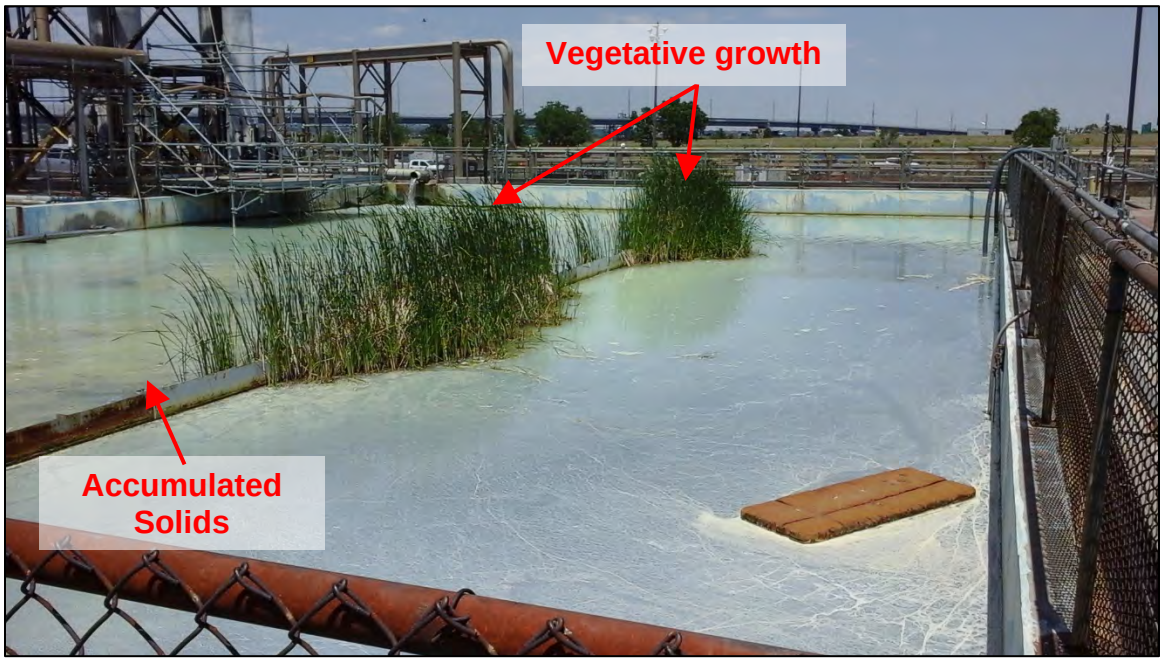
Photograph 4. View of the ISCO 4700 automatic sampler located at the Outfall 020A aerated sampling vault. This sampler was not equipped with an independently calibrated thermometer.

Photograph 5. View of the ISCO 4700 automatic composite sampler at Outfall 002B, downstream of Lagoon No. 3. This sampler was not equipped with an independently calibrated thermometer.

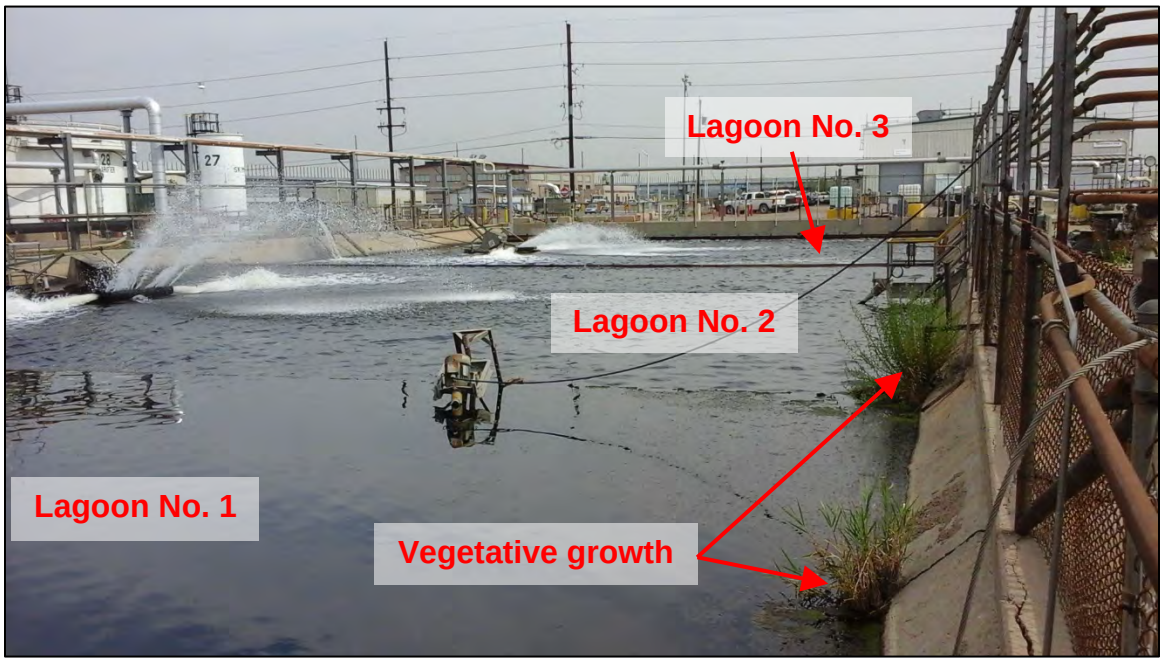
Photograph 6. View inside the ISCO automatic composite sampler at Outfall 003B. This sampler was not equipped with an independently calibrated thermometer.

Photograph 7. View, facing east, of an improperly installed (i.e., unconsolidated) sediment and gravel berm located upgradient of the Outfall 020A aerated sampling vault. Note the berm was constructed to prevent contaminated stormwater runoff from Plant 1 from entering the uncovered sampling vault, which had occurred on May 22 and May 31, 2021, resulting in high levels of benzene and BTEX and a visible sheen into Sand Creek. Also note the accumulated stormwater runoff against the berm.

Photograph 8. Additional view of the unconsolidated sediment and gravel berm upgradient of Outfall 020A aerated sampling vault, as shown in Photograph 7.



Photograph 9. View, facing north, of the GWTS surge basin. Vegetative growth and accumulation of solids were observed in the surge basin.



Photograph 10. View, facing north, of vegetative growth on the edge of Lagoon No. 1.

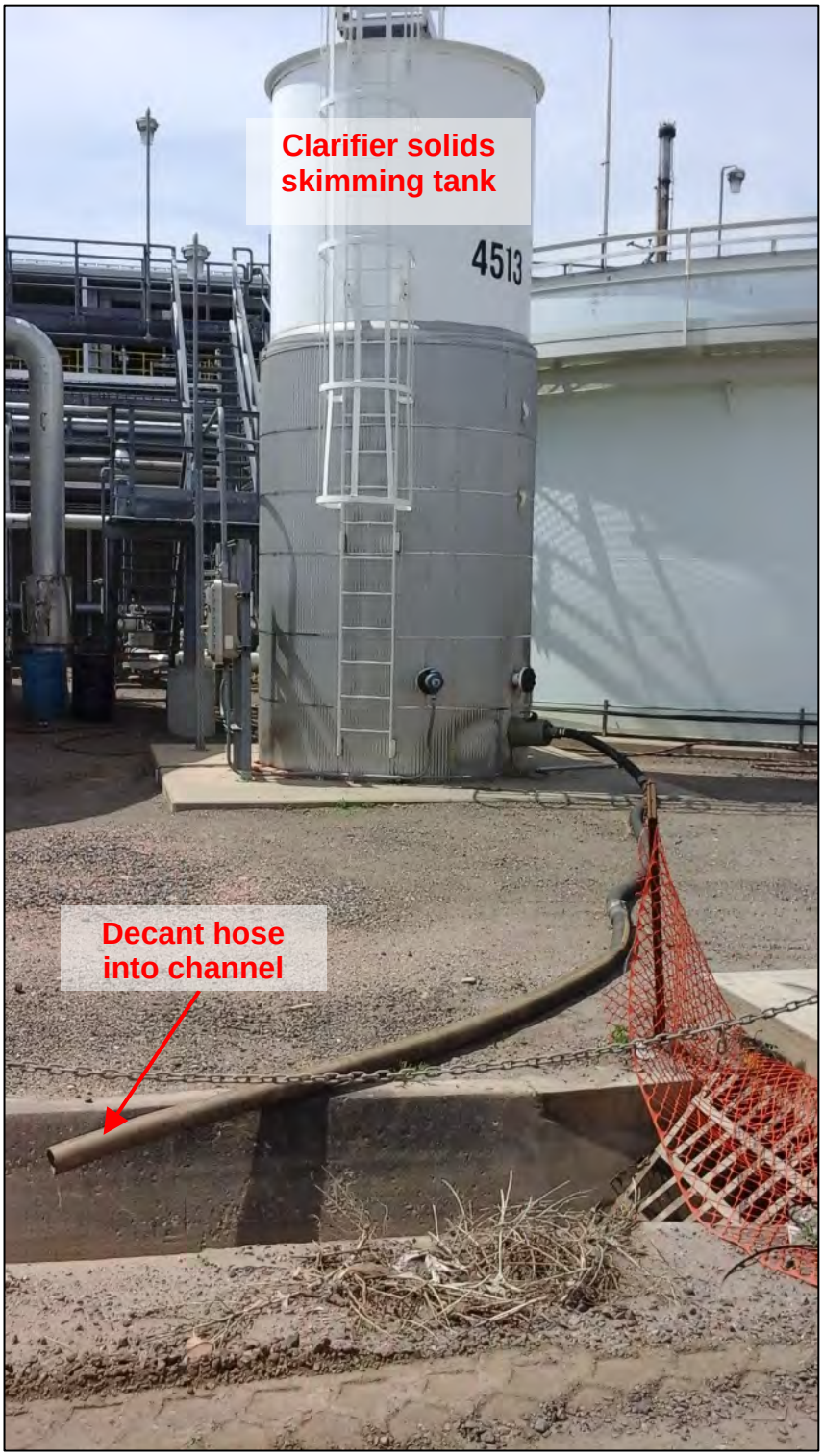
Photograph 11. View of accumulated solids and vegetative growth at the weir between Lagoon Nos. 1 and 2.

Photograph 12. View accumulated solids and vegetative growth at the weir between Lagoon Nos. 2 and 3.

Photograph 13. View of accumulated solids and vegetative growth in the Lagoon No. 1 forebay which receives flow from the "Morgan Box."

Photograph 14. View of the Outfall 003B Parshall flume and associated ultrasonic transducer for Permit flow measurements from the GWTS. Note the turbulence and disturbance (boils) observed in the approach channel run leading to the flume.

Photograph 15. Additional view of the turbulence observed in the Outfall 003B Parshall flume.



Photograph 16. View of a decant line from the Train B clarifier solids skimming collection tank (Tank No. 4513). Facility representatives suspected that the skimming tank contained only clarifier water, and therefore, it was decanted into an adjacent concrete conveyance channel instead of being pumped out by a vac truck. This channel subsequently flows to Finger Lake, shown in Photograph 18.

Photograph 17. Additional view of a decant line from the Tank B clarifier skimming collection tank shown in Photograph 16.

Photograph 18. View, facing south, of Facility's onsite Finger Lake impoundment.

Photograph 19. View, facing south, of Facility's onsite Webber's Pond.

Photograph 20. View, facing south, of rill formations along the eastern embankment of Webber's Pond. Note the sediment deposited in Webber's Pond beneath the rill. Also note the torn poly liner for Webber's Pond, as shown in Photograph 21.

Photograph 21. Close-up view of the torn poly liner of Webber's Pond shown in Photograph 20.

Photograph 22. View of the pump that transfers the contents of Finger Lake into Webber's Pond or to the WWTP. The pump was located within secondary containment; however, petroleum staining was observed on the ground surface outside of the containment.

Appendix B
Exhibit Log

Exhibit 1
SWMP Figure 1A – Location Map

Figure 1A - LOCATION MAP

Suncor Energy Commerce City Refinery

Exhibit 2
Figure 5 – Wastewater and Stormwater Outfalls

Figure 5—Wastewater and Stormwater Outfalls

Suncor Energy Commerce City Refinery

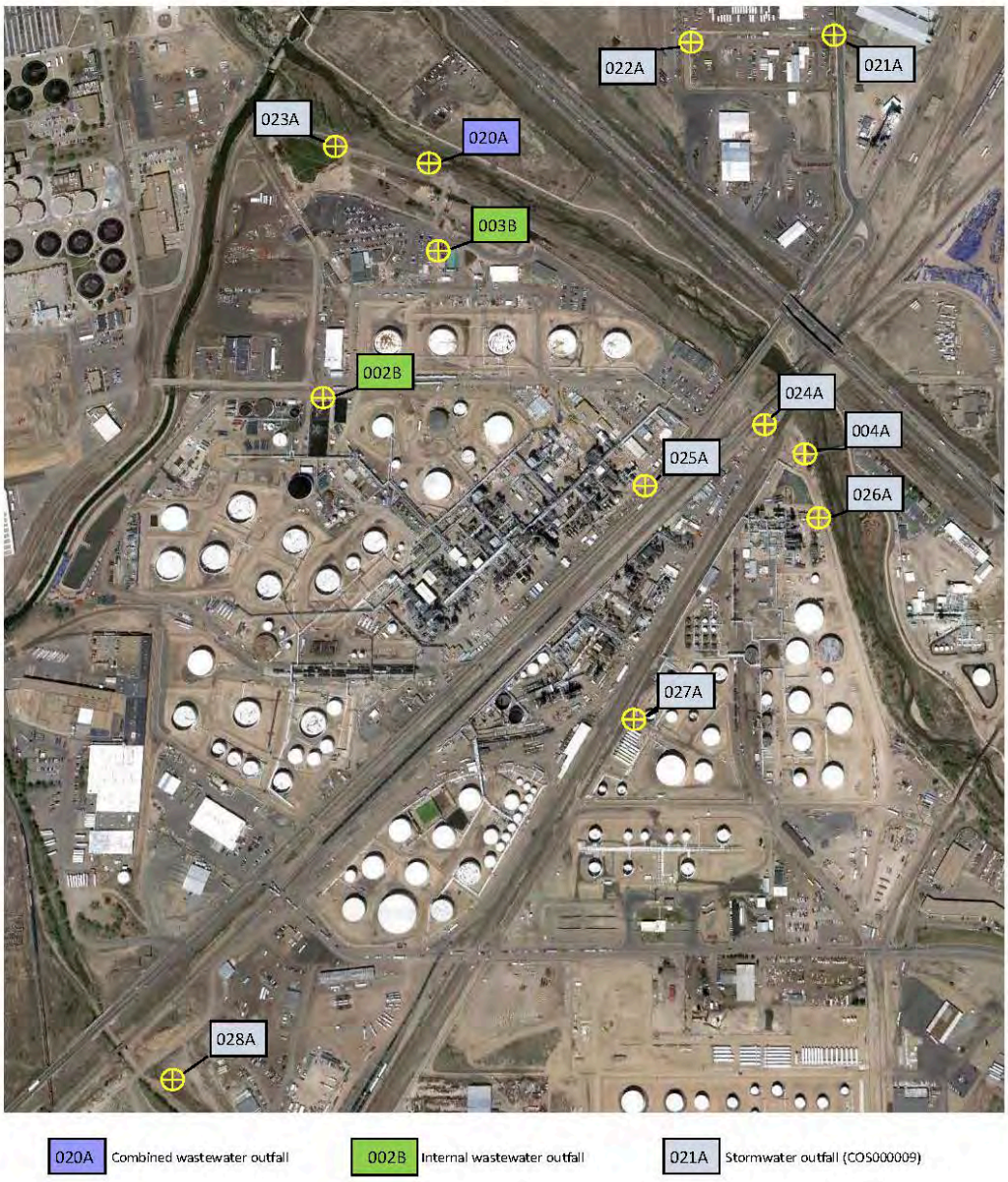


Exhibit 3
Figure 4 – Wastewater Treatment Flow Diagram

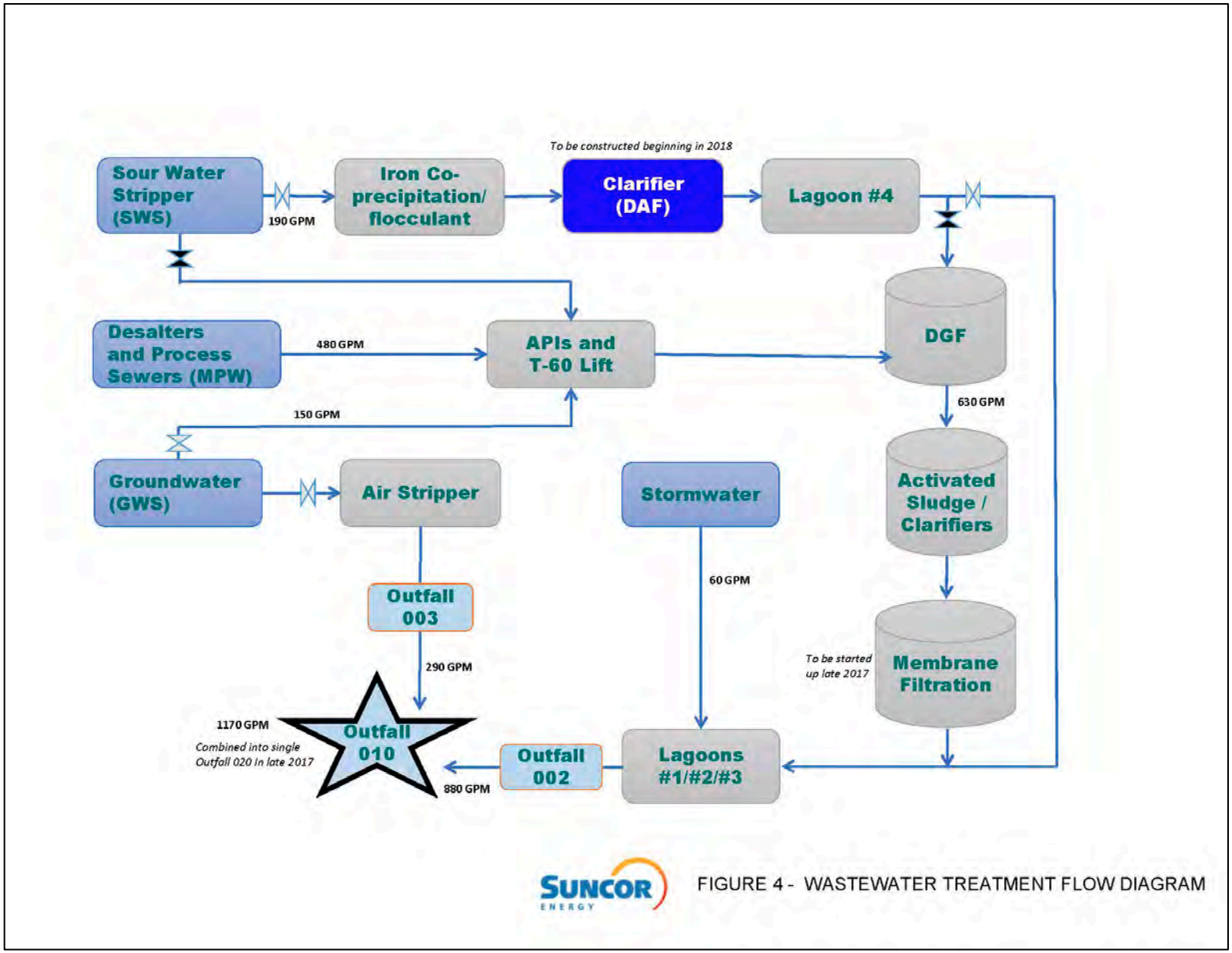


FIGURE 4 - WASTEWATER TREATMENT FLOW DIAGRAM

Exhibit 4
Figure 1: Block Flow Diagram of the Wastewater Treatment System

SECTION 1.1
PROCESS SAFETY MANAGEMENT
PROCESS TECHNOLOGY
PROCESS DESCRIPTION

WATER POLLUTION ABATEMENT – UNIT 045 **COMMERCE CITY REFINERY**

Figure 1: Block Flow Diagram of the Waste Water Treatment System

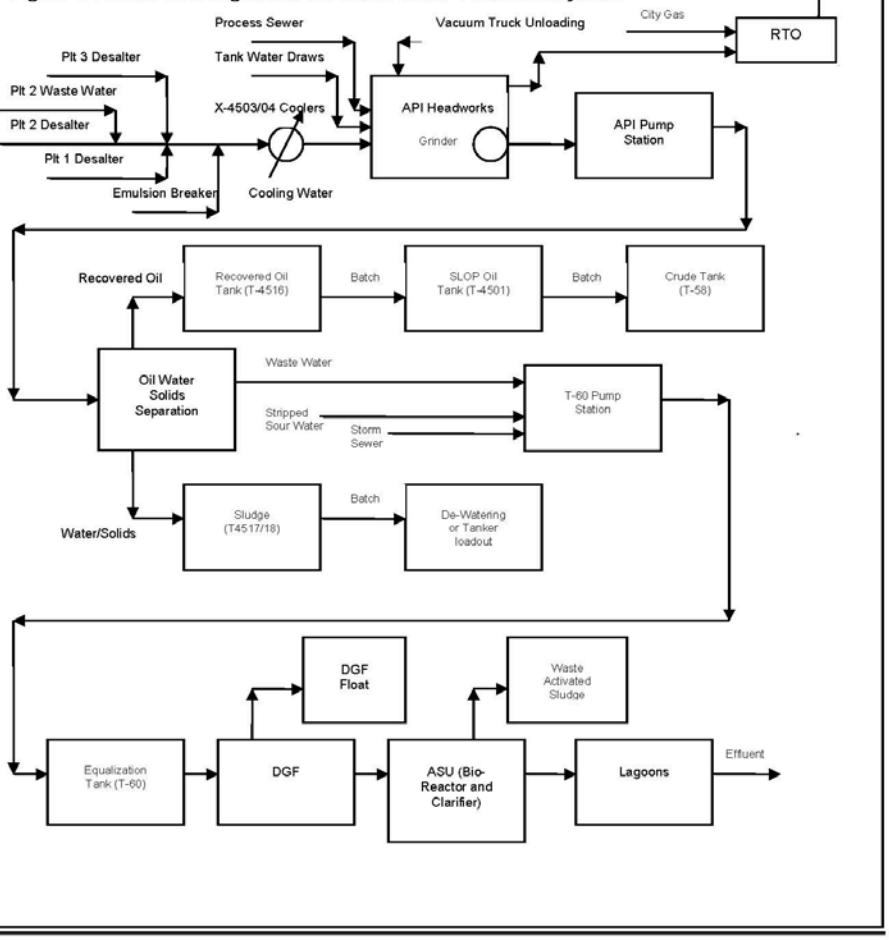
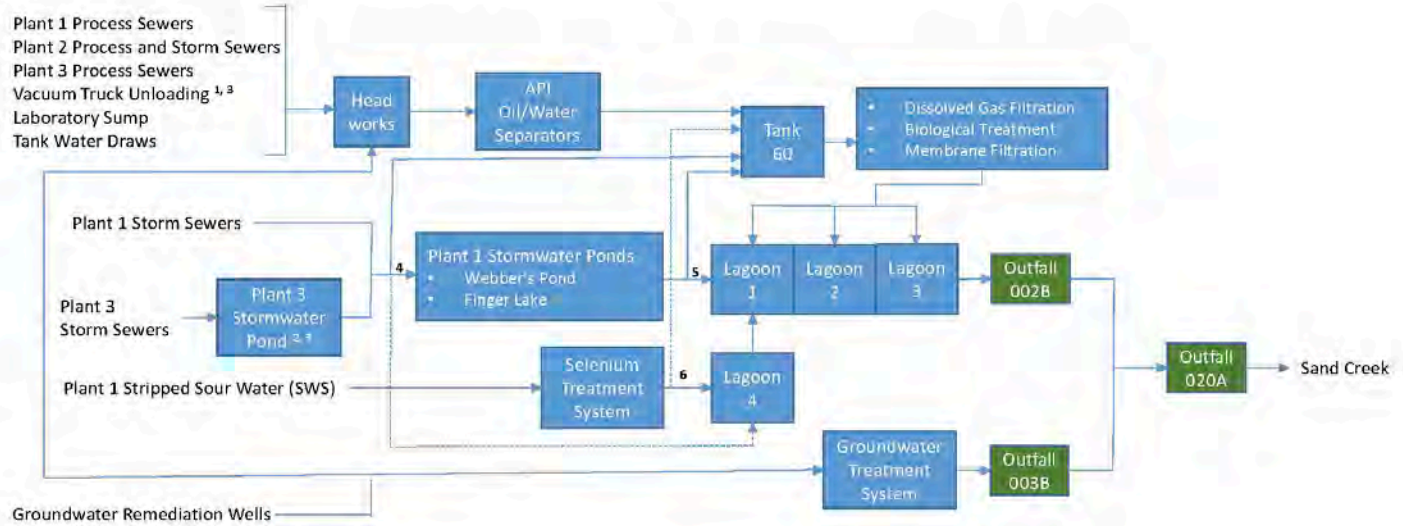


Exhibit 5
Figure 6 -Wastewater and Stormwater Contributions to CO0001147 Outfalls

Figure 6 - Wastewater and Stormwater Contributions to CO0001147 Outfalls



Notes:

1. Vacuum truck loads include water removed from various sumps and basins at the refinery, including the storm pond at Plant 2 associated with Outfall 024A under permit COS000009.
2. The Plant 3 stormwater pond (Mary's Pond) is normally routed to the Plant 1 stormwater ponds if benzene is <5 ug/L. Otherwise, it is sent to Tank 60.
3. Plant 2 and 3 stormwater ponds can be drained to Outfalls 024A and 004A, respectively, under permit COS000009 if sampling shows water is within COS000009 permit limits and benchmark limits.
4. The Plant 1 storm sewer is normally lined up to T-60 in the WWTS. During a storm event, water is diverted to the Plant 1 stormwater ponds after a period of flush to Tank 60.
5. Finger Lake is sampled prior to pumping to WWTS. If benzene is <5 ug/L and Chemical Oxygen Demand (COD) is not elevated, water is sent to Lagoon 1. Otherwise, it is sent to Tank 60.
6. Selenium Treatment System effluent is normally routed to Lagoon 4. However, the option exists to route it to Tank 60.

Exhibit 6
Technology Laboratories Inc DMR QA Study Results

AbsoluteGrade PT Program NELAC-TNI PTP16 **PT Evaluation Report** Page 1 of 1

Technology Laboratories Inc
Ryan Anderson Lab Manager 970-490-1414
1012 Centre Avenue
Fort Collins CO 80526

Account # 212

USEPA Lab ID CO00064
Study # QTA
Study Type External PT

NPDES ID #
Open Date 03/06/2020
Close Date 03/23/2020

NELAC #	Component	Method Code	Method Description	</>	Reported Value	AV or StudyMean	Assigned Value	Acceptance Limits Low	Acceptance Limits High	Performance Evaluation	Analysis Date
Part#55085	Lot#053119	Solids (Total Solids, TSS, & TDS)			DMRQA				Invoice#188767	Units mg/L	
1950	Total Solids					485	485	437	534	NOT REPORTED	
1955	Total Dissolved Solids (TDS)	7290	SM 2540 C-97		572	418	418	373	463	NOT ACCEPT.	03/23/2020
1960	Total Suspended Solids (TSS)					67.8	67.8	54.5	76.2	NOT REPORTED	
Part#55144	Lot#020420	WP Minerals #1 - DMRQA							Invoice#188767	Units mg/L	
1035	Calcium	1601	EPA 200.7-1994		46.9	55.6	55.6	47.3	63.9	NOT ACCEPT.	03/16/2020
1575	Chloride					180	180	159	202	NOT REPORTED	
1755	Total Hardness (CaCO3)	7270	SM 2340 B (1997)		220	256	256	218	294	ACCEPT.	3/16/2020
1085	Magnesium	1601	EPA 200.7-1994		24.9	28.4	28.4	24.1	32.7	ACCEPT.	03/16/2020
1550	Calcium Hardness (CaCO3)	7270	SM 2340 B (1997)		117	139	139	118	160	NOT ACCEPT.	03/16/2020
Part#55145	Lot#022120	WP Minerals #2 - DMRQA							Invoice#188767	Units mg/L	
1505	Total Alkalinity (CaCO3)	7265	SM 2320 B (1997)		146	34.5	34.5	29.3	39.7	NOT ACCEPT.	03/12/2020
1730	Fluoride					0.746	.746	.551	.935	NOT REPORTED	
1125	Potassium	1601	EPA 200.7-1994		55.4	16.3	16.3	13	19.6	NOT ACCEPT.	03/16/2020
1155	Sodium	1601	EPA 200.7-1994		58.0	16.8	16.8	13.4	20.2	NOT ACCEPT.	03/16/2020
2000	Sulfate					20.0	20	15.7	23.4	NOT REPORTED	

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Samples were prepared and scored according to the principles outlined in the "The TNI Standard EL-V3-2009" and the current Fields of Proficiency Testing Tables, FoPTs.
All components are formulated and verified under Absolutes' NELAC scope ANAB Accreditation ISO 17043 (Cert.# AP-1543) as shown in blue font.
This report may be used in whole or in part by the participant. All results are confidential but limited to accreditation body or other participant requests!

AbsoluteGrade PT Program NELAC-TNI PTP16 **PT Evaluation Report** Page 1 of 5

Technology Laboratories Inc
Ryan Anderson Lab Manager 970-490-1414
1012 Centre Avenue
Fort Collins CO 80526

Account # 212

USEPA Lab ID CO00064
Study # 0081
Study Type WPCHEM

NPDES ID #
Open Date 01/15/2020
Close Date 02/29/2020

Part# 55024 Lot# WP0081 WP & DMRQA Trace Elements AMP 1 Invoice# 186041 Units ug/L

NELAC #	Component	Method Code	Method Description	</>	Reported Value	AV or StudyMean	Assigned Value	Acceptance Limits Low	Acceptance Limits High	Performance Evaluation	Analysis Date
1000	Aluminum	1601	EPA 200.7-1994		970	919	919	749	1076	ACCEPT.	02/03/2020
1010	Arsenic	1601	EPA 200.7-1994		482	480	480	401	554	ACCEPT.	02/03/2020
1030	Cadmium	1601	EPA 200.7-1994		758	700	700	595	805	ACCEPT.	02/03/2020
1040	Chromium	1601	EPA 200.7-1994		579	560	560	476	644	ACCEPT.	02/03/2020
1050	Cobalt	1601	EPA 200.7-1994		479	460	460	391	529	ACCEPT.	02/03/2020
1055	Copper	1601	EPA 200.7-1994		461	430	430	366	495	ACCEPT.	02/03/2020
1070	Iron	1601	EPA 200.7-1994		737	689	689	586	792	ACCEPT.	02/03/2020
1075	Lead	1601	EPA 200.7-1994		242	230	230	196	265	ACCEPT.	02/03/2020
1090	Manganese	1601	EPA 200.7-1994		1100	1019	1019	866	1172	ACCEPT.	02/03/2020
1095	Mercury	7061	EPA 1631E		15.1	16.0	16	11.2	20.8	ACCEPT.	02/18/2020
1105	Nickel	1601	EPA 200.7-1994		709	679	679	595	768	ACCEPT.	02/03/2020
1140	Selenium	1601	EPA 200.7-1994		376	370	370	315	426	ACCEPT.	02/03/2020
1185	Vanadium	1601	EPA 200.7-1994		447	410	410	349	472	ACCEPT.	02/03/2020
1190	Zinc	1601	EPA 200.7-1994		1260	1219	1219	1036	1402	ACCEPT.	02/03/2020

AbsoluteGrade PT Program NELAC-TNI PTP16 **PT Evaluation Report** Page 2 of 5

Technology Laboratories Inc
Ryan Anderson Lab Manager 970-490-1414
1012 Centre Avenue
Fort Collins CO 80526

Account # 212

USEPA Lab ID CO00064
Study # 0081
Study Type WPCHEM

NPDES ID #
Open Date 01/15/2020
Close Date 02/29/2020

NELAC #	Component	Method Code	Method Description	</>	Reported Value	AV or StudyMean	Assigned Value	Acceptance Limits Low	Acceptance Limits High	Performance Evaluation	Analysis Date
Part# 55024	Lot# WP0081	WP & DMRQA Trace Elements		AMP 1					Invoice# 186041	Units ug/L	
1000	Aluminum	1605	EPA 200.8-1994		981	919	919	749	1076	ACCEPT.	01/30/2020
1010	Arsenic	1605	EPA 200.8-1994		472	480	480	401	554	ACCEPT.	01/30/2020
1030	Cadmium	1605	EPA 200.8-1994		728	700	700	595	805	ACCEPT.	01/30/2020
1040	Chromium	1605	EPA 200.8-1994		595	560	560	476	644	ACCEPT.	01/30/2020
1050	Cobalt	1605	EPA 200.8-1994		483	460	460	391	529	ACCEPT.	01/30/2020
1055	Copper	1605	EPA 200.8-1994		459	430	430	366	495	ACCEPT.	01/30/2020
1070	Iron	8493	EPA 6020A-2007		704	689	689	586	792	ACCEPT.	01/30/2020
1075	Lead	1605	EPA 200.8-1994		211	230	230	196	265	ACCEPT.	01/30/2020
1090	Manganese	1605	EPA 200.8-1994		1034	1019	1019	866	1172	ACCEPT.	01/30/2020
1095	Mercury	1605	EPA 200.8-1994		16.2	16.0	16	11.2	20.8	ACCEPT.	02/11/2020
1105	Nickel	1605	EPA 200.8-1994		719	679	679	595	768	ACCEPT.	01/30/2020
1140	Selenium	1605	EPA 200.8-1994		351	370	370	315	426	ACCEPT.	01/30/2020
1185	Vanadium	1605	EPA 200.8-1994		459	410	410	349	472	ACCEPT.	01/30/2020
1190	Zinc	1605	EPA 200.8-1994		1136	1219	1219	1036	1402	ACCEPT.	01/30/2020
Part# 55025	Lot# WP0081	WP Trace Elements - DMRQA		AMP 2					Invoice# 186041	Units ug/L	
1005	Antimony					510	510	412	592	NOT REPORTED	
1020	Beryllium	1601	EPA 200.7-1994		110	98.9	98.9	84.1	114	ACCEPT.	02/03/2020
1100	Molybdenum	1601	EPA 200.7-1994		147	140	140	116	162	ACCEPT.	02/03/2020
1160	Strontium					350	350	298	403	NOT REPORTED	
1165	Thallium					120	120	88.3	148	NOT REPORTED	
1180	Titanium					110	110	93.5	127	NOT REPORTED	
1150	Silver	1601	EPA 200.7-1994		472	430	430	366	495	ACCEPT.	02/03/2020
1015	Barium	1601	EPA 200.7-1994		196	170	170	145	196	ACCEPT.	02/03/2020
1025	Boron					1289	1289	1096	1482	NOT REPORTED	

AbsoluteGrade PT Program NELAC-TNI PTP16 **PT Evaluation Report** Page 3 of 5

Technology Laboratories Inc
Ryan Anderson Lab Manager 970-490-1414
1012 Centre Avenue
Fort Collins CO 80526

Account # 212

USEPA Lab ID CO00064
Study # 0081
Study Type WPCHEM

NPDES ID #
Open Date 01/15/2020
Close Date 02/29/2020

NELAC #	Component	Method Code	Method Description	</>	Reported Value	AV or StudyMean	Assigned Value	Acceptance Limits Low	Acceptance Limits High	Performance Evaluation	Analysis Date
Part# 55025	Lot# WP0081	WP Trace Elements - DMRQA		AMP 2					Invoice# 186041		Units ug/L
1005	Antimony	1605	EPA 200.8-1994		530	510	510	412	592	ACCEPT.	02/11/2020
1020	Beryllium	1605	EPA 200.8-1994		112	98.9	98.9	84.1	114	ACCEPT.	02/11/2020
1100	Molybdenum	1605	EPA 200.8-1994		149	140	140	116	162	ACCEPT.	02/11/2020
1160	Strontium					350	350	298	403	NOT REPORTED	
1165	Thallium					120	120	88.3	148	NOT REPORTED	
1180	Titanium					110	110	93.5	127	NOT REPORTED	
1150	Silver	1605	EPA 200.8-1994		428	430	430	366	495	ACCEPT.	02/11/2020
1015	Barium	1605	EPA 200.8-1994		183	170	170	145	196	ACCEPT.	02/11/2020
1025	Boron					1289	1289	1096	1482	NOT REPORTED	
Part# 55026	Lot# WP0081	WP Conductance @ 25°C - DMRQA		@ 25 C					Invoice# 186041		Units umhos/cm
1610	Specific Conductance @ 25 C	3	EPA 120.1		588	575	575	518	633	ACCEPT.	02/24/2020
Part# 55035	Lot# WP0081	WP & DMRQA Nutrients		Inorganic					Invoice# 186041		Units mg/L
1515	Ammonia as N	7231	SM 4500-NH3 F-1994		9.20	9.34	9.34	7.42	11.2	ACCEPT.	01/22/2020
1810	Nitrate as N	415	EPA 300.1		5.27	6.13	6.13	4.99	7.24	ACCEPT.	01/29/2020
1870	Orthophosphate as P	415	EPA 300.1		4.19	3.95	3.95	3.36	4.54	ACCEPT.	02/12/2020
Part# 55038	Lot# WP0081	WP & DMRQA Total Phenolics							Invoice# 186041		Units mg/L
1905	Total Phenolics					0.568	.568	.279	.856	NOT REPORTED	
Part# 55055	Lot# WP0081	WP & DMRQA Demands		TOC,COD,BOD,CBOD					Invoice# 186041		Units mg/L
1530	5-Day BOD	7702	SM 5210 B-2001		92.2	128	128	69.3	187	ACCEPT.	02/17/2020
1555	Carbonaceous BOD					116	116	54.5	178	NOT REPORTED	
1565	Chemical Oxygen Demand	7709	SM 5220 D (1997)		230	218	218	177	252	ACCEPT.	02/18/2020
2040	Total Organic Carbon	7720	SM 5310 C-2000		80.0	86.1	86.1	72.4	98.9	ACCEPT.	02/18/2020

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Samples were prepared and scored according to the principles outlined in the "The TNI Standard EL-V3-2009" and the current Fields of Proficiency Testing Tables, FoPTs.
All components are formulated and verified under Absolutes' NELAC scope ANAB Accreditation ISO 17043 (Cert.# AP-1543) as shown in blue font.
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AbsoluteGrade PT Program NELAC-TNI PTP16 **PT Evaluation Report** Page 4 of 5

Technology Laboratories Inc
Ryan Anderson Lab Manager 970-490-1414
1012 Centre Avenue
Fort Collins CO 80526

Account # 212

USEPA Lab ID **CO00064**
Study # **0081**
Study Type **WPCHEM**

NPDES ID #
Open Date **01/15/2020**
Close Date **02/29/2020**

NELAC #	Component	Method Code	Method Description	</>	Reported Value	AV or StudyMean	Assigned Value	Acceptance Limits Low	Acceptance Limits High	Performance Evaluation	Analysis Date
Part# **55061**	Lot# **WP0081**	**WP pH @ 25°C - DMRQA**						Invoice# **186041**		Units **pH**	
1900	pH	1419	SM 4500-H+-B 2011		7.64	7.67	7.67	7.47	7.87	ACCEPT.	02/03/2020
Part# **55062**	Lot# **WP0081**	**WP & DMRQA Total Residual Chlorine**						Invoice# **186041**		Units **mg/L**	
1940	Total Residual Chlorine					0.788	.788	.591	.96	NOT REPORTED	
1740	Free Chlorine					0.788	.788	.591	.96	NOT REPORTED	
Part# **55064**	Lot# **WP0081**	**WP & DMRQA Nutrients #2**		**TKN / Total P**				Invoice# **186041**		Units **mg/L**	
1795	Total Kjeldahl Nitrogen	7231	SM 4500-NH3 F-1994		3.60	3.64	3.64	2.45	5.07	ACCEPT.	02/17/2020
1910	Total Phosphorus	1601	EPA 200.7-1994		7.10	8.39	8.39	6.99	9.69	ACCEPT.	02/18/2020
Part# **55065**	Lot# **WP0081**	**WP & DMRQA Total Cyanide**						Invoice# **186041**		Units **mg/L**	
1645	Total Cyanide	1407	SM 4500-CN⁻ E (1992)		0.588	0.601	.601	.391	.811	ACCEPT.	02/10/2020
Part# **55084**	Lot# **WP0081**	**WP Oil & Grease + TPH (n-Hexadecane &**		**EPA Method 1664 - DMRQA**				Invoice# **186041**		Units **mg/L**	
1803	Oil & Grease	1957	EPA 1664A-1999		41.4	46.5	46.5	29.5	57.1	ACCEPT.	02/24/2020
1853	TPH	7144	EPA1664A SGT-HEM (99)		22.2	23.2	23.2	9.18	33.5	ACCEPT.	02/24/2020
Part# **55085**	Lot# **WP0081**	**Solids (Total Solids, TSS, & TDS)**		**DMRQA**				Invoice# **186041**		Units **mg/L**	
1950	Total Solids					586	586	527	645	NOT REPORTED	
1955	Total Dissolved Solids (TDS)	7290	SM 2540 C-97		628	501	501	451	551	NOT ACCEPT.	01/29/2020
1960	Total Suspended Solids (TSS)	7294	SM 2540 D-97		74.0	84.6	84.6	69.3	94	ACCEPT.	01/29/2020
Part# **55087**	Lot# **WP0081**	**Settleable Solids - DMRQA**						Invoice# **186041**		Units **mL/L**	
1965	Settleable solids (Volumetric)					6.13	6.13	3.92	8.85	NOT REPORTED	

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AbsoluteGrade PT Program NELAC-TNI PTP16 **PT Evaluation Report** Page 5 of 5

Technology Laboratories Inc
Ryan Anderson Lab Manager 970-490-1414
1012 Centre Avenue
Fort Collins CO 80526

Account # 212

USEPA Lab ID C000064
Study # 0081
Study Type WPCHEM

NPDES ID #
Open Date 01/15/2020
Close Date 02/29/2020

NELAC #	Component	Method Code	Method Description	</>	Reported Value	AV or StudyMean	Assigned Value	Acceptance Limits Low	Acceptance Limits High	Performance Evaluation	Analysis Date
Part# 55096	Lot# WP0081	WP Hexavalent Chromium - DMRQA	NELAC Additional Analytes				Invoice# 186041		Units ug/L		
1045	Chromium VI					240	240	198	280	NOT REPORTED	
Part# 55101	Lot# WP0081	WP Turbidity - DMRQA					Invoice# 186041		Units NTU		
2055	Turbidity					21.5	21.5	18	25.1	NOT REPORTED	
Part# 55130	Lot# WP0081	WP Nitrate & Nitrite - DMRQA	3 Components				Invoice# 186041		Units mg/L		
1840	Nitrite as N	415	EPA 300.1		3.68	3.91	3.91	3.4	4.43	ACCEPT.	01/29/2020
1810	Nitrate as N	415	EPA 300.1		7.94	8.95	8.95	7.38	10.5	ACCEPT.	01/29/2020
1820	Nitrite + Nitrate as N	415	EPA 300.1		11.6	12.9	12.9	10.8	14.9	ACCEPT.	01/29/2020
Part# 55144	Lot# WP0081	WP Minerals #1 - DMRQA					Invoice# 186041		Units mg/L		
1035	Calcium	1601	EPA 200.7-1994		31.7	39.2	39.2	33.3	45.1	NOT ACCEPT.	02/18/2020
1575	Chloride	415	EPA 300.1		136	136	136	120	153	ACCEPT.	01/29/2020
1755	Total Hardness (CaCO3)	7270	SM 2340 B (1997)		154	194	194	165	223	NOT ACCEPT.	02/18/2020
1085	Magnesium	1601	EPA 200.7-1994		18.2	23.2	23.2	19.7	26.7	NOT ACCEPT.	02/18/2020
1550	Calcium Hardness (CaCO3)	7270	SM 2340 B (1997)		79.2	97.8	97.8	83.1	112	NOT ACCEPT.	02/18/2020
Part# 55145	Lot# WP0081	WP Minerals #2 - DMRQA					Invoice# 186041		Units mg/L		
1505	Total Alkalinity (CaCO3)	7265	SM 2320 B (1997)		51.2	41.1	41.1	34.9	47.3	NOT ACCEPT.	02/06/2020
1730	Fluoride	415	EPA 300.1		3.33	3.68	3.68	2.98	4.22	ACCEPT.	01/29/2020
1125	Potassium	1601	EPA 200.7-1994		18.6	24.0	24	19.2	28.8	NOT ACCEPT.	02/18/2020
1155	Sodium	1601	EPA 200.7-1994		18.3	23.4	23.4	18.7	28.1	NOT ACCEPT.	02/18/2020
2000	Sulfate	415	EPA 300.1		25.2	29.4	29.4	23.7	34	ACCEPT.	01/29/2020

Exhibit 7
Chain-of-Custody Forms and Documentation

TECHNOLOGY LABORATORY, INC.
1012 CENTRE AVENUE
FORT COLLINS, CO 80526
Phone: (970)490-1414 Fax: (970)472-5488
www.techlabusa.com info@techlabusa.com

W.O. NUMBER C1720

JR 8-22-21

CHAIN-OF-CUSTODY REPORT

COMPANY NAME	Suncor Energy USA Inc
PROJECT MANAGER	Brian Lilly/Eric Marler
PROJECT NUMBER	Quarterly NPDES Water Sampling (2Q2021)
PROJECT LOCATION OR NAME	Commerce City Refinery
SAMPLER'S SIGNATURE	

	SAMPLE ID	DATE/TIME SAMPLED	SAMPLE MATRIX: SOIL (S) AIR (A) AQUEOUS (W) OTHER (O)	NUMBER OF CONTAINERS	ANALYSIS REQUESTED: BTEX / MTBE / NAP	TEPH (DRO)	OIL & GREASE (HEM)	VOC 624 / 8260 (TOTAL / TCLP)	SVOC 625 / 8270 / PAH (TOTAL / TCLP)	pH / TSS / TDS	RCRA 8 METALS (TOTAL / TCLP / DISSOLVED)	React. / Ignite. / Corr. / Paint Filt.	BTEX/TVPH Emissions Vapor	Conductivity	TOC	NITRATE / NITRITE / AMMONIA Nitrate+Nitrite (as N)	Pot. Dis. Metals (Ur, Ni) by EPA 200.8	200.7 (Total Ca, Mg, Na)	1631 LL Mercury	Specific Conductance/Bicarbonate Alkalinity for SAR	SAR	OTHER: HOLD AFTER ANALYSIS	HOLD, DON'T ANALYZE
01	OUTFALL 020 composite	7Apr.21 0543	W	1													x						
02	OUTFALL 020 grab	7Apr.21 0545	W	3														x	x	x	x		
03	Trip Blank	4/7/21 0530	W	1															x				

PAGE 1 OF 1

TURNAROUND TIME

- [x] Normal (≤10 Working Days)
- [ ] 3 Day (1.5 x Normal Rates)
- [ ] Next Day (2 x Normal Rates)
- [ ] Same Day (4 x Normal Rates)

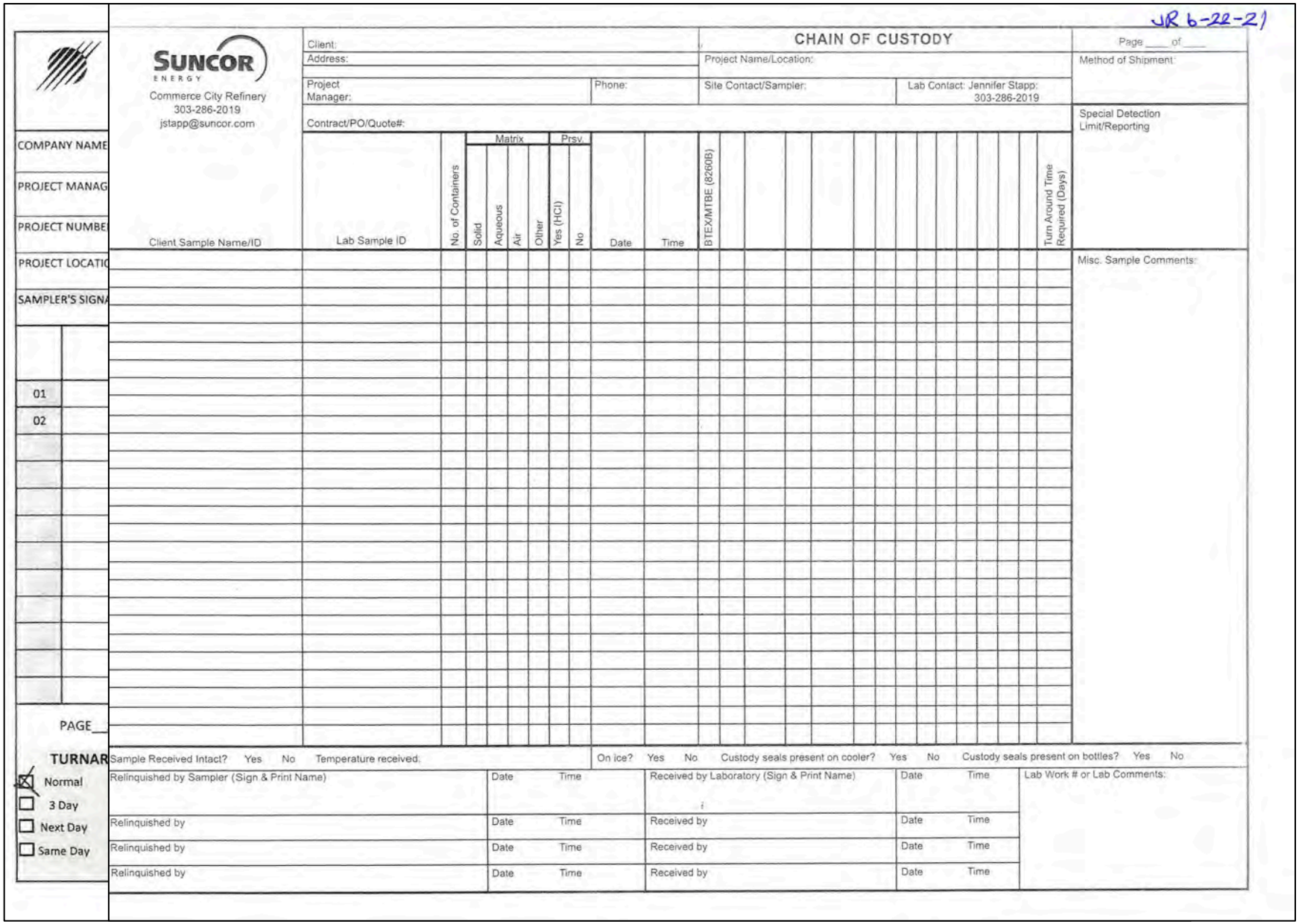
NPDES PERMIT? X YES ___ NO

COMMENTS:

RELINQUISHED BY:		DATE: 7Apr.21	RECEIVED BY:	DATE:
COMPANY:	Suncor energy	TIME: 1000	COMPANY: IEX	TIME:
RELINQUISHED BY:		DATE:	RECEIVED BY: KA	DATE: 4/7/21
COMPANY: IEX		TIME:	COMPANY: TLI	TIME: 100 p.m.

LOGGED IN BY: KA

Sample Preservative: [x] ≤ 6° C [x] None [ ] Other [x] Acid [ ] Filtered



JR 6-22-21

SUNCOR ENERGY

Commerce City Refinery
303-286-2019
jstapp@suncor.com

CHAIN OF CUSTODY

Client:
Address:
Project Manager:
Phone:
Contract/PO/Quote#:
Project Name/Location:
Site Contact/Sampler:
Lab Contact: Jennifer Stapp: 303-286-2019
Page ___ of ___
Method of Shipment:
Special Detection Limit/Reporting

COMPANY NAME
PROJECT MANAG
PROJECT NUMBE
PROJECT LOCATIO
SAMPLER'S SIGNA

Client Sample Name/ID	Lab Sample ID	No. of Containers	Matrix: Solid	Matrix: Aqueous	Matrix: Air	Matrix: Other	Prsv: Yes (HCl)	Prsv: No	Date	Time	BTEX/MTBE (8260B)													Turn Around Time Required (Days)
01																								
02																								

Misc. Sample Comments:

PAGE__

TURNAR
- [x] Normal
- [ ] 3 Day
- [ ] Next Day
- [ ] Same Day

Sample Received Intact? Yes No Temperature received: On ice? Yes No Custody seals present on cooler? Yes No Custody seals present on bottles? Yes No

Relinquished by Sampler (Sign & Print Name)	Date	Time	Received by Laboratory (Sign & Print Name)	Date	Time	Lab Work # or Lab Comments:
Relinquished by	Date	Time	Received by	Date	Time	
Relinquished by	Date	Time	Received by	Date	Time	
Relinquished by	Date	Time	Received by	Date	Time	

Appendix C
CDPS Permit No. CO0001147

AUTHORIZATION TO DISCHARGE UNDER THE

COLORADO DISCHARGE PERMIT SYSTEM

In compliance with the provisions of the Colorado Water Quality Control Act, (25-8-101 et seq., CRS, 1973 as amended), for both discharges to surface and ground waters, and the Federal Water Pollution Control Act, as amended (33 U.S.C. 1251 et seq.; the "Act"), for discharges to surface waters only, the

Suncor Energy (USA) Inc.

is authorized to discharge from the Commerce City Refinery located at **in the SW ¼ of Sect. 12, T3S, R68W, 6th P.M., at 5801 Brighton Blvd., Commerce City, CO, Latitude: 39° 48' 18'' N, Longitude: 104° 56' 35 '' W**

to **Sand Creek**

in accordance with effluent limitations, monitoring requirements and other conditions set forth in Parts I and II hereof. All discharges authorized herein shall be consistent with the terms and conditions of this permit.

The applicant may demand an adjudicatory hearing within thirty (30) calendar days of the date of issuance of the final permit determination, per the Colorado Discharge Permit System Regulations, 61.7(1). Should the applicant choose to contest any of the effluent limitations, monitoring requirements or other conditions contained herein, the applicant must comply with Section 24-4-104 CRS and the Colorado Discharge Permit System Regulations. Failure to contest any such effluent limitation, monitoring requirement, or other condition, constitutes consent to the condition by the Applicant.

This permit and the authorization to discharge shall expire at midnight October 31, 2017

COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT

Erin Scott, Acting Permits Section Manager
Water Quality Control Division

Modification #3-Minor Amendment – Issued January 25, 2017, Effective March 1, 2017 (Parts I.A.2 and II.B.2)
Modification #2– Minor Amendment–Issued February 25, 2015, Effective April 1, 2015 (Part I.A.2 and Part II.B.2)
Modification #1 – Minor Amendment – Issued May 28, 2013, Effective June 1, 2013 (Part II.B.5)
Originally Issued September 27, 2012 and Effective November 1, 2012

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PART I

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1. Permitted Feature(s)

Beginning no later than the effective date of this permit and lasting through the expiration date, the permittee is authorized to discharge from, and self monitoring samples taken in accordance with the monitoring requirements shall be obtained from permitted feature(s):

002A (prior to physical combination) / 002B (after physical combination)/, facility process water discharge. 39° 48" 51' N, 104° 56" 85'W. Due to configuration of the Outfall structure, monitoring for all parameters except pH and flow will be via samples taken inside the aeration basin immediately upstream of the basin outlet to Sand Creek; flow and pH are measured at the Parshall flume.

003A (prior to pyhsical combination) / 003B (after pyhsical combination)/, from the groundwater remediation project, to Sand Creek . 39° 48' 51" N, 104° 56' 85" W. Due to configuration of the Outfall structure, monitoring for all parameters will be via samples taken at the Parshall flume discharging to the outlet piping to Sand Creek.

010A, calculated compliance point based on flow weighted composited samples for Outfalls 002 and 003 combined, to Sand Creek.

020A, physical combination of Outfalls 002A and 003A, sampling will be conducted downstream from the confluence of outfalls 002A and 003A, 39° 48" 15' N, 104° 56" 85'W. This must be completed by December 31, 2017 to allow monitoring to commence on January 1, 2018.

The location(s) provided above will serve as the point(s) of compliance for this permit and are appropriate as they are located after all treatment and prior to discharge to the receiving water.

In accordance with the Water Quality Control Commission Regulations for Effluent Limitations, Section 62.4, and the Colorado Discharge Permit System Regulations, Section 61.8(2), 5 C.C.R. 1002-61, the permitted discharge shall not contain effluent parameter concentrations which exceed the limitations specified below or exceed the specified flow limitation.

2. Limitations, Monitoring Frequencies and Sample Types

In order to obtain an indication of the probable compliance or noncompliance with the effluent limitations specified in Part I.A, the permittee shall monitor all effluent parameters at the frequencies and sample types specified below. Such monitoring will begin immediately and last for the life of the permit unless otherwise noted. The results of such monitoring shall be reported on the Discharge Monitoring Report form (See Part I.D.)

Self-monitoring sampling by the permittee for compliance with the monitoring requirements specified above shall be performed at the location(s) noted in Part I.A.1 above.

If the permittee, using an approved analytical method, monitors any parameter more frequently than required by this permit, then the results of such monitoring shall be included in the calculation and reporting of the values required in the Discharge Monitoring Report Form (DMRs) or other forms as required by the Division. Such increased frequency shall also be indicated.

Oil and Grease Monitoring: For every permitted feature with oil and grease monitoring, a grab sample shall be collected, analyzed, and reported on the appropriate DMR. In addition, corrective action shall be taken immediately to mitigate the discharge of oil and grease. A description of the corrective action taken should be included with the DMR.

Outfall 002A (prior to physical combination)

ICIS Code	Effluent Parameter	Effluent Limitations Maximum Concentrations			Monitoring Requirements	
		30-Day Average	7-Day Average	Daily Maximum	Frequency	Sample Type
50050	Effluent Flow (MGD)	1.5		Report	Continuous	Recorder
00010	Temp Daily Max (°C) March-Nov beginning July 1, 2013			Report	Continuous	Recorder
00010	Temp Daily Max (°C) Dec-Feb beginning July 1, 2013			Report	Continuous	Recorder
00010	Temp MWAT (°C) March-Nov beginning July 1, 2013		Report		Continuous	Recorder
00010	Temp MWAT (°C) Dec-Feb beginning July 1, 2013		Report		Continuous	Recorder
00300	DO (mg/l)			5(min)	Daily	Grab
00400	pH (su)			6.5-9.0	Daily	Grab
00610	Total Ammonia as N (mg/l)					
	January	10.5		27	Monthly	Composite
	February	12.5		23	Monthly	Composite
	March	10.8		20	Monthly	Composite
	April	7		16	Monthly	Composite
	May	8.3		24	Monthly	Composite
	June	5.9		16	Monthly	Composite
	July	6.7		45	Monthly	Composite
	August	5.2		37	Monthly	Composite
	September	8.3		35	Monthly	Composite
	October	10		41	Monthly	Composite
	November	8.5		31	Monthly	Composite
	December	8.9		32	Monthly	Composite
00310	BOD5, effluent (lbs/day)	875		1575	Weekly	Calculated
00530	TSS, effluent (lbs/day)	700		1098	Weekly	Calculated
80130	COD (lbs/day)	6108		11770	Weekly	Calculated
00152	Oil and Grease (lbs/day)	254		477	Weekly	Grab
34043	Total Phenolics (lbs/day)	5.68		12	Weekly	Composite
70028	Total Chromium (lbs/day)	6.7		19.2	Quarterly	Composite
01255	Hexavalent Chromium (lbs/day)	0.5464		1.2294	Quarterly	Composite
00745	Total Sulfide (lbs/day)	4.6		10	Monthly	Composite
00978	As, TR (µg/l)	Report		Report	Monthly	Composite
01306	Cu, PD (µg/l)	Report		Report	Monthly	Composite
00980	Fe, TR (µg/l)	Report		Report	Monthly	Composite
01318	Pb, PD (µg/l)	Report		Report	Monthly	Composite
01319	Mn, PD (µg/l)	Report		Report	Monthly	Composite
71900	Hg, Tot (µg/l)	Report		Report	Quarterly	Grab
01322	Ni, PD (µg/l)	Report		Report	Quarterly	Composite
01323	Se, PD (µg/l)	Report		Report	Monthly	Composite
01304	Ag, PD (µg/l)	Report		Report	Monthly	Composite
01326	U, PD (µg/l)	Report		Report	Quarterly	Composite
01303	Zn, PD (µg/l)	Report		Report	Monthly	Composite
51202	Sulfide as H2S (mg/l)	Report		Report	Monthly	Composite

Outfall 002A (prior to physical combination), continued

ICIS Code	Effluent Parameter	Effluent Limitations Maximum Concentrations			Monitoring Requirements	
		30-Day Average	7-Day Average	Daily Maximum	Frequency	Sample Type
34030	Benzene (µg/l)			5	Weekly	Grab
49491	BTEX(µg/l)	Report		100	Weekly	Grab
22417	MTBE (µg/l)	Report		Report	Weekly	Grab
00918	Calcium (mg/l)	Report		Report	Quarterly	Grab
00921	Magnesium (mg/l)	Report		Report	Quarterly	Grab
00923	Sodium (mg/l)	Report		Report	Quarterly	Grab
00440	Bicarbonate as HCO3 (mg/l)	Report		Report	Quarterly	Grab
00931	SAR calculated limit	Report		Report	Quarterly	Calculated
00931	Adjusted SAR effluent	Report		Report	Quarterly	Calculated
00094	EC (dS/m)	Report		Report	Quarterly	Grab

There shall be no discharge of floating solids.

Outfall 003A (prior to physical combination)

ICIS Code	Effluent Parameter	Effluent Limitations Maximum Concentrations			Monitoring Requirements	
		30-Day Average	7-Day Average	Daily Maximum	Frequency	Sample Type
50050	Effluent Flow (MGD)	2.16		Report	Continuous	Recorder
00010	Temp Daily Max (°C) March-Nov beginning July 1, 2013			Report	Continuous	Recorder
00010	Temp Daily Max (°C) Dec-Feb beginning July 1, 2013			Report	Continuous	Recorder
00010	Temp MWAT (°C) March-Nov beginning July 1, 2013		Report		Continuous	Recorder
00010	Temp MWAT (°C) Dec-Feb beginning July 1, 2013		Report		Continuous	Recorder
80103	Chemical Oxygen Demand (mg/l)			Report	Weekly	Composite
00400	pH (su)			6.5-9.0	Daily	Grab
00530	TSS, effluent (mg/l)	30	45		2 Days/Week	Composite
03582	Oil and Grease (mg/l)			10	Daily	Grab
00978	As, TR (µg/l)	Report		Report	Monthly	Composite
01306	Cu, PD (µg/l)	Report		Report	Monthly	Composite
00980	Fe, TR (µg/l)	Report		Report	Monthly	Composite
01318	Pb, PD (µg/l)	Report		Report	Monthly	Composite
01319	Mn, PD (µg/l)	Report		Report	Monthly	Composite
71900	Hg, Tot (µg/l)	Report		Report	Quarterly	Grab
01322	Ni, PD (µg/l)	Report		Report	Quarterly	Composite
01323	Se, PD (µg/l)	Report		Report	Monthly	Composite
01304	Ag, PD (µg/l)	Report		Report	Monthly	Composite
01326	U, PD (µg/l)	Report		Report	Quarterly	Composite
01303	Zn, PD (µg/l)	Report		Report	Monthly	Composite
51202	Sulfide as H2S (mg/l)	Report		Report	Monthly	Composite
34030	Benzene (µg/l)			5	Weekly	Grab
49491	BTEX (µg/l)			100	Weekly	Grab
22417	MTBE (µg/l)	Report		Report	Weekly	Grab
00918	Calcium (mg/l)	Report		Report	Quarterly	Grab
00921	Magnesium (mg/l)	Report		Report	Quarterly	Grab
00923	Sodium (mg/l)	Report		Report	Quarterly	Grab
00440	Bicarbonate as HCO3 (mg/l)	Report		Report	Quarterly	Grab
00931	SAR calculated limit	Report		Report	Quarterly	Calculated
00931	Adjusted SAR effluent	Report		Report	Quarterly	Calculated
00094	EC (dS/m)	Report		Report	Quarterly	Grab

Outfall 010A (prior to physical combination)

ICIS Code	Effluent Parameter	Effluent Limitations Maximum Concentrations			Monitoring Requirements	
		30-Day Average	7-Day Average	Daily Maximum	Frequency	Sample Type
50050	Effluent Flow (MGD)	3.66		Report	Continuous	Calculated
00978	As, Tot (µg/l)					
	Until December 31, 2017	116			Monthly	Calculated
	Beginning January 1, 2018	10			Monthly	Calculated
01306	Cu, PD (µg/l)	Report		Report	Monthly	Calculated
00718	CN, WAD (µg/l)			Report	Monthly	Calculated
00980	Fe, TR (µg/l)					
	Until December 31, 2017	1100			Monthly	Calculated
	Beginning January 1, 2018	917			Monthly	Calculated
01318	Pb, PD (µg/l)	Report		Report	Monthly	Calculated
01319	Mn, PD (µg/l)					
	Until December 31, 2017	2900		5000	Monthly	Calculated
	Beginning January 1, 2018	1294		5063	Monthly	Composite
71900	Hg, Tot (µg/l)	Report				Calculated
	Until December 31, 2017	Report			Quarterly	Calculated
	Beginning January 1, 2018	0.026			Quarterly	Calculated
01322	Ni, PD (µg/l)	Report		Report	Quarterly	Calculated
01323	Se, PD (µg/l)					
	Until September 30, 2020	60		Report	Monthly	Calculated
	Beginning October 1, 2020	24		Report	Monthly	Calculated
01304	Ag, PD (µg/l)					
	Until December 31, 2017	3.9		Report	Monthly	Calculated
	Beginning January 1, 2018	3.25		Report	Monthly	Calculated
01326	U, PD (µg/l)	Report		Report	Quarterly	Calculated
01303	Zn, PD (µg/l)					
	Until December 31, 2017	Report		Report	Monthly	Calculated
	Beginning January 1, 2018	298		Report	Monthly	Calculated
51202	Sulfide as H2S (mg/l)	Report			Monthly	Calculated
34030	Benzene (µg/l)	Report		5	Weekly	Calculated
49491	BTEX (µg/l)			100	Weekly	Calculated
22417	MTBE (µg/l)	384			Weekly	Calculated
00918	Calcium (mg/l)	Report		Report	Quarterly	Calculated
00921	Magnesium (mg/l)	Report		Report	Quarterly	Calculated
00923	Sodium (mg/l)	Report		Report	Quarterly	Calculated
00440	Bicarbonate as HCO_3 (mg/l)	Report		Report	Quarterly	Calculated
00931	SAR calculated limit*	Report		Report	Quarterly	Calculated
00931	Adjusted SAR effluent**	Report		Report	Quarterly	Calculated
00094	EC (dS/m)	Report		Report	Quarterly	Calculated
TKP6C	Static Renewal 7 Day Chronic*** *Pimephales promelas*			Report	Quarterly	3 Composites / Test
TKP3B	Static Renewal 7 Day Chronic *Ceriodaphnia dubia*			Report	Quarterly	3 Composites / Test

* This SAR limit is to be calculated using the actual measured EC value (30-day average) of the effluent and substituting this value in to the following equation to solve for SAR. The equation for determining the SAR limit is: SAR = (7.1 * EC) – 2.48.

** The SAR value of the effluent is to be reported as the adjusted SAR. See the definitions section in Part I.C.17 for information on calculating the adjusted SAR value.

***The facility will collect samples from both outfalls and create a flow weighted sample to run WET testing on.

Outfall 002B(after physical combination), samples will be collected before the connection with outfall 003A

ICIS Code	Effluent Parameter	Effluent Limitations Maximum Concentrations			Monitoring Requirements	
		30-Day Average	7-Day Average	Daily Maximum	Frequency	Sample Type
50050	Effluent Flow (MGD)	Report		Report	Continuous	Recorder
00400	pH (su)			6.0-9.0	Daily	Grab
00310	BOD5, effluent (lbs/day)	875		1575	2 Days/Week	Calculated
00530	TSS, effluent (lbs/day)	700		1098	2 Days/Week	Calculated
80130	COD (lbs/day)	6108		11770	2 Days/Week	Calculated
00152	Oil and Grease (lbs/day)	254		477	Monthly	Grab
34043	Total Phenolics (lbs/day)	5.68		12	Monthly	Composite
70028	Total Chromium (lbs/day)	6.7		19.2	Monthly	Composite
01255	Hexavalent Chromium (lbs/day)	0.5464		1.2294	Quarterly	Composite
00745	Total Sulfide (lbs/day)	4.6		10	Monthly	Composite
00610	Total Ammonia as N (mg/l)					
	January	10.5		27	Monthly	Composite
	February	12.5		23	Monthly	Composite
	March	10.8		20	Monthly	Composite
	April	7		16	Monthly	Composite
	May	8.3		24	Monthly	Composite
	June	5.9		16	Monthly	Composite
	July	6.7		45	Monthly	Composite
	August	5.2		37	Monthly	Composite
	September	8.3		35	Monthly	Composite
	October	10		41	Monthly	Composite
	November	8.5		31	Monthly	Composite
	December	8.9		32	Monthly	Composite
34030	Benzene (µg/l)	Report		5	Weekly	Grab
49491	BTEX (µg/l)			100	Weekly	Grab

Outfall 003B (after physical combination), samples will be collected before the connection with outfall 002A

ICIS Code	Effluent Parameter	Effluent Limitations Maximum Concentrations			Monitoring Requirements	
		30-Day Average	7-Day Average	Daily Maximum	Frequency	Sample Type
50050	Effluent Flow (MGD)	Report		Report	Continuous	Recorder
00400	pH (su)			6.0-9.0	Daily	Grab
00530	TSS, effluent (mg/l)	30	45		2 Days/Week	Composite
03582	Oil and Grease (mg/l)			10	Daily	Grab
34030	Benzene (µg/l)			5	Weekly	Grab
49491	BTEX (µg/l)			100	Weekly	Grab

Outfall 020A(after physical combination)

ICIS Code	Effluent Parameter	Effluent Limitations Maximum Concentrations			Monitoring Requirements	
		30-Day Average	7-Day Average	Daily Maximum	Frequency	Sample Type
50050	Effluent Flow (MGD)	3.66		Report	Continuous	Recorder
00010	Temp Daily Max (°C) March-Nov			Report	Continuous	Recorder
00010	Temp Daily Max (°C) Dec-Feb			Report	Continuous	Recorder
00010	Temp MWAT (°C) March-Nov		Report		Continuous	Recorder
00010	Temp MWAT (°C) Dec-Feb		Report		Continuous	Recorder
00300	DO (mg/l)			5(min)	Daily	Grab
00400	pH (su)			6.5-9.0	Daily	Grab
50050	Effluent Flow (MGD)	3.66		Report	Continuous	Recorder
00978	As, Tot (µg/l)					
	Until December 31, 2017	116			Monthly	Composite
	Beginning January 1, 2018	10			Monthly	Composite
01306	Cu, PD (µg/l)	Report		Report	Monthly	Composite
00718	CN, WAD (µg/l)			Report	Monthly	Composite
00980	Fe, TR (µg/l)					
	Until December 31, 2017	1100			Monthly	Composite
	Beginning January 1, 2018	917			Monthly	Composite
01318	Pb, PD (µg/l)	Report		Report	Monthly	Composite
01319	Mn, PD (µg/l)					
	Until December 31, 2017	2900		5000	Monthly	Composite
	Beginning January 1, 2018	1294		5063	Monthly	Composite
71900	Hg, Tot (µg/l)					
	Until December 31, 2017	Report			Quarterly	Grab
	Beginning January 1, 2018	0.026			Quarterly	Composite
01322	Ni, PD (µg/l)	Report		Report	Quarterly	Composite
01323	Se, PD (µg/l)					
	Until September 30, 2020	60		Report	Monthly	Composite
	Beginning October 1, 2020	24		Report	Monthly	Composite
01304	Ag, PD (µg/l)					
	Until December 31, 2017	3.9		Report	Monthly	Composite
	Beginning January 1, 2018	3.25		Report	Monthly	Composite
01326	U, PD (µg/l)	Report		Report	Quarterly	Composite
01303	Zn, PD (µg/l)					
	Until December 31, 2017	Report		Report	Monthly	Composite
	Beginning January 1, 2018	298		Report	Monthly	Composite
51202	Sulfide as H2S (mg/l)	Report			Monthly	Composite

Outfall 020A(after physical combination), continued

ICIS Code	Effluent Parameter	Effluent Limitations Maximum Concentrations			Monitoring Requirements	
		30-Day Average	7-Day Average	Daily Maximum	Frequency	Sample Type
34030	Benzene (µg/l)	Report		5	Weekly	Composite
49491	BTEX (µg/l)			100	Weekly	Composite
22417	MTBE (µg/l)	384			Weekly	Grab
00918	Calcium (mg/l)	Report		Report	Quarterly	Grab
00921	Magnesium (mg/l)	Report		Report	Quarterly	Grab
00923	Sodium (mg/l)	Report		Report	Quarterly	Grab
00440	Bicarbonate as HCO_3 (mg/l)	Report		Report	Quarterly	Grab
00931	SAR calculated limit*	Report		Report	Quarterly	Calculated
00931	Adjusted SAR effluent**	Report		Report	Quarterly	Calculated
00094	EC (dS/m)	Report		Report	Quarterly	Grab
TKP6C	Static Renewal 7 Day Chronic *Pimephales promelas*			Report	Quarterly	3 Composites / Test
TKP3B	Static Renewal 7 Day Chronic *Ceriodaphnia dubia*			Report	Quarterly	3 Composites / Test

* This SAR limit is to be calculated using the actual measured EC value (30-day average) of the effluent and substituting this value in to the following equation to solve for SAR. The equation for determining the SAR limit is: SAR = (7.1 * EC) – 2.48.
** The SAR value of the effluent is to be reported as the adjusted SAR. See the definitions section in Part I.C.17 for information on calculating the adjusted SAR value.

B. TERMS AND CONDITIONS

1. Facilities Operation and Maintenance

The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee as necessary to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems when installed by the permittee only when necessary to achieve compliance with the conditions of the permit. However, the permittee shall operate, at a minimum, one complete set of each main line unit treatment process whether or not this process is needed to achieve permit effluent compliance. Any sludge produced at the wastewater treatment facility shall be disposed of in accordance with State and Federal guidelines and regulations.

2. Compliance Schedule

All information and written reports required by the following compliance schedules should be directed to the Industrial Unit of the Permits Section for final review unless otherwise stated.

a. Installation of Temperature Monitoring Equipment - The following compliance schedule is included to give the facility time to install temperature monitoring equipment for the effluent.

Code	Event	Description	Due Date
04301	Install Temperature Meters	The permittee is to submit a document certifying that continuous temperature monitoring equipment has been installed and is operational.	June 30, 2013

b. Mixing Zone Analyses – Conduct remaining threshold tests for exclusion from further analysis under Mixing Zone Regulations. The second threshold test is the Application of the Mixing Zone Exclusion Tables (p. 20, Colorado Mixing

Zone Implementation Guidance, February 2002). Under this compliance action, the permittee will collect the necessary site-specific data, perform the required analysis, and provide a report to the Division. The report will indicate the findings of this threshold test and, if not excluded, provide the workplan for the next threshold test (i.e., determining of the size of the physical and regulatory mixing zones). This analysis will be conducted for either Outfall 002A and 003A or outfall 020A (if outfall 020 becomes operational before the mixing zone study is started), see delayed due dates.

Code	Event	Description	Due Date
50008	Submit Study Results	Collect site-specific data, perform threshold tests based on Mixing Zone Exclusion Tables, and submit study results.	January 1, 2016
50008	Submit Study Results	If a low flow condition is not reached on the receiving water during the first year, the permittee shall collect the site-specific data, perform threshold tests based on Mixing Zone Exclusion Tables, and submit study results.	January 1, 2017

c. Activities to Meet Total Recoverable Arsenic, Total Recoverable Iron, Potentially Dissolved Silver and Potentially Dissolved Zinc Final Limits – In order to meet Total Recoverable Arsenic, Total Recoverable Iron, Potentially Dissolved Silver, Potentially Dissolved Zinc and Sulfide limitations, the following schedule will be included in the permit.

Code	Event	Description	Due Date
43699	Facility Evaluation Plan	Submit a report that identifies sources of arsenic, iron, silver and zinc to the wastewater treatment facility and identifies strategies to control these sources or treatment alternatives such that compliance with the final limitations may be attained.	December 31, 2013
00899	Implementation Schedule	Submit a progress report summarizing the progress in implementing the strategies to control sources such that compliance with the final Total Recoverable Arsenic, Total Recoverable Iron, Potentially Dissolved Silver and Potentially Dissolved Zinc limitations may be attained.	December 31, 2014
00899	Implementation Schedule	Submit a progress report summarizing the progress in implementing the strategies to control sources such that compliance with the final Total Recoverable Arsenic, Total Recoverable Iron, Potentially Dissolved Silver and Potentially Dissolved Zinc limitations may be attained.	December 31, 2015
00899	Implementation Schedule	Submit a progress report summarizing the progress in implementing the strategies to control sources such that compliance with the final Total Recoverable Arsenic, Total Recoverable Iron, Potentially Dissolved Silver and Potentially Dissolved Zinc limitations may be attained.	December 31, 2016
CS017	Achieve Final Compliance with Emissions or Discharge Limits	Submit study results that show compliance has been attained with the final Total Recoverable Arsenic, Total Recoverable Iron, Potentially Dissolved Silver and Potentially Dissolved Zinc limitations.	December 31, 2017

d. Activities to Meet Total Mercury Final Limits – In order to meet WET Testing, Mercury limitations, the following schedule will be included in the permit.

Code	Event	Description	Due Date
00899	Implementation Schedule	Submit a progress report summarizing the progress in implementing the strategies based on pilot study to control sources such that compliance with the final Total Mercury limitations may be attained.	6/30/2016

00899	Implementation Schedule	Submit a progress report summarizing the progress in implementing the strategies to control sources such that compliance with the final Total Mercury limitations may be attained.	6/30/2017
CS017	Achieve Final Compliance with Emissions or Discharge Limits	Submit study results that show compliance has been attained with the final Total Mercury limitations.	12/31/2017

e. Activities to combine the outfalls 002A and 003A to create single outfall of outfall 020A – In order to meet this requirement, the following schedule will be included in the permit.

Code	Event	Description	Due Date
43699	Facility Evaluation Plan	Submit a report that shows plans and identifies the implementation process for combining the outfalls.	December 31, 2015
00899	Implementation Schedule	Submit a progress report summarizing the progress in implementing the plan and any changes to the plan for combination of the outfalls.	December 31, 2016
CS017	Achieve Final Compliance with Emissions or Discharge Limits	Submit a report showing combination of outfalls 002A and 003A has been completed and outfall 020A if operational.	December 31, 2017

f. Activities to Meet Potentially Dissolved Selenium Final Limits – In order to meet potentially dissolved selenium limitations, the following schedule will be included in the permit.

Code	Event	Description	Due Date
73905	Engineering Plan	Submit report documenting that engineering plans have been completed for the addition of DAF treatment.	October 31, 2017
CS016	Complete Required Work or On-Site Construction	Complete Construction of DAF.	October 31, 2018
CS010	Status/Progress Report	Complete cleaning of Lagoon #4.	April 30, 2019
CS010	Status/Progress Report	Submit a summary of data collected to date and efforts at fine tuning the system operations	April 30, 2020
CS017	Achieve Final Compliance with Emissions or Discharge Limits	Submit study results that show compliance has been attained with the final Dissolved Selenium limitations.	September 30, 2020
CS010	Status/Progress Report	Submit a plan for investigation or pilot testing for additional reduction in selenium concentrations.	April 30, 2021
CS010	Status/Progress Report	Submit a report documenting the investigations or pilot testing of additional technologies for further reduction in selenium concentrations.	April 30, 2022
CS010	Status/Progress Report	Submit a report documenting the investigations or pilot testing of additional technologies for further reduction in selenium concentrations.	April 30, 2023

No later than 14 calendar days following each date identified in the above schedule of compliance, the permittee shall submit either a report of progress or, in the case of specific actions being required by identified dates, a written notice of compliance or noncompliance, any remedial actions taken, and the probability of meeting the next scheduled requirement.

3. Chronic WET Testing –Outfalls:010A (Flow Weighted Composite of 002A and 003A) and 020A

a. General Chronic WET Testing and Reporting Requirements

The permittee shall conduct the chronic WET test using *Ceriodaphnia dubia and Pimephales promelas*, as a static renewal 7-day test using three separate composite samples. The permittee shall conduct each chronic WET test in accordance with the 40 CFR Part 136 methods described in Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Water to Freshwater Organisms, Fourth Edition, October 2002 (EPA-821-R-02-013) or the most current edition.

The following minimum dilution series should be used: 0% effluent (control), 13%, 26%, 51%, 76%, and 100% effluent. If the permittee uses more dilutions than prescribed, and accelerated testing is to be performed, the same dilution series shall be used in the accelerated testing (if applicable) as was initially used in the failed test.

Tests shall be done at the frequency listed in Part I.A.1. Test results shall be reported along with the Discharge Monitoring Report (DMR) submitted for the end of the reporting period when the sample was taken. (i.e., WET testing results for the calendar quarter ending March 31 shall be reported with the DMR due April 28, etc.) The permittee shall submit all laboratory statistical summary sheets, summaries of the determination of a valid, invalid or inconclusive test, and copies of the chain of custody forms, along with the DMR for the reporting period.

If a test is considered invalid, the permittee is required to perform additional testing during the monitoring period to obtain a valid test result. Failure to obtain a valid test result during the monitoring period shall result in a violation of the permit for failure to monitor.

b. Violations of the Permit Limit, Failure of One Test Statistical Endpoint and Division Notification

A chronic WET test is considered a violation of a permit limitation when both the NOEC and the IC25 are at any effluent concentration less than the IWC. The IWC for this permit has been determined to be **51**% effluent.

A chronic WET test is considered to have failed one of the two statistical endpoints when either the NOEC or the IC_{25} are at any effluent concentration less than the IWC. The IWC for this permit has been determined to be **51**% effluent.

In the event of a permit violation, or when two consecutive reporting periods have resulted in failure of one of the two statistical endpoints (regardless of which statistical endpoints are failed), the permittee must provide written notification to the Division. Such notification should explain whether it was a violation or two consecutive failures of a single endpoint, and must indicate whether accelerated testing or a Toxicity Identification Evaluation or Toxicity Reduction Evaluation (TIE or TRE) is being performed, unless otherwise exempted, in writing, by the Division. **Notification must be received by the Division within 14 calendar days of the permittee receiving notice of the WET testing results.**

c. Automatic Compliance Response

The permittee is responsible for implementing the automatic compliance response provisions of this permit when one of the following occurs:

- there is a violation of the permit limit (both the NOEC and the IC25 endpoints are less than the applicable IWC)
- two consecutive monitoring periods have resulted in failure of one of the two statistical endpoints (either the IC25 or the NOEC)
- the permittee is otherwise informed by the Division that a compliance response is necessary

When one of the above listed events occurs, the following automatic compliance response shall apply. The permittee shall either:

- conduct accelerated testing using the single species found to be more sensitive

- conduct a Toxicity Identification Evaluation (TIE) or a Toxicity Reduction Evaluation (TRE) investigation as described in Part I.A.3.b.

i. Accelerated Testing

If accelerated testing is being performed, testing will be at least once every two weeks for up to five tests, running only one test at a time, using only the IC25 statistical endpoint to determine if the test passed or failed at the appropriate IWC. Accelerated testing shall continue until; 1) two consecutive tests fail or three of five tests fail, in which case a pattern of toxicity has been demonstrated or 2) two consecutive tests pass or three of five tests pass, in which case no pattern of toxicity has been found. Note that the same dilution series should be used in the accelerated testing as was used in the initial test(s) that result in the accelerated testing requirement.

If accelerated testing is required due to failure of one statistical endpoint in two consecutive monitoring periods, and in both of those failures it was the NOEC endpoint that was failed, then the NOEC shall be the only statistical endpoint used to determined whether the accelerated testing passed or failed at the appropriate IWC. Note that the same dilution series should be used in the accelerated testing as was used in the initial test(s) that result in the accelerated testing requirement.

If no pattern of toxicity is found the toxicity episode is considered to be ended and routine testing is to resume. If a pattern of toxicity is found, a TIE/TRE investigation is to be performed. If a pattern of toxicity is not demonstrated but a significant level of erratic toxicity is found, the Division may require an increased frequency of routine monitoring or some other modified approach. The permittee shall provide written notification of the results within 14 calendar days of completion of the Pattern of Toxicity/No Toxicity demonstration.

ii. Toxicity Identification Evaluation (TIE) or Toxicity Reduction Evaluation (TRE)

If a TIE or a TRE is being performed, the results of the investigation are to be received by the Division within 180 calendar days of the demonstration chronic WET in the routine test, as defined above, or if accelerated testing was performed, the date the pattern of toxicity is demonstrated. A status report is to be provided to the Division at the 60 and 120 calendar day points of the TIE or TRE investigation. The Division may extend the time frame for investigation where reasonable justification exists. A request for an extension must be made in writing and received prior to the 180 calendar day deadline. Such request must include a justification and supporting data for such an extension.

Under a TIE, the permittee may use the time for investigation to conduct a preliminary TIE (PTIE) or move directly into the TIE. A PTIE consists of a brief search for possible sources of WET, where a specific parameter(s) is reasonably suspected to have caused such toxicity, and could be identified more simply and cost effectively than a formal TIE. If the PTIE allows resolution of the WET incident, the TIE need not necessarily be conducted in its entirety. If, however, WET is not identified or resolved during the PTIE, the TIE must be conducted within the allowed 180 calendar day time frame.

The Division recommends that the EPA guidance documents regarding TIEs be followed. If another method is to be used, this procedure should be submitted to the Division prior to initiating the TIE.

If the pollutant(s) causing toxicity is/are identified, and is/are controlled by a permit effluent limitation(s), this permit may be modified upon request to adjust permit requirements regarding the automatic compliance response.

If the pollutant(s) causing toxicity is/are identified, and is/are not controlled by a permit effluent limitation(s), the Division may develop limitations the parameter(s), and the permit may be reopened to include these limitations.

If the pollutant causing toxicity is not able to be identified, or is unable to be specifically identified, or is not able to be controlled by an effluent limit, the permittee will be required to perform either item 1 or item 2 below.

l) Conduct an investigation which demonstrates actual instream aquatic life conditions upstream and downstream of the discharge, or identify, for Division approval, and conduct an alternative investigation which demonstrates the actual instream impact. This should include WET testing and chemical analyses of the ambient water. Depending on the results of the study, the permittee may also be required to identify the control program necessary to eliminate the toxicity and its cost. Data collected may be presented to the WQCC for consideration at the next appropriate triennial review of the stream standards;

2) Move to a TRE by identifying the necessary control program or activity and proceed with elimination of the toxicity so as to meet the WET effluent limit.

If toxicity spontaneously disappears in the midst of a TIE, the permittee shall notify the Division within 10 calendar days of such disappearance. The Division may require the permittee to conduct accelerated testing to demonstrate that no pattern of toxicity exists, or may amend the permit to require an increased frequency of WET testing for some period of time. If no pattern of toxicity is demonstrated through the accelerated testing or the increased monitoring frequency, the toxicity incident response will be closed and normal WET testing shall resume.

The control program developed during a TRE consists of the measures determined to be the most feasible to eliminate WET. This may happen through the identification of the toxicant(s) and then a control program aimed specifically at that toxicant(s) or through the identification of more general toxicant treatability processes. A control program is to be developed and submitted to the Division within 180 calendar days of beginning a TRE. Status reports on the TRE are to be provided to the Division at the 60 and 120 calendar day points of the TRE investigation.

If toxicity spontaneously disappears in the midst of a TRE, the permittee shall notify the Division within 10 calendar days of such disappearance. The Division may require the permittee to conduct accelerated testing to demonstrate that no pattern of toxicity exists, or may amend the permit to require an increased frequency for some period of time. If no pattern of toxicity is demonstrated through the accelerated testing or the increased monitoring frequency, the toxicity incident response will be closed and normal WET testing shall resume.

d. Toxicity Reopener

This permit may be reopened and modified to include additional or modified numerical permit limitations, new or modified compliance response requirements, changes in the WET testing protocol, the addition of both acute and chronic WET requirements, or any other conditions related to the control of toxicants.

C. DEFINITIONS OF TERMS

1. “Antidegradation limits” – See “Two (2) - Year Rolling Average”.

2. "Chronic toxicity", which includes lethality and growth or reproduction, occurs when the NOEC and IC25 are at an effluent concentration less than the IWC indicated in this permit.

3. "Composite" sample is a minimum of four (4) grab samples collected at equally spaced two (2) hour intervals and proportioned according to flow. For a SBR type treatment system, a composite sample is defined as sampling equal aliquots during the beginning, middle and end of a decant period, for two consecutive periods during a day (if possible).

4. "Continuous" measurement, is a measurement obtained from an automatic recording device which continually measures the effluent for the parameter in question, or that provides measurements at specified intervals.

5. "Daily Maximum limitation" for all parameters except temperature, means the limitation for this parameter shall be applied as an instantaneous maximum (or, for pH or DO, instantaneous minimum) value. The instantaneous value is defined as the analytical result of any individual sample. DMRs shall include the maximum (and/or minimum) of all instantaneous values within the calendar month. Any instantaneous value beyond the noted daily maximum limitation for the indicated parameter shall be considered a violation of this permit.

6. “Daily Maximum Temperature (DM)” is defined in the Basic Standards and Methodologies for Surface Water 1002-31, as the highest two-hour average water temperature recorded during a given 24-hour period. This will be determined using a rolling 2-hour maximum temperature. If data is collected every 15 minutes, a 2 hour maximum can be determined on every data point after the initial 2 hours of collection. Note that the time periods that overlap days (Wednesday night to Thursday morning) do not matter as the reported value on the DMR is the greatest of all the 2-hour averages.

   For example data points collected at:
   08:15, 08:30, 08:45, 09:00, 09:15, 09:30, 09:45, 10:00, would be averaged for a single 2 hour average data point
   08:30, 08:45, 09:00, 09:15, 09:30, 09:45, 10:00, 10:15, would be averaged for a single 2 hour average data point
   08:45, 09:00, 09:15, 09:30, 09:45, 10:00, 10:15, 10:30, would be averaged for a single 2 hour average data point

This would continue throughout the course of a calendar day. The highest of these 2 hour averages over a month would be reported on the DMR as the daily maximum temperature. At the end/beginning of a month, the collected data should be used for the month that contains the greatest number of minumtes in the 2-hour maximum.

Data from 11 pm to 12:59 am, would fall in the previous day. Data collected from 11:01 pm to 1:00 am would fall in the new month.

7. "Dissolved (D) metals fraction" is defined in the Basic Standards and Methodologies for Surface Water 1002-31, as that portion of a water and suspended sediment sample which passed through a 0.40 or 0.45 UM (micron) membrane filter. Determinations of "dissolved" constituents are made using the filtrate. This may include some very small (colloidal) suspended particles which passed through the membrane filter as well as the amount of substance present in true chemical solution.

8. "Geometric mean" for *E. coli* bacteria concentrations, the thirty (30) day and seven (7) day averages shall be determined as the geometric mean of all samples collected in a thirty (30) day period and the geometric mean of all samples taken in a seven (7) consecutive day period respectively. The geometric mean may be calculated using two different methods. For the methods shown, a, b, c, d, etc. are individual sample results, and n is the total number of samples.

   Method 1:

   Geometric Mean = $(a*b*c*d*...)^{(1/n)}$ "*" - means multiply

   Method 2:

   Geometric Mean = antilog ([log(a)+log(b)+log(c)+log(d)+...]/n)

   Graphical methods, even though they may also employ the use of logarithms, may introduce significant error and may not be used.

   In calculating the geometric mean, for those individual sample results that are reported by the analytical laboratory to be "less than" a numeric value, a value of 1 should be used in the calculations. If all individual analytical results for the month are reported to be less than numeric values, then report "less than" the largest of those numeric values on the monthly DMR. Otherwise, report the calculated value.

   For any individual analytical result of "too numerous to count" (TNTC), that analysis shall be considered to be invalid and another sample shall be promptly collected for analysis. If another sample cannot be collected within the same sampling period for which the invalid sample was collected (during the same month if monthly sampling is required, during the same week if weekly sampling is required, etc.), then the following procedures apply:

   i. A minimum of two samples shall be collected for coliform analysis within the next sampling period.

   ii. If the sampling frequency is monthly or less frequent: For the period with the invalid sample results, leave the spaces on the corresponding DMR for reporting coliform results empty and attach to the DMR a letter noting that a result of TNTC was obtained for that period, and explain why another sample for that period had not been collected.

   If the sampling frequency is more frequent than monthly: Eliminate the result of TNTC from any further calculations, and use all the other results obtained within that month for reporting purposes. Attach a letter noting that a result of TNTC was obtained, and list all individual analytical results and corresponding sampling dates for that month.

9. "Grab" sample, is a single "dip and take" sample so as to be representative of the parameter being monitored.

10. "In-situ" measurement is defined as a single reading, observation or measurement taken in the field at the point of discharge.

11. "Instantaneous" measurement is a single reading, observation, or measurement performed on site using existing monitoring facilities.

12. "Maximum Weekly Average Temperature (MWAT)" is defined in the Basic Standards and Methodologies for Surface Water 1002-31, as an implementation statistic that is calculated from field monitoring data. The MWAT is calculated as the largest mathematical mean of multiple, equally spaced, daily temperatures over a seven-day consecutive period, with a minimum of

three data points spaced equally through the day. For lakes and reservoirs, the MWAT is assumed to be equivalent to the maximum WAT from at least three profiles distributed throughout the growing season (generally July-September).

The MWAT is calculated by averaging all temperature data points collected during a calendar day, and then averaging the daily average temperatures for 7 consecutive days. This 7 day averaging period is a rolling average, i.e. on the 8th day, the MWAT will be the averages of the daily averages of days 2-8. The value to be reported on the DMR is the highest of all the rolling 7-day averages throughout the month. For those days that are at the end/beginning of the month, the data shall be reported for the month that contains 4 of the 7 days.

Day 1: Average of all temperature data collected during the calendar day.
Day 2: Average of all temperature data collected during the calendar day.
Day 3: Average of all temperature data collected during the calendar day.
Day 4: Average of all temperature data collected during the calendar day.
Day 5: Average of all temperature data collected during the calendar day.
Day 6: Average of all temperature data collected during the calendar day.
Day 7: Average of all temperature data collected during the calendar day.
1st MWAT Calculation as average of previous 7 days
Day 8: Average of all temperature data collected during the calendar day.
2nd MWAT Calculation as average of previous 7 days
Day 9: Average of all temperature data collected during the calendar day.
3rd MWAT Calculation as average of previous 7 days

13. "Potentially dissolved (PD) metals fraction" is defined in the Basic Standards and Methodologies for Surface Water 1002-31, as that portion of a constituent measured from the filtrate of a water and suspended sediment sample that was first treated with nitric acid to a pH of 2 or less and let stand for 8 to 96 hours prior to sample filtration using a 0.40 or 0.45-UM (micron) membrane filter. Note the "potentially dissolved" method cannot be used where nitric acid will interfere with the analytical procedure used for the constituent measured.

14. "Practical Quantitation Limit (PQL)" means the minimum concentration of an analyte (substance) that can be measured with a high degree of confidence that the analyte is present at or above that concentration. The use of PQL in this document may refer to those PQLs shown in Part I.D of this permit or the PQLs of an individual laboratory.

15. "Quarterly measurement frequency" means samples may be collected at any time during the calendar quarter if a continual discharge occurs. If the discharge is intermittent, then samples shall be collected during the period that discharge occurs.

16. "Recorder" requires the continuous operation of a chart and/or totalizer (or drinking water rotor meters or pump hour meters where previously approved.)

17. SAR and Adjusted SAR - The equation for calculation of SAR-adj is:

$$SAR\text{-}adj = \frac{Na^{+}}{\sqrt{\frac{Ca_{x} + Mg^{++}}{2}}}$$

Where:

Na^{+} = Sodium in the effluent reported in meq/l
Mg^{++} = Magnesium in the effluent reported in meq/l
Ca_x = calcium (in meq/l) in the effluent modified due to the ratio of bicarbonate to calcium

The values for sodium (Na^{+}), calcium (Ca^{++}), bicarbonate (HCO_3^{-}) and magnesium (Mg^{++}) in this equation are expressed in units of milliequivalents per liter (meq/l). Generally, data for these parameters are reported in terms of mg/l, which must then be converted to calculate the SAR. The conversions are:

$$\text{meq/l} = \frac{Concentration\ in\ mg/l}{Equivalent\ weight\ in\ mg/meq}$$

Where the equivalent weights are determined based on the atomic weight of the element divided by the ion's charge:

Na^{+} = 23.0 mg/meq (atomic weight of 23, charge of 1)
Ca^{++} = 20.0 mg/meq (atomic weight of 40.078, charge of 2)
Mg^{++} = 12.15 mg/meq (atomic weight of 24.3, charge of 2)
HCO_3^{-} = 61 mg/mep (atomic weight of 61, charge of 1)

The *EC* and the HCO_3^{-}/Ca^{++} ratio in the effluent (calculated by dividing the HCO_3^{-} in meq/l by the Ca^{++} in meq/l) are used to determine the Ca_x using the following table.

Table – Modified Calcium Determination for Adjusted Sodium Adsorption Ratio

HCO_3/Ca Ratio And *EC* [1], [2], [3]													
Salinity of Effluent (*EC*)(dS/m)													
		0.1	**0.2**	**0.3**	**0.5**	**0.7**	**1.0**	**1.5**	**2.0**	**3.0**	**4.0**	**6.0**	**8.0**
Ratio of HCO_3/Ca	**.05**	13.20	13.61	13.92	14.40	14.79	15.26	15.91	16.43	17.28	17.97	19.07	19.94
	.10	8.31	8.57	8.77	9.07	9.31	9.62	10.02	10.35	10.89	11.32	12.01	12.56
	.15	6.34	6.54	6.69	6.92	7.11	7.34	7.65	7.90	8.31	8.64	9.17	9.58
	.20	5.24	5.40	5.52	5.71	5.87	6.06	6.31	6.52	6.86	7.13	7.57	7.91
	.25	4.51	4.65	4.76	4.92	5.06	5.22	5.44	5.62	5.91	6.15	6.52	6.82
	.30	4.00	4.12	4.21	4.36	4.48	4.62	4.82	4.98	5.24	5.44	5.77	6.04
	.35	3.61	3.72	3.80	3.94	4.04	4.17	4.35	4.49	4.72	4.91	5.21	5.45
	.40	3.30	3.40	3.48	3.60	3.70	3.82	3.98	4.11	4.32	4.49	4.77	4.98
	.45	3.05	3.14	3.22	3.33	3.42	3.53	3.68	3.80	4.00	4.15	4.41	4.61
	.50	2.84	2.93	3.00	3.10	3.19	3.29	3.43	3.54	3.72	3.87	4.11	4.30
	.75	2.17	2.24	2.29	2.37	2.43	2.51	2.62	2.70	2.84	2.95	3.14	3.28
	1.00	1.79	1.85	1.89	1.96	2.01	2.09	2.16	2.23	2.35	2.44	2.59	2.71
	1.25	1.54	1.59	1.63	1.68	1.73	1.78	1.86	1.92	2.02	2.10	2.23	2.33
	1.50	1.37	1.41	1.44	1.49	1.53	1.58	1.65	1.70	1.79	1.86	1.97	2.07
	1.75	1.23	1.27	1.30	1.35	1.38	1.43	1.49	1.54	1.62	1.68	1.78	1.86
	2.00	1.13	1.16	1.19	1.23	1.26	1.31	1.36	1.40	1.48	1.54	1.63	1.70
	2.25	1.04	1.08	1.10	1.14	1.17	1.21	1.26	1.30	1.37	1.42	1.51	1.58
	2.50	0.97	1.00	1.02	1.06	1.09	1.12	1.17	1.21	1.27	1.32	1.40	1.47
	3.00	0.85	0.89	0.91	0.94	0.96	1.00	1.04	1.07	1.13	1.17	1.24	1.30
	3.50	0.78	0.80	0.82	0.85	0.87	0.90	0.94	0.97	1.02	1.06	1.12	1.17
	4.00	0.71	0.73	0.75	0.78	0.80	0.82	0.86	0.88	0.93	0.97	1.03	1.07
	4.50	0.66	0.68	0.69	0.72	0.74	0.76	0.79	0.82	0.86	0.90	0.95	0.99
	5.00	0.61	0.63	0.65	0.67	0.69	0.71	0.74	0.76	0.80	0.83	0.88	0.93
	7.00	0.49	0.50	0.52	0.53	0.55	0.57	0.59	0.61	0.64	0.67	0.71	0.74
	10.00	0.39	0.40	0.41	0.42	0.43	0.45	0.47	0.48	0.51	0.53	0.56	0.58
	20.00	0.24	0.25	0.26	0.26	0.27	0.28	0.29	0.30	0.32	0.33	0.35	0.37
	30.00	0.18	0.19	0.20	0.20	0.21	0.21	0.22	0.23	0.24	0.25	0.27	0.28

[1] Adapted from Suarez (1981).
[2] Assumes a soil source of calcium from lime ($CaCO_3$) or silicates; no precipitation of magnesium, and partial pressure of CO_2 near the soil surface (P_{CO2}) is 0.0007 atmospheres.
[3] Ca_x, HCO_3, Ca are reported in meq/l; EC is in dS/m (deciSiemens per meter).

Because values will not always be quantified at the exact *EC* or HCO_3^{-}/Ca^{++} ratio in the table, the resulting Ca_x must be determined based on the closest value to the calculated value. For example, for a calculated *EC* of 2.45 dS/m, the column for the *EC* of 2.0 would be used. However, for a calculated *EC* of 5.1, the corresponding column for the *EC* of 6.0 would be used. Similarly, for a HCO_3^{-}/Ca^{++} ratio of 25.1, the row for the 30 ratio would be used.

The Division acknowledges that some effluents may have electrical conductivity levels that fall outside of this table, and others have bicarbonate to calcium ratios that fall outside this table. For example, some data reflect HCO_3^{-}/Ca^{++} ratios

greater than 30 due to bicarbonate concentrations reported greater than 1000 mg/l versus calcium concentrations generally less than 10 mg/l (i.e., corresponding to HCO_3^-/Ca^{++} ratios greater than 100). Despite these high values exceeding the chart's boundaries, it is noted that the higher the HCO_3^-/Ca^{++} ratio, the greater the SAR-adj. Thus, using the Ca_x values corresponding to the final row containing bicarbonate/calcium ratios of 30, the permittee will actually calculate an SAR-adj that is less than the value calculated if additional rows reflecting HCO_3^-/Ca^{++} ratios of greater than 100 were added.

18. "Seven (7) day average" means, with the exception of fecal coliform or *E. coli* bacteria (see geometric mean), the arithmetic mean of all samples collected in a seven (7) consecutive day period. Such seven (7) day averages shall be calculated for all calendar weeks, which are defined as beginning on Sunday and ending on Saturday. If the calendar week overlaps two months (i.e. the Sunday is in one month and the Saturday in the following month), the seven (7) day average calculated for that calendar week shall be associated with the month that contains the Saturday. Samples may not be used for more than one (1) reporting period. **(See the "Analytical and Sampling Methods for Monitoring and Reporting Section in Part I.D.3 for guidance on calculating averages and reporting analytical results that are less than the PQL).**

19. "Thirty (30) day average" means, except for fecal coliform or *E. coli* bacteria (see geometric mean), the arithmetic mean of all samples collected during a thirty (30) consecutive-day period. The permittee shall report the appropriate mean of all self-monitoring sample data collected during the calendar month on the Discharge Monitoring Reports. Samples shall not be used for more than one (1) reporting period. **(See the "Analytical and Sampling Methods for Monitoring and Reporting Section in Part I.D.3 for guidance on calculating averages and reporting analytical results that are less than the PQL).**

20. Toxicity Identification Evaluation (TIE) is a set of site-specific procedures used to identify the specific chemical(s) causing effluent toxicity.

21. "Total Inorganic Nitrogen (T.I.N.)" is an aggregate parameter determined based on ammonia, nitrate and nitrite concentrations. To determine T.I.N. concentrations, the facility must monitor for total ammonia and total nitrate plus nitrite (or nitrate and nitrite individually) on the same days. The calculated T.I.N. concentrations in mg/L shall then be determined as the sum of the analytical results of same-day sampling for total ammonia (as N) in mg/L, and total nitrate plus nitrite (as N) in mg/L (or nitrate as N and nitrite as N individually). From these calculated T.I.N. concentrations, the daily maximum and thirty (30) day average concentrations for T.I.N. shall be determined in the same manner as set out in the definitions for the daily maximum and thirty (30) day average. **(See the "Analytical and Sampling Methods for Monitoring and Reporting Section in Part I.D.5 for guidance on calculating averages and reporting analytical results that are less than the PQL).**

22. "Total Metals" means the concentration of metals determined on an unfiltered sample following vigorous digestion (Section 4.1.3), or the sum of the concentrations of metals in both the dissolved and suspended fractions, as described in Manual of Methods for Chemical Analysis of Water and Wastes, U.S. Environmental Protection Agency, March 1979, or its equivalent.

23. "Total Recoverable Metals" means that portion of a water and suspended sediment sample measured by the total recoverable analytical procedure described in Methods for Chemical Analysis of Water and Wastes, U.S. Environmental Protection Agency, March 1979 or its equivalent.

24. Toxicity Reduction Evaluation (TRE) is a site-specific study conducted in a step-wise process to identify the causative agents of effluent toxicity, isolate the source of toxicity, evaluate the effectiveness of toxicity control options, and then confirm the reduction in effluent toxicity after the control measures are put in place.

25. "Twenty four (24) hour composite" sample is a combination of at least eight (8) sample aliquots of at least 100 milliliters, collected at equally spaced intervals during the operating hours of a facility over a twenty-four (24) hour period. For volatile pollutants, aliquots must be combined in the laboratory immediately before analysis. The composite must be flow proportional; either the time interval between each aliquot or the volume of each aliquot must be proportional to either the wastewater or effluent flow at the time of sampling or the total wastewater or effluent flow since the collection of the previous aliquot. Aliquots may be collected manually or automatically.

26. "Twice Monthly" monitoring frequency means that two samples shall be collected each calendar month on separate weeks with at least one full week between the two sample dates. Also, there shall be at least one full week between the second sample of a month and the first sample of the following month.

27. "Two (2) -Year Rolling Average" - Antidegradation limits apply as the average of all data collected in a two (2) year (24-month) period. These limits become effective upon the effective date of the permit, but are not reportable on a DMR until two years (typically 24 months) of data have been collected. After data has been collected for 24 months, the 30-day

averages for each month are then averaged together to determine the two-year rolling average (using data from month 1 to month 24, then month 2 to month 25, month 3 to month 26, etc).

For ammonia, two-year rolling averages may be set up for individual months, or may be grouped together for several months. For individual months (every month has a different two-year rolling average limit) the two-year average is reportable after two months of data are collected.

Example: Permit is effective Jan 2010 and there is a two-year rolling average limit specific to the month of January.

Jan 2010 DMR – Nothing to Report
Jan 2011 DMR – 2-Year Average of Jan 2010 and Jan 2011
Jan 2012 DMR – 2-Year Average of Jan 2011 and Jan 2012, etc.

Where several months have the same two-year average limit, it is reportable on the DMR after two months of data have been collected for every month in the group.

Example: Permit is effective Jan 2010 and there is a two-year rolling average limit specific to the months of Jan, Feb, June.

1st Reportable DMR – June 2011 - 2-Year Average Jan 2010 Feb 2010 June 2010 Jan 2011 Feb 2011 June 2011
2nd Reportable DMR – Jan 2012 - 2-Year Average Feb 2010 June 2010 Jan 2011 Feb 2011 June 2011 Jan 2012
3rd Reportable DMR – Feb 2012 - 2-Year Average June 2010 Jan 2011 Feb 2011 June 2011 Jan 2012 Feb 2012, etc.

(See the "Analytical and Sampling Methods for Monitoring and Reporting Section in Part I.D.3 for guidance on calculating averages and reporting analytical results that are less than the PQL).

28. "Visual" observation is observing the discharge to check for the presence of a visible sheen or floating oil.

29. "Water Quality Control Division" or "Division" means the state Water Quality Control Division as established in 25-8-101 et al.)

Additional relevant definitions are found in the Colorado Water Quality Control Act, CRS §§ 25-8-101 et seq., the Colorado Discharge Permit System Regulations, Regulation 61 (5 CCR 1002-61) and other applicable regulations.

D. GENERAL MONITORING, SAMPLING AND REPORTING REQUIREMENTS

1. Routine Reporting of Data

Reporting of the data gathered in compliance with Part I.A shall be on a **monthly** basis. Reporting of all data gathered shall comply with the requirements of Part I.D. (General Requirements). Monitoring results shall be summarized for each calendar month and reported on Division approved discharge monitoring report (DMR) forms (EPA form 3320-1).

The permittee must submit these forms either by mail, or by using the Division's Net-DMR service (when available). If mailed, one form shall be mailed to the Division, as indicated below, so that the DMR is received no later than the 28th day of the following month (for example, the DMR for the first calendar quarter must be received by the Division by April 28th). If no discharge occurs during the reporting period, "No Discharge" shall be reported.

The original signed copy of each discharge monitoring report (DMR) shall be submitted to the Division at the following address:

Colorado Department of Public Health and Environment
Water Quality Control Division
WQCD-P-B2
4300 Cherry Creek Drive South
Denver, Colorado 80246-1530

The Discharge Monitoring Report forms shall be filled out accurately and completely in accordance with requirements of this permit and the instructions on the forms. They shall be signed by an authorized person as identified in Part I.D.6.

2. Representative Sampling

Samples and measurements taken as required herein shall be representative of the volume and nature of the monitored discharge. All samples shall be taken at the monitoring points specified in this permit and, unless otherwise specified, before the effluent joins or is diluted by any other wastestream, body of water, or substance. Monitoring points shall not be changed without notification to and approval by the Division.

3. Analytical and Sampling Methods for Monitoring and Reporting

The permittee shall install, calibrate, use and maintain monitoring methods and equipment, including biological and indicated pollutant monitoring methods. All sampling shall be performed by the permittee according to specified methods in 40 C.F.R. Part 136; methods approved by EPA pursuant to 40 C.F.R. Part 136; or methods approved by the Division, in the absence of a method specified in or approved pursuant to 40 C.F.R. Part 136 (see text below for specifics on nonylphenol monitoring).

If the permit contains a numeric effluent limit for a parameter, the analytical method and PQL selected for all monitoring conducted in accordance with this permit for that parameter shall be the one that can measure at or below the numeric effluent limit. If all specified analytical methods and corresponding PQLs are greater than the numeric effluent limit, then the analytical method with the lowest PQL shall be used.

If the permit contains a report only requirement for a parameter, the analytical method and PQL chosen shall be one that can measure at or below the potential numeric effluent limit(s) (maximum allowable pollutant concentration as shown in the WQA or fact sheet). If all analytical methods and corresponding PQLs are greater than the potential numeric effluent limit (s), then the analytical method with the lowest PQL shall be used.

If the permit contains an interim effluent limitation (a limit is report until such time as a numeric effluent limit becomes effective) for a parameter, the analytical method and PQL chosen for all monitoring conducted in accordance with this permit for the parameter shall be one that can measure to the final numeric effluent limit. If all analytical methods and corresponding PQLs are greater than the final numeric effluent limit (s), then the analytical method with the lowest PQL shall be used.

For parameters such as TIN, the analytical methods chosen shall be those that can measure to the potential or final numeric effluent limit, based on the sum of the PQLs for nitrate, nitrite and ammonia.

When the analytical method which complies with the above requirements has a PQL greater than the permit limit, and the permittee's analytical result is less than the PQL, the permittee shall report "BDL" on the DMR. Such reports will not be considered as violations of the permit limit, as long as the lowest available PQL is used for the analysis. When the analytical method which complies with the above requirements has a PQL that is equal to or less than the permit limitation, and the permittee's analytical result is less than the PQL, "< X" (where X = the actual PQL achieved by the laboratory) shall be reported on the DMR. For parameters that have a report only limitation, and the permittee's analytical result is less than the PQL, "< X" (where X = the actual PQL achieved by the laboratory) shall be reported on the DMR.

In the calculation of average concentrations (i.e. 7- day average, 30-day average, 2-year rolling average) any individual analytical result that is less than the PQL shall be considered to be zero for the calculation purposes. When reporting:

If all individual analytical results are less than the PQL, the permittee shall report either "BDL" or "<X" (where X = the actual PQL achieved by the laboratory), following the guidance above.

If one or more individual results is greater than the PQL, an average shall be calculated and reported. Note that it does not matter if the final calculated average is greater or less than the PQL, it must be reported as a value.

Note that when calculating T.I.N. for a single sampling event, any value less than the PQL (for total ammonia, total nitrite, or total nitrate) shall be treated as zero. The T.I.N. concentration for a single sampling event shall then be determined as the sum of the analytical results (zeros if applicable) of same day sampling for total ammonia and total nitrite and total nitrate. From these calculated T.I.N. concentrations, the daily maximum and thirty day average concentrations shall be calculated and must be reported as a value.

The present lowest PQLs for specific parameters, as determined by the State Laboratory (November 2008) are provided below. If the analytical method cannot achieve a PQL that is less than or equal to the permit limit, then the method, or a

more precise method, must achieve a PQL that is less than or equal to the PQL in the table below. A listing of the PQLs for organic parameters that must meet the above requirement can be found in the Division's Practical Quantitation Limitation Guidance Document, July 2008.

For nonylphenol, until such time as there is an EPA 40 CFR Part 136 method, the State is approving use of ASTM Methods D7065 and D7485. Until a statewide PQL has been developed, the permittee shall use either the default PQLs listed in the table below, or develop their own site-specific PQL in accordance with the Practical Quantitation Limitation Guidance Document (July 2008) for Organic Parameters. This document is available on the Division's website at www.coloradowaterpermits.com . The delayed effective date for the monitoring requirement allows time for the permittee to develop a site-specific PQL.

These limits apply to the total recoverable or the potentially dissolved fraction of metals.

For hexavalent chromium, samples must be unacidified so dissolved concentrations will be measured rather than potentially dissolved concentrations.

Parameter	Practical Quantitation Limits,	Parameter	Practical Quantitation Limits, µg/l
Aluminum	50 µg/l	Mercury	0.1 µg/l
Ammonia	1 mg/l	Mercury (low-level)	0.003 µg/l
Arsenic	1 µg/l	Nickel	50 µg/l
Barium	5 µg/l	N-Ammonia	50 µg/l
Beryllium	1 µg/l	N Nitrate/Nitrite	0.5 mg/l
BOD / CBOD	1 mg/l	N-Nitrate	50 µg/l
Boron	50 µg/l	N-Nitrite	10 µg/l
Cadmium	1 µg/l	Total Nitrogen	0.5 mg/l
Calcium	20 µg/l	Phenols	100 µg/l
Chloride	2 mg/l	Phosphorus	10 µg/l
Chlorine	0.1 mg/l	Radium 226	1 pCi/l
Total Residual Chlorine		Radium 228	1 pCi/l
DPD colorimetric	0.10 mg/l	Selenium	1 µg/l
Amperometric titration	0.05 mg/l	Silver	0.5 µg/l
Chromium	20 µg/l	Sodium	0.2 mg/l
Chromium, Hexavalent	20 µg/l	Sulfate	5 mg/l
Copper	5 µg/l	Sulfide	0.2 mg/l
Cyanide (Direct / Distilled)	10 µg/l	Total Dissolved Solids	10 mg/l
Cyanide, WAD+A47	5 µg/l	Total Suspended Solids	10 mg/l
Fluoride	0.1 mg/l	Thallium	1 µg/l
Iron	10 µg/l	Uranium	1 µg/l
Lead	1 µg/l	Zinc	10 µg/l
Magnesium	20 µg/l	Nonylphenol D7065	10 µg/l
Manganese	2 µg/l	Nonylphenol D7485	0.33 µg/l

4. Records

The permittee shall establish and maintain records. Those records shall include the following:

a. The date, type, exact location, and time of sampling or measurements;
b. The individual(s) who performed the sampling or measurements;
c. The date(s) the analyses were performed;
d. The individual(s) who performed the analyses;
e. The analytical techniques or methods used;
f. The results of such analyses; and
g. Any other observations which may result in an impact on the quality or quantity of the discharge as indicated in 40 CFR 122.44 (i)(1)(iii).

The permittee shall retain for a minimum of three (3) years records of all monitoring information, including all original strip chart recordings for continuous monitoring instrumentation, all calibration and maintenance records, copies of all reports required by this permit and records of all data used to complete the application for this permit. This period of retention shall be extended during the course of any unresolved litigation regarding the discharge of pollutants by the permittee or when requested by the Division or EPA.

5. Flow Measuring Device

If not already a part of the permitted facility, within ninety (90) days after the effective date of the permit, a flow measuring device shall be installed to give representative values of effluent quantities at the respective discharge points. Unless specifically exempted, or modified in Part I.A of this permit, a flow measuring device will be applicable at all designated discharge points.

At the request of the Division, the permittee shall show proof of the accuracy of any flow-measuring device used in obtaining data submitted in the monitoring report. The flow-measuring device must indicate values within ten (10) percent of the actual flow being discharged from the facility.

6. Signatory and Certification Requirements

a. All reports and other information required by the Division, shall be signed and certified for accuracy by the permittee in accord with the following criteria:

   i) In the case of corporations, by a responsible corporate officer. For purposes of this section, the responsible corporate officer is responsible for the overall operation of the facility from which the discharge described in the form originates;

   ii) In the case of a partnership, by a general partner;

   iii) In the case of a sole proprietorship, by the proprietor;

   iv) In the case of a municipal, state, or other public facility, by either a principal executive officer, or ranking elected official. For purposes of this section, a principal executive officer has responsibility for the overall operation of the facility from which the discharge originates;

   v) By a duly authorized representative of a person described above, only if:

      1) The authorization is made in writing by a person described in i, ii, iii, or iv above;

      2) The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position); and,

      3) The written authorization is submitted to the Division.

b. If an authorization as described in this section is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of this section must be submitted to the Division prior to or together with any reports, information, or applications to be signed by an authorized representative.

   The permittee, or the duly authorized representative shall make and sign the following certification on all such documents:

   "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is to the best of my knowledge and belief, true, accurate and

complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

PART II

A. NOTIFICATION REQUIREMENTS

1. Notification to Parties

All notification requirements under this section shall be directed as follows:

a. Oral Notifications**,** during normal business hours shall be to:

Water Quality Protection Section - Industrial Compliance Program
Water Quality Control Division
Telephone: (303) 692-3500

b. Written notification shall be to:

Water Quality Protection Section - Industrial Compliance Program
Water Quality Control Division
Colorado Department of Public Health and Environment
WQCD-WQP-B2
4300 Cherry Creek Drive South
Denver, CO 80246-1530

2. Change in Discharge

The permittee shall notify the Division, in writing, of any planned physical alterations or additions to the permitted facility. Notice is required only when:

a. The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged, or;

b. The alteration or addition results in a significant change in the permittee's sludge use or disposal practices, and such alteration, addition, or change may justify the application of permit conditions that are different from or absent in the existing permit, including notification of additional use or disposal sites not reported pursuant to an approved land application plan.

The permittee shall give advance notice to the Division of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

Whenever notification of any planned physical alterations or additions to the permitted facility is required pursuant to this section, the permittee shall furnish the Division such plans and specifications which the Division deems reasonably necessary to evaluate the effect on the discharge, the stream, or ground water. If the Division finds that such new or altered discharge might be inconsistent with the conditions of the permit, the Division shall require a new or revised permit application and shall follow the procedures specified in Sections 61.5 through 61.6, and 61.15 of the Colorado Discharge Permit System Regulations.

3. Special Notifications - Definitions

a. Bypass: The intentional diversion of waste streams from any portion of a treatment facility.

b. Severe Property Damage: Substantial physical damage to property at the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. It does not mean economic loss caused by delays in production.

c. Upset: An exceptional incident in which there is unintentional and temporary noncompliance with permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventative maintenance, or careless or improper operation.

4. Noncompliance Notification

a. If, for any reason, the permittee does not comply with or will be unable to comply with any discharge limitations or standards specified in this permit, the permittee shall, at a minimum, provide the Division and EPA with the following information:

i) A description of the discharge and cause of noncompliance;

ii) The period of noncompliance, including exact dates and times and/or the anticipated time when the discharge will return to compliance; and

iii) Steps being taken to reduce, eliminate, and prevent recurrence of the noncomplying discharge.

b. The permittee shall report the following circumstances **orally within twenty-four (24) hours** from the time the permittee becomes aware of the circumstances, and shall mail to the Division a written report containing the information requested in Part II.A.4 (a) **within five (5) working days** after becoming aware of the following circumstances:

i) Circumstances leading to any noncompliance which may endanger health or the environment regardless of the cause of the incident;

ii) Circumstances leading to any unanticipated bypass which exceeds any effluent limitations in the permit;

iii) Circumstances leading to any upset which causes an exceedance of any effluent limitation in the permit;

iv) Daily maximum violations for any of the pollutants limited by Part I.A of this permit and specified as requiring 24-hour notification. This includes any toxic pollutant or hazardous substance or any pollutant specifically identified as the method to control any toxic pollutant or hazardous substance.

c. Unless otherwise indicated in this permit, the permittee shall report instances of non-compliance which are not required to be reported within 24-hours at the time Discharge Monitoring Reports are submitted. The reports shall contain the information listed in sub-paragraph (a) of this section.

5. Other Notification Requirements

Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule in the permit shall be submitted no later than fourteen (14) calendar days following each scheduled date, unless otherwise provided by the Division.

The permittee shall notify the Division, in writing, thirty (30) calendar days in advance of a proposed transfer of permit as provided in Part II.B.3.

The permittee's notification of all anticipated noncompliance does not stay any permit condition.

All existing manufacturing, commercial, mining, and silvicultural dischargers must notify the Division as soon as they know or have reason to believe:

a. That any activity has occurred or will occur which would result in the discharge, on a routine or frequent basis, of any toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":

i) One hundred micrograms per liter (100 µg/l);

ii) Two hundred micrograms per liter (200 µg/l) for acrolein and acrylonitrile; five hundred micrograms per liter (500 µg/l) for 2.4-dinitrophenol and 2-methyl-4.6-dinitrophenol; and one milligram per liter (1.0 mg/l) for antimony;

iii) Five (5) times the maximum concentration value reported for that pollutant in the permit application in accordance with Section 61.4(2)(g).

iv) The level established by the Division in accordance with 40 C.F.R. § 122.44(f).

b. That any activity has occurred or will occur which would result in any discharge, on a non-routine or infrequent basis, of a toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":

i) Five hundred micrograms per liter (500 µg/l);

ii) One milligram per liter (1 mg/l) for antimony; and

iii) Ten (10) times the maximum concentration value reported for that pollutant in the permit application.

iv) The level established by the Division in accordance with 40 C.F.R. § 122.44(f).

6. Bypass Notification

If the permittee knows in advance of the need for a bypass, a notice shall be submitted, at least ten (10) calendar days before the date of the bypass, to the Division. The bypass shall be subject to Division approval and limitations imposed by the Division. Violations of requirements imposed by the Division will constitute a violation of this permit.

7. Upsets

a. Effect of an Upset

An upset constitutes an affirmative defense to an action brought for noncompliance with permit effluent limitations if the requirements of paragraph (b) of this section are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.

b. Conditions Necessary for a Demonstration of Upset

A permittee who wishes to establish the affirmative defense of upset shall demonstrate through properly signed contemporaneous operating logs, or other relevant evidence that:

i) An upset occurred and that the permittee can identify the specific cause(s) of the upset; and

ii) The permitted facility was at the time being properly operated and maintained; and

iii) The permittee submitted proper notice of the upset as required in Part II.A.4. of this permit (24-hour notice); and

iv) The permittee complied with any remedial measure necessary to minimize or prevent any discharge or sludge use or disposal in violation of this permit which has a reason able likelihood of adversely affecting human health or the environment.

In addition to the demonstration required above, a permittee who wishes to establish the affirmative defense of upset for a violation of effluent limitations based upon water quality standards shall also demonstrate through monitoring, modeling or other methods that the relevant standards were achieved in the receiving water.

c. Burden of Proof

In any enforcement proceeding the permittee seeking to establish the occurrence of an upset has the burden of proof.

8. Discharge Point

Any discharge to the waters of the State from a point source other than specifically authorized by this permit is prohibited.

9. Proper Operation and Maintenance

The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee as necessary to achieve compliance with the conditions of this permit. Proper operation and maintenance includes effective performance and adequate laboratory and process controls, including appropriate quality assurance procedures (40 CFR 122.41(e)). This provision requires the operation of back-up or

auxiliary facilities or similar systems which are installed by the permittee only when necessary to achieve compliance with the conditions of the permit.

10. Minimization of Adverse Impact

The permittee shall take all reasonable steps to minimize or prevent any discharge of sludge use or disposal in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment. As necessary, accelerated or additional monitoring to determine the nature and impact of the noncomplying discharge is required.

11. Removed Substances

Solids, sludges, or other pollutants removed in the course of treatment or control of wastewaters shall be disposed in accordance with applicable state and federal regulations.

For all domestic wastewater treatment works, at industrial facilities, the permittee shall dispose of sludge in accordance with all State and Federal regulations.

12. Submission of Incorrect or Incomplete Information

Where the permittee failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or report to the Division, the permittee shall promptly submit the relevant information which was not submitted or any additional information needed to correct any erroneous information previously submitted.

13. Bypass

a. Bypasses are prohibited and the Division may take enforcement action against the permittee for bypass, unless:

   i) The bypass is unavoidable to prevent loss of life, personal injury, or severe property damage;

   ii) There were no feasible alternatives to bypass such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and

   iii) Proper notices were submitted in compliance with Part II.A.4.

b. "Severe property damage" as used in this Subsection means substantial physical damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

c. The permittee may allow a bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance or to assure optimal operation. These bypasses are not subject to the provisions of paragraph (a) above.

d. The Division may approve an anticipated bypass, after considering adverse effects, if the Division determines that the bypass will meet the conditions specified in paragraph (a) above.

14. Reduction, Loss, or Failure of Treatment Facility

The permittee has the duty to halt or reduce any activity if necessary to maintain compliance with the effluent limitations of the permit. Upon reduction, loss, or failure of the treatment facility, the permittee shall, to the extent necessary to maintain compliance with its permit, control production, control sources of wastewater, or all discharges, until the facility is restored or an alternative method of treatment is provided. This provision also applies to power failures, unless an alternative power source sufficient to operate the wastewater control facilities is provided.

It shall not be a defense for a permittee in an enforcement action that it would be necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

B. RESPONSIBILITIES

1. Inspections and Right to Entry

The permittee shall allow the Division and/or the authorized representative, upon the presentation of credentials:

a. To enter upon the permittee's premises where a regulated facility or activity is located or in which any records are required to be kept under the terms and conditions of this permit;

b. At reasonable times to have access to and copy any records required to be kept under the terms and conditions of this permit and to inspect any monitoring equipment or monitoring method required in the permit; and

c. To enter upon the permittee's premises in a reasonable manner and at a reasonable time to inspect and/or investigate, any actual, suspected, or potential source of water pollution, or to ascertain compliance or non compliance with the Colorado Water Quality Control Act or any other applicable state or federal statute or regulation or any order promulgated by the Division. The investigation may include, but is not limited to, the following: sampling of any discharge and/or process waters, the taking of photographs, interviewing of any person having knowledge related to the discharge permit or alleged violation, access to any and all facilities or areas within the permittee's premises that may have any affect on the discharge, permit, or alleged violation. Such entry is also authorized for the purpose of inspecting and copying records required to be kept concerning any effluent source.

d. The permittee shall provide access to the Division to sample the discharge at a point after the final treatment process but prior to the discharge mixing with state waters upon presentation of proper credentials.

In the making of such inspections, investigations, and determinations, the Division, insofar as practicable, may designate as its authorized representatives any qualified personnel of the Department of Agriculture. The Division may also request assistance from any other state or local agency or institution.

2. Duty to Provide Information

The permittee shall furnish to the Division, within a reasonable time, any information which the Division may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the Division, upon request, copies of records required to be kept by this permit.

3. Transfer of Ownership or Control

a. Except as provided in paragraph b. of this section, a permit may be transferred by a permittee only if the permit has been modified or revoked and reissued as provided in Section 61.8(8) of the Colorado Discharge Permit System Regulations, to identify the new permittee and to incorporate such other requirements as may be necessary under the Federal Act.

b. A permit may be automatically transferred to a new permittee if:

i) The current permittee notifies the Division in writing 30 calendar days in advance of the proposed transfer date; and

ii) The notice includes a written agreement between the existing and new permittee(s) containing a specific date for transfer of permit responsibility, coverage and liability between them; and

iii) The Division does not notify the existing permittee and the proposed new permittee of its intent to modify, or revoke and reissue the permit.

iv) Fee requirements of the Colorado Discharge Permit System Regulations, Section 61.15, have been met.

4. Availability of Reports

Except for data determined to be confidential under Section 308 of the Federal Clean Water Act and the Colorado Discharge Permit System Regulations 5 CCR 1002-61, Section 61.5(4), all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the Division and the Environmental Protection Agency.

The name and address of the permit applicant(s) and permittee(s), permit applications, permits and effluent data shall not be considered confidential. Knowingly making false statement on any such report may result in the imposition of criminal penalties as provided for in Section 309 of the Federal Clean Water Act, and Section 25-8-610 C.R.S.

5. Modification, Suspension, Revocation, or Termination of Permits By the Division

The filing of a request by the permittee for a permit modification, revocation and reissuance, termination or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

a. A permit may be modified, suspended, or terminated in whole or in part during its term for reasons determined by the Division including, but not limited to, the following:

i) Violation of any terms or conditions of the permit;

ii) Obtaining a permit by misrepresentation or failing to disclose any fact which is material to the granting or denial of a permit or to the establishment of terms or conditions of the permit; or

iii) Materially false or inaccurate statements or information in the permit application or the permit.

iv) A determination that the permitted activity endangers human health or the classified or existing uses of state waters and can only be regulated to acceptable levels by permit modifications or termination.

b. A permit may be modified in whole or in part for the following causes, provided that such modification complies with the provisions of Section 61.10 of the Colorado Discharge Permit System Regulations:

i) There are material and substantial alterations or additions to the permitted facility or activity which occurred after permit issuance which justify the application of permit conditions that are different or absent in the existing permit. This includes additional remediation of the seep emanating from the permitted facility which would contribute to the availability of assimilative capacity in the South Platte River and a WQBEL calculated with the available dilution.

ii) The Division has received new information which was not available at the time of permit issuance (other than revised regulations, guidance, or test methods) and which would have justified the application of different permit conditions at the time of issuance. For permits issued to new sources or new dischargers, this cause includes information derived from effluent testing required under Section 61.4(7)(e) of the Colorado Discharge Permit System Regulations. This provision allows a modification of the permit to include conditions that are less stringent than the existing permit only to the extent allowed under Section 61.10 of the Colorado Discharge Permit System Regulations.

iii) The standards or regulations on which the permit was based have been changed by promulgation of amended standards or regulations or by judicial decision after the permit was issued. Permits may be modified during their terms for this cause only as follows:

(A) The permit condition requested to be modified was based on a promulgated effluent limitation guideline, EPA approved water quality standard, or an effluent limitation set forth in 5 CCR 1002-62, § 62 et seq.; and

(B) EPA has revised, withdrawn, or modified that portion of the regulation or effluent limitation guideline on which the permit condition was based, or has approved a Commission action with respect to the water quality standard or effluent limitation on which the permit condition was based; and

(C) The permittee requests modification after the notice of final action by which the EPA effluent limitation guideline, water quality standard, or effluent limitation is revised, withdrawn, or modified; or

(D) For judicial decisions, a court of competent jurisdiction has remanded and stayed EPA promulgated regulations or effluent limitation guidelines, if the remand and stay concern that portion of the regulations or guidelines on which the permit condition was based and a request is filed by the permittee in accordance with this Regulation, within ninety (90) days of judicial remand.

iv) The Division determines that good cause exists to modify a permit condition because of events over which the permittee has no control and for which there is no reasonable available remedy.

v) The permittee has received a variance.

vi) When required to incorporate applicable toxic effluent limitation or standards adopted pursuant to § 307(a) of the Federal act.

vii) When required by the reopener conditions in the permit.

viii) As necessary under 40 C.F.R. 403.8(e), to include a compliance schedule for the development of a pretreatment program.

ix) When the level of discharge of any pollutant which is not limited in the permit exceeds the level which can be achieved by the technology-based treatment requirements appropriate to the permittee under Section 61.8(2) of the Colorado Discharge Permit System Regulations.

x) To establish a pollutant notification level required in Section 61.8(5) of the Colorado Discharge Permit System Regulations.

xi) To correct technical mistakes, such as errors in calculation, or mistaken interpretations of law made in determining permit conditions, to the extent allowed in Section 61.10 of the Colorado State Discharge Permit System Regulations.

xii) When required by a permit condition to incorporate a land application plan for beneficial reuse of sewage sludge, to revise an existing land application plan, or to add a land application plan.

xiii) For any other cause provided in Section 61.10 of the Colorado Discharge Permit System Regulations.

c. At the request of a permittee, the Division may modify or terminate a permit and issue a new permit if the following conditions are met:

i) The Regional Administrator has been notified of the proposed modification or termination and does not object in writing within thirty (30) calendar days of receipt of notification,

ii) The Division finds that the permittee has shown reasonable grounds consistent with the Federal and State statutes and regulations for such modifications or termination;

iii) Requirements of Section 61.15 of the Colorado Discharge Permit System Regulations have been met, and

iv) Requirements of public notice have been met.

d. Permit modification (except for minor modifications), termination or revocation and reissuance actions shall be subject to the requirements of Sections 61.5(2), 61.5(3), 61.6, 61.7 and 61.15 of the Colorado Discharge Permit System Regulations. The Division shall act on a permit modification request, other than minor modification requests, within 180 calendar days of receipt thereof. Except for minor modifications, the terms of the existing permit govern and are enforceable until the newly issued permit is formally modified or revoked and reissued following public notice.

e. Upon consent by the permittee, the Division may make minor permit modifications without following the requirements of Sections 61.5(2), 61.5(3), 61.7, and 61.15 of the Colorado Discharge Permit System Regulations. Minor modifications to permits are limited to:

i) Correcting typographical errors; or

ii) Increasing the frequency of monitoring or reporting by the permittee; or

iii) Changing an interim date in a schedule of compliance, provided the new date of compliance is not more than 120 calendar days after the date specific in the existing permit and does not interfere with attainment of the final compliance date requirement; or

iv) Allowing for a transfer in ownership or operational control of a facility where the Division determines that no other change in the permit is necessary, provided that a written agreement containing a specific date for transfer of permit responsibility, coverage and liability between the current and new permittees has been submitted to the Division; or

v) Changing the construction schedule for a discharger which is a new source, but no such change shall affect a discharger's obligation to have all pollution control equipment installed and in operation prior to discharge; or

vi) Deleting a point source outfall when the discharge from that outfall is terminated and does not result in discharge of pollutants from other outfalls except in accordance with permit limits.

f. When a permit is modified, only the conditions subject to modification are reopened. If a permit is revoked and reissued, the entire permit is reopened and subject to revision and the permit is reissued for a new term.

g. The filing of a request by the permittee for a permit modification, revocation and reissuance or termination does not stay any permit condition.

h. All permit modifications and reissuances are subject to the antibacksliding provisions set forth in 61.10(e) through (g).

6. Oil and Hazardous Substance Liability

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject to under Section 311 (Oil and Hazardous Substance Liability) of the Clean Water Act.

7. State Laws

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable State law or regulation under authority granted by Section 510 of the Clean Water Act. Nothing in this permit shall be construed to prevent or limit application of any emergency power of the division.

8. Permit Violations

Failure to comply with any terms and/or conditions of this permit shall be a violation of this permit. The discharge of any pollutant identified in this permit more frequently than or at a level in excess of that authorized shall constitute a violation of the permit. Except as provided in Part I.D and Part II.A or B, nothing in this permit shall be construed to relieve the permittee from civil or criminal penalties for noncompliance (40 CFR 122.41(a)(1)).

9. Property Rights

The issuance of this permit does not convey any property or water rights in either real or personal property, or stream flows, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Federal, State or local laws or regulations.

10. Severability

The provisions of this permit are severable. If any provisions of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances and the application of the remainder of this permit shall not be affected.

11. Renewal Application

If the permittee desires to continue to discharge, a permit renewal application shall be submitted at least one hundred eighty (180) calendar days before this permit expires. If the permittee anticipates there will be no discharge after the expiration date of this permit, the Division should be promptly notified so that it can terminate the permit in accordance with Part II.B.5.

12. Confidentiality

Any information relating to any secret process, method of manufacture or production, or sales or marketing data which has been declared confidential by the permittee, and which may be acquired, ascertained, or discovered, whether in any sampling investigation, emergency investigation, or otherwise, shall not be publicly disclosed by any member, officer, or employee of the Commission or the Division, but shall be kept confidential. Any person seeking to invoke the protection of this

Subsection (12) shall bear the burden of proving its applicability. This section shall never be interpreted as preventing full disclosure of effluent data.

13. Fees

The permittee is required to submit payment of an annual fee as set forth in the 2005 amendments to the Water Quality Control Act. Section 25-8-502 (l) (b), and the Colorado Discharge Permit System Regulations 5 CCR l002-61, Section 61.l5 as amended. Failure to submit the required fee when due and payable is a violation of the permit and will result in enforcement action pursuant to Section 25-8-60l et. seq., C.R.S. l973 as amended.

14. Duration of Permit

The duration of a permit shall be for a fixed term and shall not exceed five (5) years. Filing of a timely and complete application shall cause the expired permit to continue in force to the effective date of the new permit. The permit's duration may be extended only through administrative extensions and not through interim modifications.

15. Section 307 Toxics

If a toxic effluent standard or prohibition, including any applicable schedule of compliance specified, is established by regulation pursuant to Section 307 of the Federal Act for a toxic pollutant which is present in the permittee's discharge and such standard or prohibition is more stringent than any limitation upon such pollutant in the discharge permit, the Division shall institute proceedings to modify or revoke and reissue the permit to conform to the toxic effluent standard or prohibition.

16. Effect of Permit Issuance

a. The issuance of a permit does not convey any property rights or any exclusive privilege.

b. The issuance of a permit does not authorize any injury to person or property or any invasion of personal rights, nor does it authorize the infringement of federal, state, or local laws or regulations.

c. Except for any toxic effluent standard or prohibition imposed under Section 307 of the Federal act or any standard for sewage sludge use or disposal under Section 405(d) of the Federal act, compliance with a permit during its term constitutes compliance, for purposes of enforcement, with Sections 301, 302, 306, 318, 403, and 405(a) and (b) of the Federal act. However, a permit may be modified, revoked and reissued, or terminated during its term for cause as set forth in Section 61.8(8) of the Colorado Discharge Permit System Regulations.

d. Compliance with a permit condition which implements a particular standard for sewage sludge use or disposal shall be an affirmative defense in any enforcement action brought for a violation of that standard for sewage sludge use or disposal.

Appendix D
Pre-Inspection Records Request
Completed by Suncor June 3, 2021

Suncor Energy (USA) Inc.
CDPS Permit No. CO0001147 (Industrial Wastewater Treatment Facility)
Records Request

Permit

- Current Waste Discharge Requirements including the following:
  - Any permit amendments
    Permit Document(s) Provided
  - Compliance Schedules or Time Schedule Orders (TSOs)
    See Permit Document(s)
  - Monitoring and Reporting Program Requirements
    See Permit Document(s)
  - Permit Standard Provisions (CWA)
    See Permit Document(s)
- Permit renewal application: including, but not limited to, Report of Waste Discharge (ROWD)
  Renewal application dated 5/4/2017 Document(s) provided

Routine Reporting

- Discharge Monitoring Reports (DMRs) and/or Self-Monitoring Reports (SMRs) (at least the last twelve monthly reports (including weekly monitoring) and the most recent quarterly and semi-annual reports)
  Document(s) provided
- Annual Report (most recent)
  Not Applicable
- Annual Biosolids Report (most recent biosolids monitoring and management reports, as applicable)
  Not Applicable
- Chronic WET Testing
  Document(s) provided
- Toxicity Identification Evaluations (TIE) or Toxicity Reduction Evaluations (TRE)
  Document(s) provided (2014)
- Compliance scheduled reports, actions taken, pending items:
  Document(s) provided
  - Zone Implementation Guidance Study Results (**due January 1, 2017**)
  - Facility Evaluation Plan (Activities to Meet Total Recoverable Arsenic, Total Recoverable Iron, Potentially Dissolved Silver and Potentially Dissolved Zinc Final Limits) and latest Implementation Schedule/Study Results (**due December 31, 2017**)
  - Total Mercury Implementation Schedule and Study Results (**due December 31, 2017**)
  - Dissolved Selenium latest Status/Progress Report
- Per – and polyfluoroalkyl substances (PFAS) monitoring reports (last twelve months)
  Document(s) provided
- Noncompliance notification records
  Document(s) provided
- Spill records – Sewage, chemical, and otherwise
  Document(s) provided

Plans

- Operations and Maintenance Plan
  Document(s) provided
- Solids, sludges, other pollutant/wts disposal practices and records
- Spill Prevention Control and Countermeasures (SPCC) plan
  Document(s) provided

- Special Monitoring Plans (i.e., benthic, outfall, and groundwater) (if applicable)
  Not Applicable
- Processes and wastewater treatment system flow diagrams or schematics
  Available in the Permit Renewal application dated 5/4/2017

Laboratory

- Laboratory certification – On-site lab and contract labs
  Document(s) Provided (DMR-QA)
- Laboratory Quality Assurance (QA) / Quality Control (QC) Program
  Document(s) Provided
- Standard operating procedures (SOP) (*)
- DMR QA
  Document(s) Provided
- Sample chain-of-custodies (COCs) and corresponding laboratory analytical data (at least 3 most recent months of reporting to the CDPHE)
  Documents Provided for Labs:
  Technology Laboratory (March, April, May 2021)
  Seacrest Group (3Q2020, 4Q2020,
  Suncor (03-03-2020, 05-7-2021)
- Equipment calibration logs(*)
- Equipment manuals(*)
- Refrigeration log(*)
- Laboratory bench sheets or raw data sheets (at least 3 most recent months of reporting to the CDPHE)

- **Operations and Maintenance(*)**
- Operator(s) qualifications/certifications
- Operations and maintenance logs (all areas of plant/facility)
- Operations daily rounds sheets
- Critical parts list and inventory
- Preventative maintenance program records including SOPs and pending maintenance records/outstanding maintenance needs
- Temperature measurement – type of meter, meter calibration records for all meters used for compliance with NPDES Permit (i.e., effluent meters)
- Flow measurement – type of meter, meter calibration records for all meters used for compliance with NPDES Permit (i.e., influent and effluent meters)
- Auxiliary power operation (testing, and maintenance logs or records)

Other

- Special studies or other reports
  Document(s) Provided
- Reports, evaluations, and corrective measures associated with past hydrocarbons releases to Sand Creek

* - Ensure these records requested are available for onsite review and evaluation at the time of the inspection.

NOTE: This is a list of documentation that is typically requested at the time of inspection. Your permit may have special reporting provisions specific to your facility or facilities; those records may not be included on this list but should be available at the time of the onsite inspection.

Appendix E
November 30, 2018 Suncor Flume Assessment Technical Memorandum by Brown and Caldwell

Technical Memorandum- DRAFT

1527 Cole Blvd, Suite 300
Denver, CO 80407
T: 303.239.5400
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Prepared for: Suncor Energy (U.S.A.) Inc.

Project Title: Suncor Flume Assessment

Project No.: 150222.101

Technical Memorandum [No. 2]- Draft

Subject: Combined Flume Assessment

Date: November 30, 2018

To: Eric Marler and Pete Christos

From: Erin Tracy and Amy West

Prepared by: _____
Amy West, Environmental Engineering Staff

Prepared by: _____
Erin Tracy, P.E., Senior Staff Engineer

Reviewed by: _____
Ravi Ravisangar, Ph.D., P.E. (licensed in GA, FL, MI), BCEE

Reviewed by: _____
Andrew Neuhart, Managing Scientist

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Executive Summary

The Suncor Energy (U.S.A.) (Suncor) Colorado Refinery, located in Commerce City, has three Parshall flumes installed to measure the flowrate of wastewater discharged from the facility. Flow from two upstream flumes, Flume 002 and Flume 003, combine in a 24-inch-diameter pipe which flows into an aeration sump. This sump feeds the downstream flume, Flume 020. Level transmitters at each flume measure the level of water at the inlets to calculate the flowrate. The flumes are configured such that the sum of the flow rates from Flume 002 and Flume 003 should equal the flowrate measured at Flume 020. However, data shows that the flowrate measured at Flume 020 is lower than the sum of the two upstream flumes. Brown and Caldwell (BC) analyzed flow data from the control system to help diagnose the sources of this discrepancy.

Two trends associated with the large deviations were observed in the September 2018 data set which attribute discrepancies to flow scenarios through Flume 002: one when flows are below approximately 500 gallons per minute (gpm), and the other when flow rapidly increases by relatively large amounts. Neither of these are considerably concerning but being aware of trends within the data is important in understanding limits of the system and knowing when deviations are a sign of a systematic error or temporary disruptions.

As a supplement to the previous Flume 003 model, BC modeled all three flumes together based on drawings received from the plant. The model identified two pinch-points at locations downstream of Flume 002 and an upper limit to flows through both upstream flumes. The deeper investigation into interdependency of the three flumes' hydraulics revealed that if Flume 020 is not freely-flowing, then flow through the two upstream flumes will be affected. However, Flume 020 submergence greater than 60% is unlikely.

In addition to investigating possible causes of flume measurement deviations, Suncor requested that BC model proposed system modifications to predict the expected hydraulic effects. These modifications included raising the invert elevation of the discharge pipe at Flume 002 and increasing the flow through Flume 002 to approximately 1600 gpm. Raising the invert elevation of the discharge pipe did not show any problems in the model but allowing 1600 gpm to continuously flow through Flume 002 did.

Section 1: Data Analysis

This section reviews the two sets of flume system flow data provided to BC and identifies trends in the relationships between flumes.

1.1 Overview

Two sets of flume measurement flow data have been provided to BC to supplement the modeling effort. Flow data is collected continuously from level sensors which measure flow rates at Flumes 002, 003, and 020 simultaneously. Figures 1 and 2, below, are plots exported from the control system that records the flows by flume in gpm. Excel files with the collected data were provided to BC: one file of the tabulated 1-minute average data from July 13, 2018 through July 23, 2018, and the second file of 15-minute averages from September 1, 2018 through October 1, 2018.

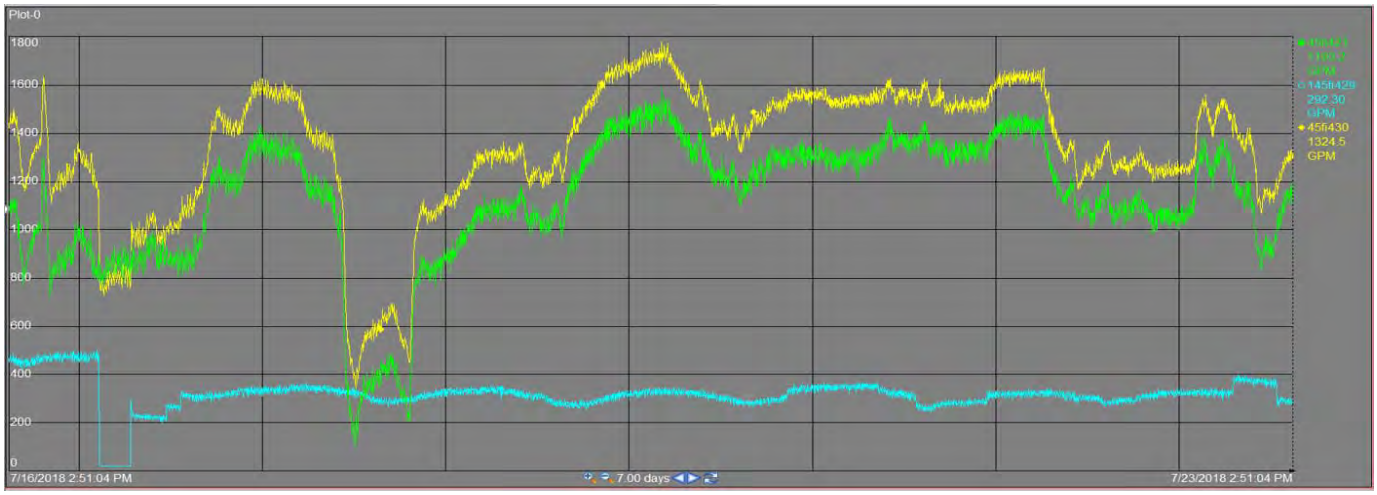

Figure 1. Plotted data for flow measurements (in gpm) recorded between July 16, 2018 and July 23, 2018. The yellow, green, and blue lines represent flumes 020, 002, and 003, respectively.

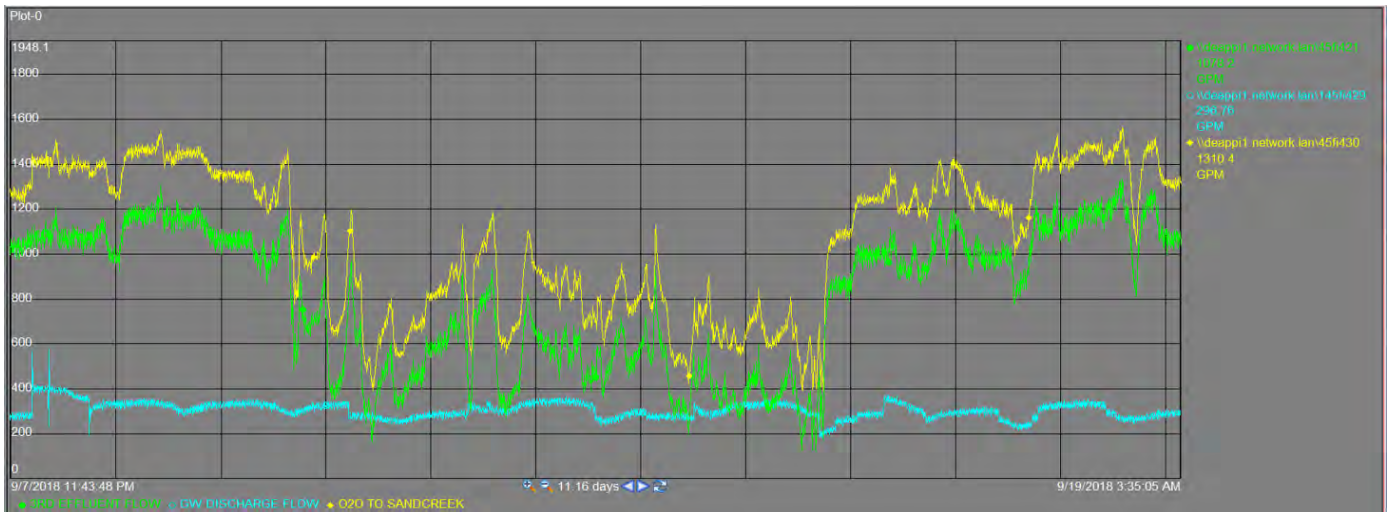

Figure 2. Plotted data for flow measurements (in gpm) recorded between September 7, 2018 and September 19, 2018. The yellow, green, and blue lines represent flumes 020, 002, and 003, respectively.

Using the tabulated data, measurements at Flume 020 were compared to the sum of the measurements at Flume 003 and Flume 002. The difference between the two values is referred to as the deviation in the data. The flow measurement data and associated deviations were analyzed for the following observations and trends:

- Deviation consistency vs. time: How consistent are the deviations for specific flow rates across multiple days?
- Deviation consistency in changing conditions: How the measurements at each of the flumes responded as flow increased and decreased. For example, if flow rate increased at Flume 002, did Flume 020's flow rate increase the same amount while flow at 003 was static?

- Deviation consistency vs. flow: Did the total system flow rate affect the magnitude of the deviations? How did deviations vary with respect to high or large flows? For example, were deviations higher or lower when flow through Flume 002 was reduced?
- Outliers versus inaccuracy: For single points in time where there was a uniquely large deviation, the surrounding data was analyzed.

Additionally, the deviations and percent deviations were analyzed to establish a baseline range for each data set and used for comparisons in evaluating the observations and trends described above. The baseline range and trend analyses were used to look for hydraulic relationships between flumes and for potential submergence conditions to supplement the results of the hydraulic modeling.

1.2 Baseline

Deviations between the measured flow at Flume 020 and the sum of Flumes 003 and 002 in the July data set were relatively large compared to the plant staff's experience. Plant staff indicated that the level sensor at Flume 002 was recalibrated and that the deviations had generally decreased in September, which is supported by the second data set.

A statistical analysis was used to compare the baseline ranges between the June and September data sets. Average flow through each flume and total system flow rates were very similar and made for a reasonable comparison between the two sets of data. In June, the baseline deviation was 90-130 gpm. The baseline range for September was 30-60 gpm, which is a significant improvement. The average deviation reduced by over 50% from a 9% deviation in June, to a 4% deviation in September. Additionally, the percentage of data with deviations less than 10%, increased from 69% in June to 96% in September. Summary statistics are presented in Table 1, below.

Table1: Summary of Statistical Analysis of Flow Measurement Data

		June	September
Based on Averages of Data			
Average Flow Rate at Flume, gpm	002	1,116	1,034
	003	310	300
	020	1,316	1,288
	002 + 003	1,426	1,333
Average Deviation (020-(002+003)), gpm		111	47
Based on Individual Data Points			
Baseline Range of Deviation, gpm		90-130	30-60
Average Deviation, %		9%	4%
Maximum Deviation, %		63%	31%
Percentage of data with < 10% deviation		69%	96%

1.3 Trends

Through analysis of the flow data sets, two trends were observed:

1. Periods of large discrepancies occurred when flow measured at Flume 002 was low.
2. Outlying large discrepancies corresponded to large, rapid increases of flow measured at Flume 002.

While the above trends were observed in both sets of flow data, they were more pronounced in the September data set, where the flow through Flume 003 was relatively consistent as the flow through Flumes 002 and 020 varied.

The first trend described is that the majority of large deviations occur when the flow measured though Flume 002 is low (less than approximately 500 gpm). This trend was observed on September 12, 14, and 15. The percent deviations during these periods were approximately 10-20%. The majority of the data with large deviations occurred for a few hours at a time. Table 2 provides samples of the flow data where this trend was observed. The first sample shows a period of low flow through Flume 002 and the deviation has increased from the baseline range of 30-60 gpm to 69-80 gpm. The second sample shows that when average flows through Flume 002 are occurring, the deviation is smaller, ranging from 15-25 gpm. Note that the decrease in percent deviation at average Flume 002 flows is not believed to be due to lower flows through Flume 003, as this possibility was investigated in the available data and no trend could be established to support this possibility.

According to the Open Channel Flow flume manual, a pre-fabricated 9-inch flume should have +/- 3-5% accuracy in measuring flow down to approximately 40 gpm. Flume 002 is not a pre-fabricated flume and so the accuracy at 40 gpm may not hold true. While it is expected that Flume 002 would be able to accurately measure a flow rate of 300 gpm, this might be an experimentally-proved limit of the flume. Other possible explanations, like submergence (>60%) or incorrect positioning of the flow sensor, can be eliminated due to the low flow and precision of readings at other flows.

Table 2: Deviations associated with Low and High Flow Measurements in Flume 002

Timestamp	Flume 002, gpm	Flume, 003gpm	Flume 020, gpm	Sum of Flumes 002 and 003, gpm	Difference, gpm (020-(002+003))
September 14; large deviations with low flow through Flume 002					
9/14/18 8:14 AM	326	282	529	608	79
9/14/18 8:29 AM	337	279	547	616	69
9/14/18 8:44 AM	349	279	548	628	80
September 7; small deviations with high flow through Flume 002					
9/7/18 4:59 PM	1191	252	1422	1443	22
9/7/18 5:14 PM	1199	250	1435	1449	15
9/7/18 5:29 PM	1194	253	1423	1447	25

The second trend describes the observations of large deviations that did not fall into the first trend, referred to as the outliers. These deviations were characterized by their occurrence over a much shorter sample period, less than an hour, and were observed when flow through Flume 002 rapidly increased but flow through Flume 003 was consistent. Table 3 shows two periods when this trend was observed. In the examples, Flume 003 flow is steady. When flow through Flume 002 increases quickly, there is a corresponding increase in the difference between flow measured at Flume 020 and the sum of flows measured at Flumes 002 and 003. A larger-than-normal deviation is recorded, sometimes for a few consecutive timestamps, however the flow soon levels out and the deviation starts to decrease back to the baseline range.

This trend represents a measurement lag, which is momentary and expected due to the physical distance (roughly 800 feet) between the two flumes. The water levels throughout the system play a role in the magni-

tude of the lag, which is why there is not a large deviation every time flow through Flume 002 experiences a rapid increase. Similar to the trend described above, awareness is key to identifying when large deviations should be concerning. This scenario is not concerning as it only occurs when the scale of the flow increases is considerable, and its effect on the deviation is momentary.

Table 3: Large Deviations with Rapidly Increasing Flow Measurements in Flume 002

Timestamp	Flume 002, gpm	Flume, 003gpm	Flume 020, gpm	Sum of Flumes 002 and 003, gpm	Difference, gpm (020-(002+003))
September 11					
9/11/18 10:29 AM	217	276	405	493	87
9/11/18 10:44 AM	221	276	421	497	76
9/11/18 10:59 AM	279	271	442	550	108
9/11/18 11:14 AM	342	272	512	614	101
9/11/18 11:29 AM	392	269	558	661	103
9/11/18 11:44 AM	407	272	600	679	79
September 12					
9/12/18 8:44 AM	352	321	602	673	71
9/12/18 8:59 AM	334	319	572	654	82
9/12/18 9:14 AM	403	320	603	722	119
9/12/18 9:29 AM	583	318	747	900	154
9/12/18 9:44 AM	714	318	905	1,031	127
9/12/18 9:59 AM	738	320	982	1,058	76

1.4 Conclusions

Identifying trends and establishing baselines from the collected flow data is useful to investigating the hydraulic interdependence between the three flumes and determining possible reasons for flow measurement inaccuracy. These trends provide supplemental information to the hydraulic model results discussed in Section 2.

The overall flow data collected from September show improved flow measuring precision. The trends observed indicate that Flume 002 flow measurement accuracy decreases at lower flow rates, and that there is a lag in flow measurement between flow through Flume 002 and Flume 020. Neither of these trends are concerning, but awareness of the trends would serve to explain discrepancies.

If the recalibration of Flume 002 is the only notable change in the system between the two sets of data, then it is the likely cause of improved precision from June to September. This does not directly indicate, however, that the remaining deviation should be completely attributed to known challenges with Flume 003. This is the case as flow measurement discrepancies tend to decrease slightly when flow through Flume 003 is drastically reduced in both data sets, but deviation is not eliminated. Flow measuring devices inherently are not 100% accurate, and so a deviation of zero between three flow devices is highly unlikely. The analysis of the two data sets indicate that the measured flow rates are generally within the expected range of accuracy at each flume. The recommendations to increase accuracy is to routinely recalibrate the flow measuring

devices, monitor the data for increasing deviations, and check for submerged flume conditions. The potential for submerged flume conditions is further explained with results from the hydraulic modeling performed.

Additionally, elimination of the surging effects at Flume 003 will further improve the accuracy. Reference the Flume 003 technical memorandum (TM) for further details on Flume 003 surging and effects to flow measurement.

Section 2: Combined Hydraulic Model Results

This section explains the purpose of the hydraulic model, how it was used, and an analysis of the results.

2.1 Set Up for the Combined Model

A computer-based hydraulic model of Flume 003 was created using Visual Hydraulics, as previously summarized in the Flume 003 TM. As a follow-up to the results of the Flume 003 model, the model was expanded to include all three flumes. The combined model assumes that Flume 020 is operating under free-flowing conditions and that downstream conditions are not limiting the flow through the flume.

The model uses a starting downstream water surface level (WSL) of 5,127 feet in the downstream outlet channel of Flume 020. From there, the model builds upon the starting WSL, calculating head loss based on the process configuration, such as the 10-inch-diameter discharge pipe from Flume 003 and the 24-inch-diameter discharge pipe from Flume 002. The model simulates flow through the flumes under varying flow rates to model different scenarios. For each scenario, the model calculates the water surface elevation before and after each flume which is then used to calculate the submergence ratio. As a result, a hydraulic grade line can be created for each flow scenario through the system.

The purpose of the combined model is to indicate the hydraulic relationships between the flumes. Because the plant is considering raising the elevation of the Flume 002 discharge pipe, the model is also used to explore possible hydraulic limitations for future modifications to the system.

2.2 Model Results

Figure 3, below, shows the hydraulic grade line through the 24-inch-diameter pipe between the Flume 002 outlet and the downstream sump. Along this pipe system, there are two potential pinch-points where flow may become constricted, creating a back-up in the pipe. These two pinch-points are located at the two 4-foot-diameter manholes where the inlet pipe invert is lower than the outlet pipe invert.

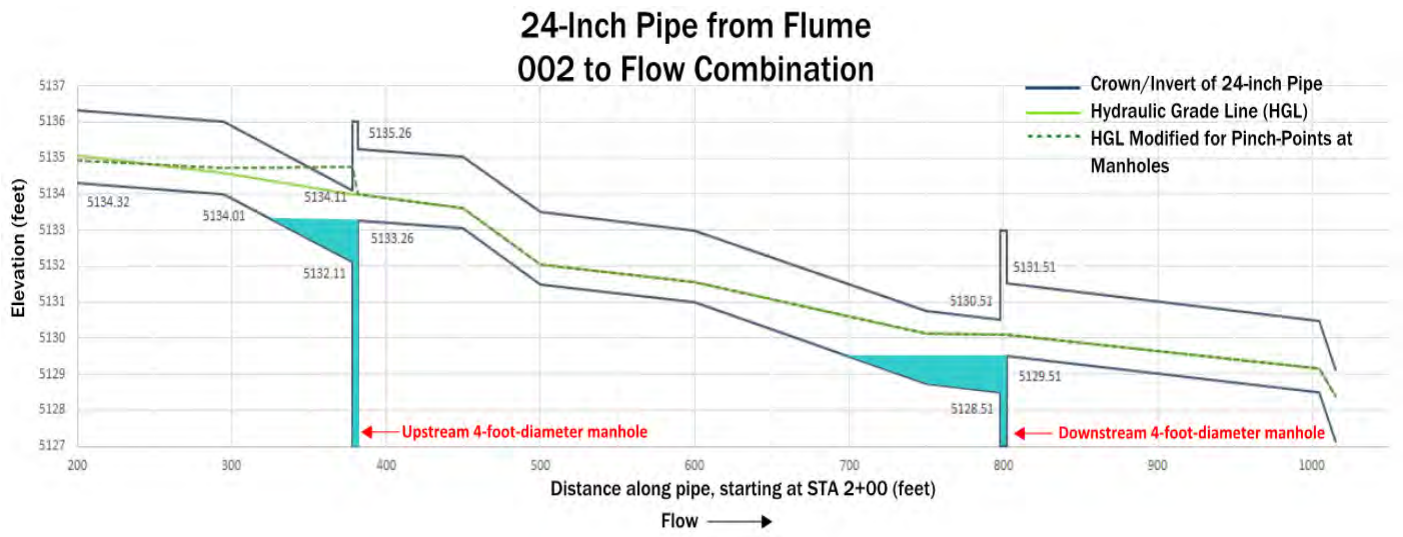

Figure 3. Profile of the 24-inch discharge pipe from Flume 002 to the location where flow from Flume 003 combines with flow from Flume 002.

As illustrated by the light blue areas in Figure 3, water will flow into the upstream manhole and fill-up the manhole until the water level is high enough to flow into the outlet pipe. The difference between inlet pipe crown and the outlet pipe invert is approximately 10 inches, meaning the manhole hydraulically acts as a 10-inch orifice for flow to pass through. The 10-inch orifice constricts flow from the 24-inch-diameter pipe, and at a high enough flow, the pipe will be full-flowing, and water will back-up in the pipe, eventually submerging the upstream Flume 002.

According to the model, the flow at which Flume 002 becomes submerged is approximately 1,300 gpm, but it is time-dependent. This means that an increased flow rate will not immediately result in flow back-up but will take some amount of time depending on the magnitude of flow rate, how rapidly the flow increases, and the amount of time the increased flow rate is sustained. Based on the model results, raising the inlet of the discharge pipe by a few inches would not have any major effect on the hydraulics, besides reducing the amount of time it takes for the pinch-point manhole downstream to back-up the flow. The second, downstream 4-foot diameter manhole is also a potential pinch-point for the same reason. However, the impact on flow is lower with the downstream manhole because the difference between the inlet pipe crown and the outlet pipe invert is larger (12 inches) allowing more flow to pass through and because it is further downstream.

Various flow scenarios were modeled based on the flow data sets provided to model real flow rates that have been observed and compare the flow measurement data to the model results at Flumes 002, 003, and 020. As mentioned above, Flume 002 is hydraulically limited at flows greater than 1,300 gpm because of the pinch-points downstream. Flumes 003 and 020 are not hydraulically limited in typical operating ranges as the model did not report any issues up to flows of approximately 600 gpm through Flume 003. Submergence was noted at Flume 003 with flow near 600 gpm due to constraints in the downstream 10-inch pipe. These constraints are due to the slope of the downstream pipe, before flow from Flume 003 combines with Flume 002 flow, where the pipe transitions from a mild slope to a steep slope. As long as flow through Flume 003 remains below 600 gpm, acceptable flow conditions are expected for Flume 003.

2.3 Summary of Analysis and Conclusions

This model assumes that Flume 020 is operating under free-flow conditions because a downstream free water surface level was not provided. If Flume 020 becomes submerged, then the upstream flumes will be affected. The extent of the effect of Flume 020 submergence on upstream conditions will be related to the flowrate so that the effect will be less at low flow rates and greater at high flow rates. Submergence of Flume 020 can be determined by measuring the depth of water directly upstream and downstream of the flume. Because flow data typically records lower flow at Flume 020 than the sum of Flumes 002 and 003, Flume 020 is likely not experiencing submergence issues.

The model shows that Flume 002 becomes submerged at around 1,300 gpm due to the configuration of the manholes in the system. Flow data from July and September do not reflect this expected submergence. In fact, deviations between the flumes in the September flow data are consistently low, particularly at higher flows such as 1,600 gpm through Flume 002, when the model predicts submergence. It is possible that both flumes 002 and 020 are submerged and reporting higher than actual flows, but it is unlikely. It is more likely that that the submergence predicted is not experienced in the field because high flows (greater than 1,600 gpm) have not been sustained long enough for the system to back-up from the manhole to the flume. The configuration of the pipe in and out of the manholes generates complexity in accurately modeling the hydraulic interactions, and the headloss calculated at that location in the model could be larger than the actual headloss.

As mentioned in Section 2.2, raising the discharge pipe inlet at Flume 002 should not cause any major changes to the hydraulics downstream of the flume based on the model results. The increased slope resulting from raising the discharge pipe starting elevation is not a concern because the hydraulic pinch-point at the upstream manhole (downstream of the modified pipe) effectively reduces the changes in slope between the pipe segments upstream of the manhole.

The model predicts that increasing the normal flow through Flume 002 to 1,600 gpm will cause submergence and an associated decline in measurement accuracy due to the constriction at the downstream manhole. However, models are not perfect replications of field conditions. Before permanently increasing flow, this scenario should be tested in the field to confirm the model results. Allowing high flow rates through Flume 002 and measuring the water depth directly upstream and downstream of the flume to calculate submergence at timed intervals would provide reasonable support of whether or not Flume 002 could accurately measure up to 1,600 gpm in the future. If sustaining a flow of at least 1,600 gpm through Flume 002 for at least 24 hours is problematic either at Flume 002 or at Flume 020 during these trials, then increasing flows in the future are not recommended as the current system is configurated (or when the discharge pipe is raised). Problems to note would be large deviation increases in the measured flow data, negative deviations (Flume 020 measuring larger than the sum of 003 and 002 flows), and field measured submergence greater than 60% at Flume 002 or 020. This exercise would serve as a stress test for the proposed modifications.

The hydraulic model of all three flumes in the system has identified potential pinch-points, hydraulically limiting interactions, and approximate flows at which submergence greater than 60% may occur. In addition to the test flow runs suggested in the previous Flume 003 Assessment, measuring the water depths directly upstream and downstream of Flumes 002 and 020 to check for submergence will further narrow down the cause of flow measurement deviation.

Site Visit Report

Prepared for: Suncor Energy (U.S.A.) Inc.
Project Title: Suncor Flume Assessment
Project No.: 150222.101

Purpose of Visit: Flume observation and measurements
Date: July 23, 2018
Time: 1:00 p.m. to 3:15 p.m.
Prepared by: Erin McGregor, Brown and Caldwell

Attendees:

Name	Organization
Eric Marler	Suncor
Pete Christos	Jacobs
Erin McGregor	Brown and Caldwell

Summary of Site Visit

- Erin met Eric and Pete at the visitor building at 1 pm to complete visitor orientation and collect PPE. We proceeded drove to the plant site control room to sign in before visiting three Parshall flumes used to measure treated effluent flow.
- Issue under investigation:
    - Flumes 002 and 003 feed Flume 020. The sum of flow measured at Flumes 002 and 003 are higher than the flow measured at Flume 020. The plant suspects that Flume 003 is reading high.
- Flume 003 is a 6" flume fed by upstream media filters. The flume was uncovered and accessible for measurement
    - Flume 003 is fed by an underground pipe, with the elbow into the ground shown in the photos.
    - There is a certified, bolt-on-style ultrasonic flow meter in the treatment process upstream of Flume 003, which also predicts that the flow measurement at 003 should be lower than currently measured there.
    - Rainwater has collected in the concrete compartment directly upstream of the flume (see photos). This water is not associated with the flume/pipeline. The clear tubing shown in the photos is the intake for the autosampler.
    - There is some surface disturbance directly after the inlet of the flume, including bubbles. The 10"-diameter inlet pipe is filled to approximately 9" above the pipe invert. Grit has accumulated at the flume inlet, which Eric and Pete suspect is filter media from the upstream process.
    - Flow surging is occurring throughout the flume, causing the water surface elevation to continuously fluctuate by approximately 1". This fluctuation made accurate measurement of the water surface elevation difficult.
    - The water surface elevation was measured at 5 points along the flume cross-section. Water surface elevation across the cross-section is relatively uniform.

  - Water surface elevation is measured by a level indicating transmitter. Eric suspects that the flume cover may be causing deflection of the instrument mount. Deflection of the instrument mounting would likely result in measurement discrepancy depending on the magnitude of the deflection. Eric will look at the data to see if a there was a step change when the flume is covered vs. uncovered.
  - The flume has a 10”-diameter outlet pipe. Submergence of the outlet is also affected by surging. The water surface elevation at the outlet pipe is approximately 6.5” above the pipe invert.
  - Flume 003 discharges to an underground HDPE pipeline with more 200’ of run before any elbows. Due to underground interference, the discharge pipeline was installed at a lower slope than the original design (see record drawing markups).
  - The filter reject pipeline was observed with significant flow surging. The filters are being fed by a portable diesel pump but are normally fed by trash pumps. The suction line for the diesel pump was fully submerged.
  - Measured flow displayed on the local readout was fluctuating between 280 and 290 gallons per minute (gpm).
- Flume 020 is a 9” flume that receives flow from Flumes 002 and 003. It is fed from an upstream sump and manhole. Flume 020 was observed through grating. No measurements were taken to avoid confined space entry, but Eric will forward recent measurements.
  - No surging was observed at Flume 020.
  - The flume 020 discharge pipe was more than 60% full. The flume discharges to an underground pipeline.
  - Measured flow displayed on the local readout was fluctuating between 1985 and 1920 gallons per minute (gpm). Eric reports that this is higher than typical.
- Flume 002 receives flow from the lagoon system. Flume 002 was observed through grating, so no measurements were taken.
  - No surging was observed at Flume 002.
  - There was not local readout of flow, but Flume 002 accounts for a majority of the Flume 020 flow.
  - Flume 002 has a drop-off before the discharge pipe. No outlet submergence issue was observed.
  - Suncor has plans to raise the discharge pipe on Flume 002. The planned discharge pipe will be 24”-diameter with an invert elevation 2” below the invert elevation of the flume. Suncor wants to put up to 1600 gpm through Flume 002 in the future.
- The group existed the plant site around 2:30. Erin and Eric reviewed PI data at the office afterwards. Eric has pulled data for all three flumes into a spreadsheet and emailed to Erin.

Summary of Site Visit

- Brown and Caldwell will analyze the plant data to study the flow balance deviation between in the system.
- Brown and Caldwell will perform calculations to model Flume 003 with the as-built conditions to support troubleshooting.
- Suncor has requested that Brown and Caldwell preform calculations on Flume 002 to assess the proposed outlet pipe modifications.

Visual Hydraulics Summary Report - Hydraulic Analysis

Project: **Flume Assessment - Base.vhf**
Company: **Brown and Caldwell**
Date:

Current flow conditions

Forward Flow =	1400 gpm
Return I Flow =	-----
Return II Flow =	-----
Return III Flow =	-----

Section Description	Water Surface Elevation
Starting WSE, estimated WSE of aeration	**5128.5**
08 - aeration sump	**5128.5**

Channel shape = Rectangular
Manning's 'n' = 0.014
Channel length = 20 ft
Channel width/diameter = 20 ft
Flow = 1400 gpm
Downstream channel invert = 5127.14
Channel slope = 0 ft/ft
Channel side slope = not applicable
Area of flow = 27.21 ft^2
Hydraulic radius = 1.197
Normal depth = infinite
Critical depth = 0.09 ft
Depth downstream = 1.36 ft
Bend loss = 0 ft
Depth upstream = 1.36 ft
Velocity = 0.11 ft/s
Flow profile = Horizontal

07 - 10.4 ft of 24 inch pipe of combined flow **5128.54**

Pipe shape = Circular
Diameter = 24 in
Length = 10.41 ft
Flow = 1400 gpm
Friction method = Manning's Equation
Friction factor = 0.012

Section Description	Water Surface Elevation
Total fitting K value = 2.5 Pipe area = 3.14 ft² Pipe hydraulic radius = 0.5 Age factor = 1 Solids factor = 1 Velocity = 0.99 ft/s Friction loss = 0 ft Fitting loss = 0.04 ft Total loss = 0.04 ft	
06 - Flumes 002 + 003 Combination	
05.3 - 26 ft of 9.2%	**5131.31**
Channel shape = Circular Manning's 'n' = 0.012 Channel length = 26.1 ft Channel width/diameter = 0.83 ft Flow = 300 gpm Downstream channel invert = 5128.5 Channel slope = 0.092 ft/ft Channel side slope = not applicable Area of flow = 0.16 ft^2 Hydraulic radius = 0.157 Normal depth = 0.18 ft Critical depth = 0.37 ft Depth downstream = 0.37 ft Bend loss = 0.04 ft Depth upstream = 0.41 ft Velocity = 2.87 ft/s Flow profile = Steep	
05.2 - 138 ft of 1.8%	**5133.81**
Channel shape = Circular Manning's 'n' = 0.012 Channel length = 138.7 ft Channel width/diameter = 0.83 ft Flow = 300 gpm Downstream channel invert = 5130.91 Channel slope = 0.018 ft/ft Channel side slope = not applicable Area of flow = 0.2 ft^2 Hydraulic radius = 0.177 Normal depth = 0.26 ft Critical depth = 0.37 ft Depth downstream = 0.4 ft Bend loss = 0.03 ft Depth upstream = 0.4 ft Velocity = 2.58 ft/s	

Section Description	Water Surface Elevation
Flow profile = Steep	
05.1 - 164 ft of .7%	**5135.01**
Channel shape = Circular Manning's 'n' = 0.012 Channel length = 164.4 ft Channel width/diameter = 0.83 ft Flow = 300 gpm Downstream channel invert = 5133.44 Channel slope = 0.0068 ft/ft Channel side slope = not applicable Area of flow = 0.21 ft^2 Hydraulic radius = 0.184 Normal depth = 0.34 ft Critical depth = 0.37 ft Depth downstream = 0.37 ft Bend loss = 0.09 ft Depth upstream = 0.46 ft Velocity = 2.87 ft/s Flow profile = Steep	
Pipe from Flume 020	**5128.6**
Pipe shape = Circular Diameter = 24 in Length = 800 ft Flow = 1100 gpm Friction method = Manning's Equation Friction factor = 0.01 Total fitting K value = 0 Pipe area = 3.14 ft² Pipe hydraulic radius = 0.5 Age factor = 1 Solids factor = 1 Velocity = 0.78 ft/s Friction loss = 0.06 ft Fitting loss = 0 ft Total loss = 0.06 ft	
04 - D.S. End Adapter	**5135.02**
Channel shape = Rectangular Manning's 'n' = 0.012 Channel length = 1.5 ft Channel width/diameter = 1.29 ft Flow = 300 gpm Downstream channel invert = 5134.56 Channel slope = 0 ft/ft Channel side slope = not applicable Area of flow = 0.59 ft^2	

Section Description	Water Surface Elevation
Hydraulic radius = 0.267 Normal depth = infinite Critical depth = 0.2 ft Depth downstream = 0.45 ft Bend loss = 0 ft Depth upstream = 0.46 ft Velocity = 1.14 ft/s Flow profile = Horizontal	
03 - Flume 003	**5135.31**
Flume invert = 5134.81 Flume throat width = 0.5 ft Flow through flume = 300 gpm Flume 'm' value = 2 Flume 'e' value = 1.58 Head through flume = 0.5 ft	
02 - U.S. End Adapter	**5135.32**
Channel shape = Rectangular Manning's 'n' = 0.012 Channel length = 2.25 ft Channel width/diameter = 2 ft Flow = 300 gpm Downstream channel invert = 5134.81 Channel slope = -0.22 ft/ft Channel side slope = not applicable Area of flow = 1.5 ft^2 Hydraulic radius = 0.429 Normal depth = infinite Critical depth = 0.15 ft Depth downstream = 0.5 ft Bend loss = 0 ft Depth upstream = 1 ft Velocity = 0.67 ft/s Flow profile = Adverse	
01 - 20.5 ft of 10 inch Inlet Pipe from Vertical Drop	**5135.36**
Pipe shape = Circular Diameter = 10 in Length = 20.5 ft Flow = 300 gpm Friction method = Manning's Equation Friction factor = 0.012 Total fitting K value = 1 Pipe area = 0.55 ft² Pipe hydraulic radius = 0.208 Age factor = 1 Solids factor = 1	

Section Description	Water Surface Elevation
Velocity = 1.23 ft/s Friction loss = 0.02 ft Fitting loss = 0.02 ft Total loss = 0.04 ft	

Visual Hydraulics Summary Report - Hydraulic Analysis

Project: **Flume Assessment - Base.vhf**
Company: **Brown and Caldwell**
Date:

Current flow conditions

Forward Flow =	1000 gpm
Return I Flow =	-----
Return II Flow =	-----
Return III Flow =	-----

Section Description	Water Surface Elevation
Starting WSE, estimated WSE of aeration	**5128.5**
08 - aeration sump	**5128.5**

Channel shape = Rectangular
Manning's 'n' = 0.014
Channel length = 20 ft
Channel width/diameter = 20 ft
Flow = 1000 gpm
Downstream channel invert = 5127.14
Channel slope = 0 ft/ft
Channel side slope = not applicable
Area of flow = 27.21 ft^2
Hydraulic radius = 1.197
Normal depth = infinite
Critical depth = 0.07 ft
Depth downstream = 1.36 ft
Bend loss = 0 ft
Depth upstream = 1.36 ft
Velocity = 0.08 ft/s
Flow profile = Horizontal

07 - 10.4 ft of 24 inch pipe of combined flow **5128.52**

Pipe shape = Circular
Diameter = 24 in
Length = 10.41 ft
Flow = 1000 gpm
Friction method = Manning's Equation
Friction factor = 0.012

Section Description	Water Surface Elevation
Total fitting K value = 2.5 Pipe area = 3.14 ft² Pipe hydraulic radius = 0.5 Age factor = 1 Solids factor = 1 Velocity = 0.71 ft/s Friction loss = 0 ft Fitting loss = 0.02 ft Total loss = 0.02 ft	
06 - Flumes 002 + 003 Combination	
05.3 - 26 ft of 9.2%	**5131.24**
Channel shape = Circular Manning's 'n' = 0.012 Channel length = 26.1 ft Channel width/diameter = 0.83 ft Flow = 214.286 gpm Downstream channel invert = 5128.5 Channel slope = 0.092 ft/ft Channel side slope = not applicable Area of flow = 0.12 ft^2 Hydraulic radius = 0.136 Normal depth = 0.15 ft Critical depth = 0.31 ft Depth downstream = 0.31 ft Bend loss = 0.03 ft Depth upstream = 0.34 ft Velocity = 2.59 ft/s Flow profile = Steep	
05.2 - 138 ft of 1.8%	**5133.74**
Channel shape = Circular Manning's 'n' = 0.012 Channel length = 138.7 ft Channel width/diameter = 0.83 ft Flow = 214.286 gpm Downstream channel invert = 5130.91 Channel slope = 0.018 ft/ft Channel side slope = not applicable Area of flow = 0.15 ft^2 Hydraulic radius = 0.154 Normal depth = 0.22 ft Critical depth = 0.31 ft Depth downstream = 0.33 ft Bend loss = 0.03 ft Depth upstream = 0.34 ft Velocity = 2.34 ft/s	

Section Description	Water Surface Elevation
Flow profile = Steep	
05.1 - 164 ft of .7%	**5134.94**
Channel shape = Circular Manning's 'n' = 0.012 Channel length = 164.4 ft Channel width/diameter = 0.83 ft Flow = 214.286 gpm Downstream channel invert = 5133.44 Channel slope = 0.0068 ft/ft Channel side slope = not applicable Area of flow = 0.17 ft^2 Hydraulic radius = 0.16 Normal depth = 0.29 ft Critical depth = 0.31 ft Depth downstream = 0.31 ft Bend loss = 0.07 ft Depth upstream = 0.38 ft Velocity = 2.59 ft/s Flow profile = Steep	
Pipe from Flume 020	**5128.55**
Pipe shape = Circular Diameter = 24 in Length = 800 ft Flow = 785.714 gpm Friction method = Manning's Equation Friction factor = 0.01 Total fitting K value = 0 Pipe area = 3.14 ft² Pipe hydraulic radius = 0.5 Age factor = 1 Solids factor = 1 Velocity = 0.56 ft/s Friction loss = 0.03 ft Fitting loss = 0 ft Total loss = 0.03 ft	
04 - D.S. End Adapter	**5134.94**
Channel shape = Rectangular Manning's 'n' = 0.012 Channel length = 1.5 ft Channel width/diameter = 1.29 ft Flow = 214.286 gpm Downstream channel invert = 5134.56 Channel slope = 0 ft/ft Channel side slope = not applicable Area of flow = 0.49 ft^2	

Section Description	Water Surface Elevation
Hydraulic radius = 0.239 Normal depth = infinite Critical depth = 0.16 ft Depth downstream = 0.38 ft Bend loss = 0 ft Depth upstream = 0.38 ft Velocity = 0.98 ft/s Flow profile = Horizontal	
03 - Flume 003	**5135.21**
Flume invert = 5134.81 Flume throat width = 0.5 ft Flow through flume = 214.286 gpm Flume 'm' value = 2 Flume 'e' value = 1.58 Head through flume = 0.4 ft	
02 - U.S. End Adapter	**5135.22**
Channel shape = Rectangular Manning's 'n' = 0.012 Channel length = 2.25 ft Channel width/diameter = 2 ft Flow = 214.286 gpm Downstream channel invert = 5134.81 Channel slope = -0.22 ft/ft Channel side slope = not applicable Area of flow = 1.31 ft^2 Hydraulic radius = 0.396 Normal depth = infinite Critical depth = 0.12 ft Depth downstream = 0.4 ft Bend loss = 0 ft Depth upstream = 0.91 ft Velocity = 0.59 ft/s Flow profile = Adverse	
01 - 20.5 ft of 10 inch Inlet Pipe from Vertical Drop	**5135.24**
Pipe shape = Circular Diameter = 10 in Length = 20.5 ft Flow = 214.286 gpm Friction method = Manning's Equation Friction factor = 0.012 Total fitting K value = 1 Pipe area = 0.55 ft² Pipe hydraulic radius = 0.208 Age factor = 1 Solids factor = 1	

Section Description	Water Surface Elevation
Velocity = 0.88 ft/s Friction loss = 0.01 ft Fitting loss = 0.01 ft Total loss = 0.02 ft	

Visual Hydraulics Summary Report - Hydraulic Analysis

Project: **Flume Assessment - Base.vhf**
Company: **Brown and Caldwell**
Date:

Current flow conditions

Forward Flow =	2000 gpm
Return I Flow =	-----
Return II Flow =	-----
Return III Flow =	-----

Section Description	Water Surface Elevation
Starting WSE, estimated WSE of aeration	**5128.5**
08 - aeration sump	**5128.5**

Channel shape = Rectangular
Manning's 'n' = 0.014
Channel length = 20 ft
Channel width/diameter = 20 ft
Flow = 2000 gpm
Downstream channel invert = 5127.14
Channel slope = 0 ft/ft
Channel side slope = not applicable
Area of flow = 27.21 ft^2
Hydraulic radius = 1.197
Normal depth = infinite
Critical depth = 0.12 ft
Depth downstream = 1.36 ft
Bend loss = 0 ft
Depth upstream = 1.36 ft
Velocity = 0.16 ft/s
Flow profile = Horizontal

07 - 10.4 ft of 24 inch pipe of combined flow **5128.58**

Pipe shape = Circular
Diameter = 24 in
Length = 10.41 ft
Flow = 2000 gpm
Friction method = Manning's Equation
Friction factor = 0.012

Section Description	Water Surface Elevation
Total fitting K value = 2.5 Pipe area = 3.14 ft² Pipe hydraulic radius = 0.5 Age factor = 1 Solids factor = 1 Velocity = 1.42 ft/s Friction loss = 0 ft Fitting loss = 0.08 ft Total loss = 0.08 ft	
06 - Flumes 002 + 003 Combination	
05.3 - 26 ft of 9.2%	**5131.39**
Channel shape = Circular Manning's 'n' = 0.012 Channel length = 26.1 ft Channel width/diameter = 0.83 ft Flow = 428.571 gpm Downstream channel invert = 5128.5 Channel slope = 0.092 ft/ft Channel side slope = not applicable Area of flow = 0.2 ft^2 Hydraulic radius = 0.179 Normal depth = 0.21 ft Critical depth = 0.44 ft Depth downstream = 0.44 ft Bend loss = 0.05 ft Depth upstream = 0.49 ft Velocity = 3.28 ft/s Flow profile = Steep	
05.2 - 138 ft of 1.8%	**5133.89**
Channel shape = Circular Manning's 'n' = 0.012 Channel length = 138.7 ft Channel width/diameter = 0.83 ft Flow = 428.571 gpm Downstream channel invert = 5130.91 Channel slope = 0.018 ft/ft Channel side slope = not applicable Area of flow = 0.26 ft^2 Hydraulic radius = 0.202 Normal depth = 0.32 ft Critical depth = 0.44 ft Depth downstream = 0.48 ft Bend loss = 0.04 ft Depth upstream = 0.48 ft Velocity = 2.91 ft/s	

Section Description	Water Surface Elevation
Flow profile = Steep	
05.1 - 164 ft of .7%	**5135.11**
Channel shape = Circular Manning's 'n' = 0.012 Channel length = 164.4 ft Channel width/diameter = 0.83 ft Flow = 428.571 gpm Downstream channel invert = 5133.44 Channel slope = 0.0068 ft/ft Channel side slope = not applicable Area of flow = 0.28 ft^2 Hydraulic radius = 0.21 Normal depth = 0.42 ft Critical depth = 0.44 ft Depth downstream = 0.45 ft Bend loss = 0.11 ft Depth upstream = 0.55 ft Velocity = 3.2 ft/s Flow profile = Steep	
Pipe from Flume 020	**5128.7**
Pipe shape = Circular Diameter = 24 in Length = 800 ft Flow = 1571.429 gpm Friction method = Manning's Equation Friction factor = 0.01 Total fitting K value = 0 Pipe area = 3.14 ft² Pipe hydraulic radius = 0.5 Age factor = 1 Solids factor = 1 Velocity = 1.12 ft/s Friction loss = 0.11 ft Fitting loss = 0 ft Total loss = 0.11 ft	
04 - D.S. End Adapter	**5135.11**
Channel shape = Rectangular Manning's 'n' = 0.012 Channel length = 1.5 ft Channel width/diameter = 1.29 ft Flow = 428.571 gpm Downstream channel invert = 5134.56 Channel slope = 0 ft/ft Channel side slope = not applicable Area of flow = 0.71 ft^2	

Section Description	Water Surface Elevation
Hydraulic radius = 0.296 Normal depth = infinite Critical depth = 0.26 ft Depth downstream = 0.55 ft Bend loss = 0 ft Depth upstream = 0.55 ft Velocity = 1.36 ft/s Flow profile = Horizontal	
03 - Flume 003	**5135.44**
Flume invert = 5134.81 Flume throat width = 0.5 ft Flow through flume = 428.571 gpm Flume 'm' value = 2 Flume 'e' value = 1.58 Head through flume = 0.63 ft	
02 - U.S. End Adapter	**5135.44**
Channel shape = Rectangular Manning's 'n' = 0.012 Channel length = 2.25 ft Channel width/diameter = 2 ft Flow = 428.571 gpm Downstream channel invert = 5134.81 Channel slope = -0.22 ft/ft Channel side slope = not applicable Area of flow = 1.75 ft^2 Hydraulic radius = 0.467 Normal depth = infinite Critical depth = 0.19 ft Depth downstream = 0.63 ft Bend loss = 0 ft Depth upstream = 1.13 ft Velocity = 0.76 ft/s Flow profile = Adverse	
01 - 20.5 ft of 10 inch Inlet Pipe from Vertical Drop	**5135.53**
Pipe shape = Circular Diameter = 10 in Length = 20.5 ft Flow = 428.571 gpm Friction method = Manning's Equation Friction factor = 0.012 Total fitting K value = 1 Pipe area = 0.55 ft² Pipe hydraulic radius = 0.208 Age factor = 1 Solids factor = 1	

Section Description	Water Surface Elevation
Velocity = 1.75 ft/s Friction loss = 0.03 ft Fitting loss = 0.05 ft Total loss = 0.08 ft	