UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 8
1595 Wynkoop Street
DENVER, CO 80202-1129
Phone 800-227-8917
http://www.epa.gov/region08

Ref: 8ENF-W-NP

JAN 16 2015

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Sara Sexe
City Attorney
City of Great Falls
P.O. Box 5021
Great Falls, MT 59403

Re: Permit Limits for Calamut Montana Refinery – Paragraph 9 of *United States and State of Montana v. The City of Great Falls, MT and Malteurop North America, Inc.* Civil Action No. 4:14-cv-00016-BMM

Dear Ms. Sexe:

The Environmental Protection Agency (EPA) has received proposed limits for Calamut Montana Refining post marked June 12, 2014 and received by the EPA on June 17, 2014. These limits were submitted pursuant to paragraph 9 of the consent decree. These limits have been reviewed by both enforcement and program staff at the EPA, and they are approved.

As a reminder, paragraph 9 provides 60 days from EPA approval to public notice these limits. The EPA requests a copy of the public notice to include in our records.

If you have any questions regarding this matter, you may contact Stephanie DeJong at 303-312-6362.

Sincerely,

Gwenette C. Campbell, Unit Chief
NPDES Enforcement Unit
Office of Enforcement, Compliance
and Environmental Justice

Attention Legal Ads

PUBLIC NOTICE OF INTENT TO MODIFY AND REISSUE PERMIT
TO DISCHARGE INDUSTRIAL WASTEWATER

Notice is hereby given that the City of Great Falls Public Works Department, Environmental Division, intends to modify and reissue the Permit to Discharge Industrial Wastewater to the following industry: Calumet Montana Refining LLC, 1900 10th Street N.E., Great Falls, MT 59404, consistent with the permit limits and conditions submitted to the United States Environmental Protection Agency (EPA) on June 12, 2014, and approved by the EPA on or about January 16, 2015. Pursuant to the requirements of the Consent Decree dated April 14, 2014 in RE: *United States of America and State of Montana v. The City of Great Falls, MT and Malteurop North America, Inc.*, United States District Court, Montana, Cause No. CV-14-16-GF-BMM, United States Department of Justice Reference Number 90-5-1-108955, as well as Section 13.12.050.G.2 of the Official Code of the City of Great Falls, notice is further given that the City will receive public comment on the limits set forth in the permit for a period of 30 days and will consider all comments that are received and incorporate any comments as appropriate prior to issuing the permit. A copy of the permit containing the limits may be reviewed at the City of Great Falls Public Works Administration Building, 1005 25th Avenue NE, Great Falls, MT, 59404, during normal business hours. Written comments may be submitted to Mike Jacobson, Environmental Division Supervisor, City of Great Falls Public Works Department, P.O. Box 5021, Great Falls, MT 59403 until April 14, 2015.

DO NOT PUBLISH BELOW THIS LINE:

Publication Date: March 15, 2015.

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CATHY LAUGHNER
cathyl@bkbh.com

June 15, 2015

Hand Delivered

Great Falls City Commission
City of Great Falls
P.O. Box 5021
Great Falls, MT 59403

RE: CMR Appeal of Modified Industrial Wastewater Discharge Permit #13-01

Dear Commissioners:

On May 19, 2015 the City of Great Falls issued to Calumet Montana Refining, LLC (CMR) modified Industrial Wastewater Discharge Permit No. 13-01. On behalf of CMR, I submit this appeal of the following May 19, 2015 proposed limits or conditions:

(1) pH limit of "less than or equal to 7.6 s.u." and monitoring of pH (pages 6, 33, 34).
(2) Use of air blower continuously (page 35).
(3) Change or addition to existing slug control plan (page 30).

CMR respectfully requests a stay pending resolution of this appeal, such that the appealed limits and conditions do not go into effect. (*See* 5/19/2015 Permit (attached hereto as Exhibit 2.) The reasons and grounds for the appeal are described below.

I. The City Failed to Take into Consideration CMR's Operations or Expansion When Imposing New Limitations.

Without discussing any change with CMR, the City proposed revising CMR's wastewater discharge limits in a letter to EPA on June 12, 2014. The City proposed new limits without letting CMR know and without any consideration of CMR's actual or future operating parameters. The City proposed limits on its mistaken understanding of what the normal operating conditions are at the refinery and that a pH limit would help resolve the City's hydrogen sulfide problem. In March 2015, when CMR discovered what the City planned to impose, CMR responded, and explained in its April 14, 2015 comments that the proposed permit changes were unnecessary and were based on bad data, outdated facts or erroneous conclusions. (*See* 4/14/2015 CMR Comments attached hereto as Exhibit 3.)

Moreover, imposing the new proposed changes now would be a waste because the configuration of CMR's wastewater treatment plant will be changed with the refinery expansion. For example, the wastewater treatment plant upgrades will increase the aeration capacity more than three times, but this has been disregarded by the City in the 5/19/2015 Modified Permit ("Modified Permit"). CMR's wastewater treatment plant Basic Engineering Design document was provided to the City on June 5, 2015. (*See* attached 6/5/2015 letter from H. Bedbury attached hereto as Exhibit 4.) If the City had discussed its proposed changes with CMR prior to forwarding them to EPA last June, CMR could have advised the City of the wastewater treatment plant expansion upgrades. This likely would have avoided the City from issuing the ineffective 5/19/2015 Modified Permit and this appeal.

II. Proposed Permit Monitors the Wrong Chemical Parameter for Protection of POTW

The Modified Permit and the City's "Exhibit C" which CMR requested, and received from Stephanie DeJong on April 8, 2015 illustrate the City's concern with minimizing the exposure of POTW employees to hazardous concentrations of gas-phase hydrogen sulfide. The draft Permit and City's Exhibit C propose using pH as a surrogate parameter for assessing the potential to release gas-phase hydrogen sulfide in the POTW. While CMR appreciates that using pH as a surrogate for sulfide would make it "easier to continuously monitor" (City's Exhibit A, February 13, 2014 email from Stephanie Gleck to Mike Jacobson and Chris Sorensen), there are problems associated with monitoring and with responding to excursions above proposed upper pH limit. These operational and reliability difficulties include probe fouling and the potential for "false positives" resulting in unnecessary pH mitigation. Also, the discharge of CMR wastewater with high pH values by itself is not an operational concern for the City POTW, because the caustic discharges are neutralized by the slightly acidic wastewater already present in the City sewer (City's Exhibit B, February 25, 2014 email from David Gwisdalla to Chris Sorensen).

The role of the surrogate pH parameter is to warn when gas-phase hydrogen sulfide concentrations in the City POTW could exceed 10 ppmv. Continuous pH monitoring is a poor surrogate for elevated sulfide concentrations in the CMR discharge. After the 2011 WWTP improvements, no correlation exists between discharge pH and measured headspace H_2S concentrations (CMR's Exhibit 2). In the Response to Comments dated March 15, 2015, the City claimed "...the risk of H_2S generation in the POTW increases with the pH of CMR's discharge." This claim is only partially correct. The risk of gas-phase hydrogen sulfide generation only increases if the CMR discharge contains dissolved free sulfides (*i.e.*, H_2S, HS^-, and $S^=$). Without dissolved free sulfides, an increase in pH has no effect on the risk of gas-phase hydrogen release in the POTW. By itself, the monitoring of pH is an inappropriate surrogate for assessing the risk of gas-phase hydrogen sulfide release in the POTW.

Use of an inappropriate surrogate parameter for compliance monitoring can result in high numbers of false alarms, an under representation of compliance, and unnecessary supplemental wastewater treatment costs. A conservative estimate of the number of false alarms associated with using the surrogate pH parameter can be obtained from Attachment 2 of the City's Exhibit C, which is a plot the pH of CMR discharge versus gas-phase hydrogen sulfide in the City

sewer.[1] The plotted data were collected prior to the 2011 improvements and represent conditions that no longer exist. A simple tally of the plotted data points were performed, which does not consider the multiple readings associated with reach plotted data point. For example, there are hundreds of 0-ppmv measured gas-phase hydrogen sulfide concentrations for the compiled time period, but they were tallied as only a single count for each plotted pH value. The simple tally approach suggests that use of pH as a surrogate parameter for gas-phase hydrogen sulfide in the City sewer with a threshold pH value of 7.6 will result in 4 times more false alarms than observed gas-phase hydrogen sulfide concentrations greater than 10 ppmv. Thus, use of pH as a surrogate parameter will result in large numbers of false alarms.

CMR understands the City's concern regarding the potential discharge of elevated concentrations of free dissolved sulfides into the POTW. Upon mixing with the wastewater already in the sewer, a fraction of the free dissolved sulfides in the CMR discharge could accumulate in the headspace of the sewer. The pH of the mixed wastewater influences the concentration gradient for the accumulation of gas-phase hydrogen sulfide in the sewer headspace. Thus, the risk of gas-phase hydrogen sulfide accumulation in the sewer headspace is influenced by the pH of the mixed wastewater and the mass loading of free dissolved sulfides provided by the CMR discharge (ignoring all other sources of dissolved sulfides in the sewer).

Rather than assessing the risk of releasing gas-phase hydrogen sulfide into the POTW by monitoring the pH of the CMR discharge, a modification of its present hydrogen sulfide monitoring procedure would be more effective. Direct monitoring of hydrogen sulfide in the CMR discharge is a possible regulatory-acceptable option. The City's Exhibit A (February 13, 2014 email from Stephanie Gleck to Mike Jacobson and Chris Sorensen) refers to the surrogate pH approach as "easier to continuously monitor than a sulfide limit, but you could choose to go that route too." For direct hydrogen sulfide monitoring, CMR collects a wastewater sample and measures the headspace concentration of hydrogen sulfide using an industrial gas meter every 3 to 4 hours. When the gas-phase hydrogen sulfide concentration is less than 10 parts per million by volume (ppmv), CMR continues to discharge to the City sewer. When the measured concentration is greater than 10 ppmv, CMR stops discharging to the sewer and begins to operate its wastewater treatment plant in a recirculating mode. Recirculation continues until treatment reduces the headspace concentration to below 10 ppmv.

III. Imposing a pH Limit of 7.6 Prohibits CMR's Ability to Optimize Sulfide Reduction and Biological Treatment, and Such Limit is Without Accurate Basis.

The Modified Permit and the City's Exhibit C overemphasize the importance of wastewater pH in determining rates of sulfide removal from aerated wastewater. The Modified Permit's premise that sulfide removal rates drop drastically above pH 7.6 is incorrect. As explained in more detail in the attached Exhibit 1, optimal sulfide removal rates occur at pH values above 7.6 and significant rates of removal continue up pH values above 9. Setting an upper pH limit in the Modified Permit for the CMR discharge restricts CMR's ability to optimize sulfide oxidation and biological removal. As described in CMR's 4/14/2015

[1] The graph incorrectly identifies the gas-phase hydrogen sulfide concentrations in mg/L. The correct units are ppmv.

Comments to the draft Modified Permit (Exhibit 2), CMR has already implemented effective and reliable improvements that have reduced the frequency and intensity of hydrogen sulfide events in the City POTW. Additional improvements are being implemented in the Fall of 2015 as part of CMR's wastewater treatment plant upgrades. CMR's current slug control plan is effective and the pending wastewater treatment plant upgrades are sufficient to meet the City's industrial pretreatment objectives. The newly imposed pH limit would be of no benefit and an unnecessary burden to CMR's normal operations.

IV. Continuous Blower Operation is Not Required for Normal Operations.

The Modified Permit proposes the continuous operation of the pretreatment blower to promote the removal of hydrogen sulfide by volatilization. The blower will be operated during any upsets, *e.g.*, following the accidental release of alkaline sulfide-containing solutions to the CMR wastewater treatment plant when the WWTP is operated in recirculation mode. During normal operation, continuous operation is not required to meet wastewater treatment objectives and to protect City POTW employees. The proposed requirement of continuous blower operation would be of little benefit and be an unnecessary burden to CMR's normal operations.

V. No Need for a Redundant Slug Control Plan.

The Modified Permit proposes additional requirements on the CMR's existing slug control program. Because there is a slug control requirement in the existing Industrial Wastewater Discharge Permit and because CMR has already identified spent caustic and NaHS solutions as problematic sources, the proposed additional requirements are redundant and would be of little additional benefit, and would be an unnecessary burden to CMR's environmental compliance staff.

In conclusion, CMR respectfully appeals the above conditions imposed by the Modified Permit, and requests a stay of those conditions. If further explanation is required, CMR welcomes the opportunity to meet with the City. Thank you for your consideration.

Sincerely,

C A Laughner

Catherine A. Laughner

Enclosures
cc : James L. Rearden
Mike Jacobsen
Paul Skubinna
Sara Sexe, Esq. (w/o enc.)

EXHIBIT 1

Imposing a pH Limit of 7.6 Prohibits CMR's Ability to Optimize Sulfide Reduction and Biological Treatment, and Such Limit is Without Accurate Basis

The emphasis of the draft modified Industrial Wastewater Discharge Permit on developing an upper pH limit for the CMR discharge is misplaced. Its premise that sulfide removal rates drop precipitously above pH 7.6 is incorrect. As demonstrated below, the optimal rates of sulfide removal occur at pH values above 7.6 and significant rates of removal continue up pH values above 9. Instead of attempting to establish an arbitrary upper pH limit, the emphasis should be preventing and managing upset conditions that can result in unacceptably high effluent sulfide concentrations. As part of the fall upgrades to the CMR wastewater treatment plant, CMR is improving its ability to detect in-plant releases of sulfide-containing solutions, expanding the treatment capacity of Tank 146, and improving the delivery systems (bulk storage tank and pre-mixing prior to the aeration tank) for hydrogen peroxide to promote significantly improved chemical oxidation.

CMR is making substantial investments in upgrading the capacity and reliability of its wastewater treatment plant. The majority of the upgrades will be operational this fall. Some of the upgrades focus on the treatment of free dissolved sulfides. Improvements to Tank 146, an aeration/biotreatment reactor, include increased aeration capacity and installation of distribution piping for chemical oxidants. These two improvements are engineered to improve the removal of sulfides when the wastewater treatment plant is operated in both once-through (normal) and recirculating (upset) modes.

Tank 146 reduces dissolved sulfide concentrations in the CMR wastewater by physical removal (volatilization), microbial oxidation (biodegradation), and chemical oxidation. The primary chemical oxidant is dissolved oxygen, which will be supplied by the upgraded aeration system. The secondary chemical oxidant is hydrogen peroxide, which can be added to Tank 146 during upset conditions via the upgraded distribution piping.

Figure 1 illustrates that wastewater pH influences the rate of dissolved sulfide removal from aerated wastewater. Although significant sulfide removal occurs at pH values above 9, optimal sulfide removal rates are observed at pH values near 7.9. Dissolved oxygen from aeration is the only chemical oxidant considered in Figure 1 and is assumed to be present at a concentration of 2 mg/L.

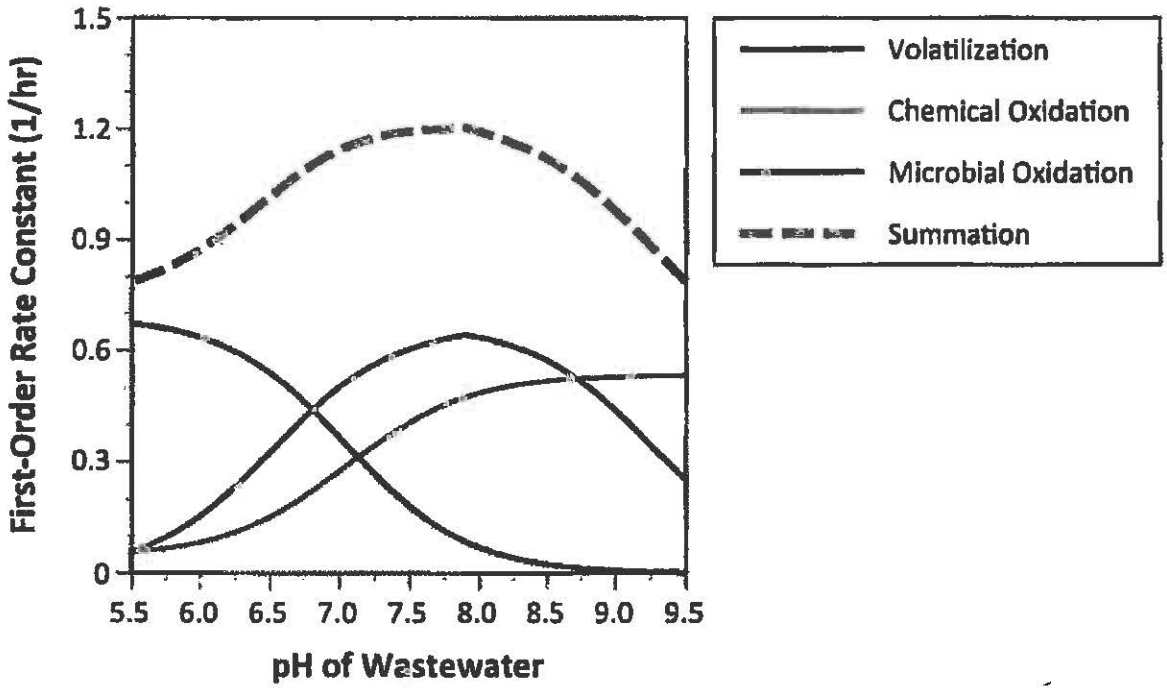

Figure 1. Substantial rates of sulfide removal from aerated wastewater occur at pH values above the proposed maximum pH limit of 7.6 for CMR discharge. Chemical oxidation refers to dissolved oxygen as the oxidant.

In the draft modified Industrial Wastewater Discharge Permit and associated attachments, the implication is that the sulfide removal rate in aerated wastewater drops sharply above pH values of 7. Figure 1 indicates that this is an incorrect characterization of sulfide removal from aerated wastewater. While the rate of volatilization slows as pH value increases above 7, the rates of chemical oxidation (dissolved oxygen as oxidant) and microbial oxidation actually increase up to a pH of about 7.9, beyond which microbial oxidation begins to slow. CMR observes maximal rates of sulfide removal from aerated wastewater at pH values ranging from 7.8 to 8.2, which agrees with the summation of the rate constants provided in Figure 1.

One of the principle arguments for proposing the upper pH limit of 7.6 is a precipitous drop in sulfide removal from aerated wastewater at higher pH values. Figure 1 demonstrates that the specific rates of sulfide removal do not precipitously decline at pH values above 7.6. Thus, a principle justification for the proposed upper pH limit is incorrect.

However, while sulfide removal rates do not precipitously drop at higher wastewater pH values, aerated reactors can be overloaded such that the effluent concentrations of dissolved sulfides can be higher than the desired target concentration. For example, during a November 2011 episode there was a release from a sodium hydrosulfide (NaHS) unit to the CMR wastewater treatment plant. Headspace hydrogen sulfide concentrations for the CMR discharge exceeded 10 ppmv, which caused CMR to block in the discharge and to operate the wastewater treatment plant in

recirculation mode until headspace hydrogen sulfide concentrations dropped below 10 ppmv. Thus, the aerated reactors can be overloaded and high effluent sulfide concentrations can result.

The Fall 2015 upgrades to the CMR wastewater treatment plant include the installation of equipment for better detecting accidental releases of sulfide-containing solutions entering the wastewater treatment plant and for accelerating the chemical oxidation of sulfide when the aerated reactor is at risk for being overloaded. For influent piping that could contain accidental releases of alkaline sulfide-containing solutions and alkaline non-sulfide solutions, continuous pH and oxidation-reduction potential (ORP) probes will be installed. When the pH probe shows a sharp increase, an alkaline solution release is suspected and staff will begin searching for the source. Any resulting increases in wastewater pH will not have a precipitous adverse impact on sulfide removal rates. When the pH probe shows a sharp increase and the ORP probe shows a sharp decrease, then the release of an alkaline sulfide-containing solution is suspected. Alkaline sulfide-containing solutions include NaHS or spent caustic solutions. Both of which have historically caused the gas-phase hydrogen sulfide episodes. Upon detection of a possible release of an alkaline sulfide-containing solution, staff will perform additional measurements to determine the need to block discharge to the City sewer and to operate the wastewater treatment plant in recirculation mode. Staff will also begin searching for the source. Thus, not all releases of alkaline solution (such as sodium hydroxide or potassium hydroxide) are an operational concern to the CMR wastewater treatment plant and the City POTW. Solutions with high dissolved sulfide concentrations are a concern.

The capacity and efficiency of adding hydrogen peroxide to Tank 146 will be upgraded as part of the fall improvements. The addition of a bulk hydrogen peroxide injection into mixing chambers prior to Tank 146 will improve the completeness of peroxide treatment to oxidize dissolved sulfides and, thus, provide a rapid method for increasing the treatment capacity of Tank 146. The upgraded hydrogen peroxide delivery system will prevent the aerated reactor from being overloaded during upset conditions.

The draft modified Industrial Wastewater Discharge Permit and associated attachments often place too much emphasis on wastewater pH as a parameter that determines the distribution of sulfide mass between the water phase and the headspace. While pH does play a role in the interfacial distribution of sulfide, the Henry's Law constant for hydrogen sulfide and the ratio of the water and headspace volumes are also important. Sentences that describe the interfacial distribution of sulfide mass as only a function of pH are incorrect. For example, "At a pH 7, the sulfide will occur approximately 50% in the water and 50% in the headspace." (City's Exhibit A, February 13, 2014 email from Stephanie Gleck to Mike Jacobson and Chris Sorensen) and "...at a pH of 7 almost 50% of the sulfide is held in solution..." (City's Exhibit B, February 25, 2014 email from David Gwisdalla to Chris Sorensen) are incorrect characterizations of interfacial sulfide distribution.[2] Both examples ignore the impact of the Henry's Law constant for hydrogen sulfide and the ratio of the water and headspace volumes. [3]

[2] In addition to incorrect characterization of the importance of pH on interfacial sulfide distribution, there are a few other examples of imprecision in City's Exhibit B (February 25, 2014 email from David Gwisdalla to Chris Sorensen). Discussions regarding the removal of sulfides from aerated wastewater were limited to volatilization, and did not consider chemical

The room temperature interfacial distribution of sulfide as a function of pH and the ratio of the water to headspace volumes is provided in Figure 2. When the headspace volume is small compared to the water volume (e.g., $V_{water}/V_{gas} = 10$), the interfacial sulfide distribution does not change greatly with pH. Virtually all the sulfide mass remains in the water, regardless of pH. Conversely, when the headspace volume is large compared to the water volume (e.g., $V_{water}/V_{gas} = 0.1$), the interfacial sulfide distribution is sensitive to pH.

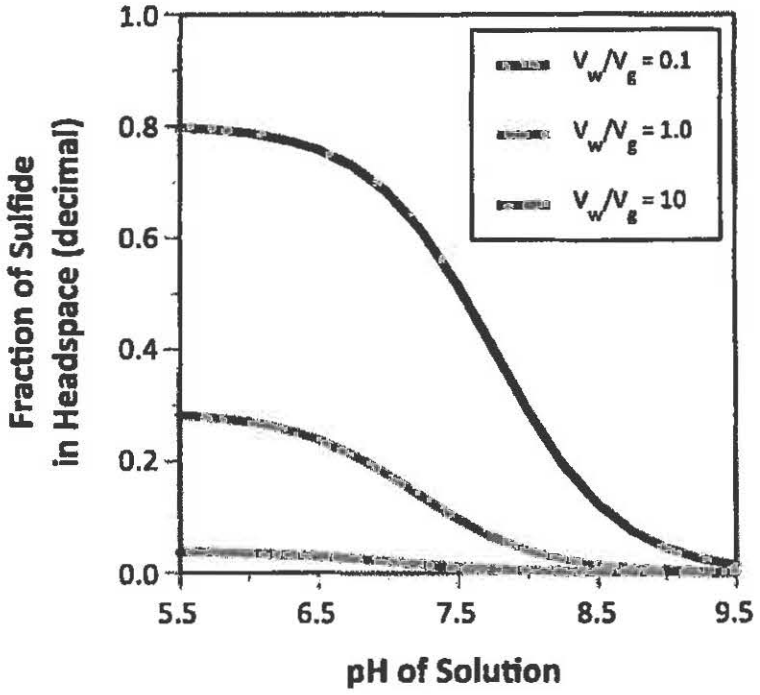

Figure 2. The interfacial distribution of sulfide mass between the water phase and the headspace is a function of both pH and the ratio of the water and headspace volumes. For room temperature, a pH value of 7, and equal water and headspace volumes ($V_w/V_g = 1.0$), about 18 percent of the sulfide mass is in the headspace and 82 percent is in the water phase.

In summary, the draft modified Industrial Wastewater Discharge Permit and associated attachments overemphasize the importance of wastewater pH in determining the distribution of

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and microbial oxidation of sulfides. Gas-phase hydrogen sulfide concentrations were often incorrectly defined in terms of mg/L. Compliance monitoring in the City's POTW and CMR discharge monitoring are for gas-phase hydrogen sulfide with concentrations reported in ppmv. The increase is pH values from 7.5 to 9.5 is a factor of about 1.3 and is not a change of "almost two orders of magnitude." Of course, the concentration of protons would decrease by "almost two orders of magnitude."

[3] A similar incorrect characterization of interfacial sulfide distribution is also found in Attachment 1 of the City's Exhibit C.

sulfide between the water and air phases, and overemphasize the importance of wastewater pH in determining rates of sulfide removal from aerated wastewater. As illustrated in Figure 2, the interfacial distribution of sulfide is strongly influenced by the ratio of the water and air volumes. The draft Permit's premise that sulfide removal rates drop drastically above pH 7.6 is incorrect. Figure 1 indicates that optimal sulfide removal rates occur at pH values above 7.6 and that significant rates of removal continue up pH values above 9. The draft Permit's emphasis on developing an upper pH limit for the CMR discharge is misplaced. Instead, the emphasis should be on preventing and managing upset conditions that can result in unacceptably high effluent sulfide concentrations. This is the approach being implemented as part of CMR's wastewater treatment plant upgrades. CMR is improving its ability to detect in-plant releases of alkaline sulfide-containing solutions, expanding the treatment capacity of Tank 146, and improving the delivery systems for hydrogen peroxide to quickly provide supplemental chemical oxidation.

P.O. Box 5021, 59403-5021

HAND DELIVERED

May 19, 2015

Dana Leach, Vice President Refining
Calumet Montana Refining, LLC
1900 10th Street N.E.
Great Falls, MT 59404

RE: Permit Modification

Dear Mr. Leach,

Attached please find a copy of the modified Industrial Wastewater Discharge Permit with an effective date of 6/22/2015. The attached permit supersedes the original permit and should be made available to the appropriate Calumet Montana Refining representative to ensure compliance with the requirements.

A Public Notice of the proposed changes to the permit was published in the Great Falls Tribune on March 15, 2015 and 30 days were provided for public comment. Also attached is a copy of the Response to Comments and Permit Rationale that describes the changes that were made to the permit and addresses all comments that were received by the due date. This consists of the City's departmental administrative determination in this matter.

Calumet Montana Refining has thirty days from the date of this letter in which to appeal this determination to the Great Falls City Commission. The Commission will determine whether it will review this decision. If it does, a hearing before the Commission will be conducted pursuant to the City of Great Falls Charter at Article II, Section III and issue a final decision thereafter. If the Commission does not review this decision, then this letter will serve as the final administrative determination in this matter. The conditions of the modified permit will go into effect unless Calumet Montana Refining requests a stay with the appeal and such stay is granted by the Commission.

If you have any questions or comments please feel free to contact Randall Rappe or me at 727-8390.

Sincerely,

Mike Jacobson
Environmental Division Supervisor
Public Works Dept.
City of Great Falls

RECEIVED
MAY 19 2015
CALUMET MONTANA REFINING

CMR Ex 2:1

Permit # 13-01

INDUSTRIAL WASTEWATER DISCHARGE PERMIT

Calumet Montana Refining LLC
1900 10th Street N.E.
Great Falls MT 59404

In compliance with The Official Code of the City of Great Falls Title 13, Chapters 2 and 12, (herein referred to as the City Code) **Calumet Montana Refining LLC** (herein referred to as the Permittee) is hereby authorized by the City of Great Falls (herein referred to as the City or the Control Authority), to discharge wastewater to the sanitary sewer and the City Publicly Owned Treatment Works (herein referred to as the POTW) from the above identified facility, in accordance with the effluent limitations, monitoring requirements, and other conditions set forth in this Industrial Wastewater Discharge Permit (herein referred to as the Permit).

It is the Permittee's duty to comply with all applicable Federal, State and local laws whether or not they are specifically incorporated in the permit. A violation in any of the terms of the permit constitutes a violation of the Official Code of the City of Great Falls (herein identified as the City Code) and will subject the Permittee to enforcement action.

It is the Permittee's duty to reapply for renewal of this permit as required in Part IV section H of this permit.

This permit shall become effective on December 24, 2013 and shall expire at midnight on December 23, 2018.

Permit modification effective date 6/22/2015.

Issued by the City of Great Falls

James L. Rearden 5/19/15

James L. Rearden, Director of Public Works Date

The contact information for the Control Authority is:

Industrial Pretreatment Program
City of Great Falls Public Works Department
P.O. Box 5021
Great Falls, MT 59403
406-727-8390

Part V Special Conditions

A. Sewer Meter Accuracy
B. Slug Control Plan
C. Stormwater Diversion
D. Continuous pH monitoring
E. Copper Allocation
F. Copper Compliance Requirements
G. Flow Proportional Sampling

Part VI Definitions and Abbreviations

A. Definitions
B. Abbreviations

Part I Facility Information

A. General Facility Information

Industry Name	Calumet Montana Refining, LLC
Industry Address	1900 10th Street N.E. Great Falls MT 59404
Industry Contact	Dana Leach, Vice President Refining Hadley Bedbury, Manager, Safety, Security and Environment.
Industrial Category	NAICS Code 2911 40 CFR 419.35 Petroleum Refining
Wastewaters to be Discharged	A. Domestic wastewater. B. Process wastewater that meets the limits and conditions of this permit with adequate treatment to achieve compliance with a Pretreatment Standard or requirement.
Wastewaters not to be Discharged	Any process wastewater that exceeds the limits of this permit, does not meet the conditions of this permit or City Code, or does not conform to any applicable Federal, State or Local Regulation.

B. Outfalls

Description and Location of Outfall 001
Outfall 001 is located on the southern boundary of the refinery property and discharges to manhole 4070A. Calumet Montana Refining Company LLC is the last discharger on this sewer line prior to this sewer line entering the wastewater treatment plant.

C. Monitoring Points

Description and location of Monitoring Point 001

Monitoring Point 001 is located directly before the flow meter on the line that discharges to the City sewer system. At monitoring point 001, two 1" lines are located. One of the lines has a ball valve installed for the collection of grab samples.

Description and location of Monitoring Point 002

The other 1" line is connected to a composite sampler.

Part II Effluent Limitations

A. Special Effluent Limitations

It shall be unlawful for the Permittee to discharge, deposit, cause, or allow to be discharged any waste or wastewater which fails to comply with the limitations imposed by this Permit.

B. Dilution Prohibition

Dilution is prohibited as a substitute for treatment and shall be a violation of this Permit except where expressly authorized to do so by an applicable Pretreatment Standard or requirement, Permittee shall not increase the use of process water, or in any other way attempt to dilute a discharge as a partial or complete substitute for adequate treatment to achieve compliance with a Pretreatment Standard or requirement.

C. Specific Effluent Limitations

The wastewater discharged from the Permittee that is regulated by this Permit is subject to all local limitations outlined in the City Code, whether or not the constituent is listed in this Permit, and all applicable categorical standards. Effective upon permit issuance, the Permittee shall not discharge wastewater containing any of the parameters in excess of the listed maximums:

Limits for Monitoring Points 001 (MP001) and 002 (MP002)

Parameter	Limits[1]	Reference
Flow	350,000 GPD	Historical data and refinery treatment plant capacity.
pH	Greater than or equal to 5.5 s.u.[2] and less than or equal to 7.6 s.u.	City Code 13.12.030.B.2
Ammonia	100 mg/l	40 CFR 419.15 City Code 13.12.030.C.3
Oil and Grease	100 mg/l	40 CFR 419.15 City Code 13.12.030.C.3
Arsenic, Total	1.57 mg/l	City Code 13.12.030. C.2
Cadmium, Total	3.51 mg/l	City Code 13.12.030. C.2
Chromium III	0.57 mg/l	City Code 13.12.030. C.2
Chromium VI	0.04 mg/l	City Code 13.12.030. C.2
Chromium, Total	5.92 mg/l	City Code 13.12.030. C.2
Lead, Total	0.14 mg/l	City Code 13.12.030. C.2
Mercury, Total	0.02 mg/l	City Code 13.12.030. C.2
Nickel, Total	0.59 mg/l	City Code 13.12.030. C.2
Silver, Total	0.62 mg/l	City Code 13.12.030. C.2
Selenium, Total	0.2540 lbs/day	City Code 13.12.030. C.2 and allocations calculations
Zinc, Total	2.13 mg/l	City Code 13.12.030. C.2
Sulfide, Total	3608 mg/l	City Code 13.12.030. C.2

[1] All limits are daily maximum values unless specified otherwise.
[2] No discharge shall occur with a pH lower than 5.5 s.u. Any pH discharge greater than or equal to 12.5 is subject to the hazardous waste reporting criteria required by 40 CFR 403.12(p) (1-4), section VI.B – Hazardous Waste Notification. The pH limit is an instantaneous limit.

Sewer Extra Strength Charges shall be levied in accordance with the approved Utility Rate Schedule in effect at the time of the discharge. Billing will be based on monthly average concentration of each parameter and the total monthly discharge reported by the Permittee unless the Permittee has entered into an alternate agreement with the City for determining the monthly billing.

Permittee may choose to pay under the pretreatment sewer charges in accordance with the approved Utility Rate Schedule in effect at the time of the discharge

D. General Prohibitions

The Permittee may not introduce into the POTW any pollutant(s) which cause Pass Through or Interference. These general prohibitions and the specific prohibitions in paragraph F of this section apply to every Industrial User introducing pollutants into the POTW whether or not the Industrial User is subject to other Pretreatment Standards or Requirements.

E. Specific Prohibitions

It shall be unlawful for the Permittee to discharge or deposit or cause or allow to be discharged or deposited into the wastewater treatment system of the City any wastewater which contains the following:

1. Pollutants which create a fire or explosion hazard in the POTW. More specifically, the Permittee shall not discharge any wastestream with a closed cup flashpoint of less than sixty (60) degrees Celsius (140 degrees Fahrenheit) using the test methods specified in 40 CFR Section 261.21. The Director may require Industrial Users with the potential to discharge flammable, combustible or explosive substances to install and maintain an approved combustible gas detection meter or explosion hazard meter. No two successive readings on an explosion hazard meter at the point of discharge shall be more than five percent (5%), nor any one reading more than ten percent (10%), of the Lower Explosive Limit (LEL) of the meter.

2. Pollutants which will cause corrosive structural damage to the POTW but in no case discharges with pH lower than pH 5.5.

3. Solid or viscous substances which may cause obstruction in the sewage system or otherwise cause Interference to the POTW.

4. Any pollutant, including oxygen demanding pollutants (BOD, etc.) released in a discharge at a flow rate and/or pollutant concentration which will cause Pass Through or Interference with the POTW.

5. Heat in amounts which will inhibit biological activity in the POTW resulting in Interference, but in no case heat in such quantities that the temperature at the POTW Treatment Plant exceeds 40 °C (104 °F) unless the Approval Authority, upon request of the POTW, approves alternate temperature limits.

6. Stormwater drainage from ground resulting in Infiltration and Inflow (I&I) through the Permittee's service line(s), surface, roof drains, catch basins, unroofed area drains (e.g. commercial car washing facilities) or any other source unless otherwise approved by the Director. Specifically prohibited is the connection of roof downspouts, exterior foundation drains, areaway drains, or other sources of surface runoff or ground water to a building sewer or building drain which in turn

is connected directly or indirectly to the City's wastewater collection system. No person shall connect or discharge water from underground drains, sump pump discharges, natural springs and seeps, water accumulated in excavation or grading or any other water associated with construction activities.

7. A Slug Discharge as defined in Section 13.12.020 A of City Code.

8. Petroleum oil, nonbiodegradable cutting oil, or products of mineral oil origin in amounts that will cause Pass Through or Interference.

9. Pollutants which result in the presence of toxic gases, vapors, or fumes within the POTW in a quantity that may cause acute health and safety hazards for employees of the City employed at the POTW.

10. Trucked or hauled pollutants except as authorized by the Director and only at discharge points designated by the Director.

11. Any water or waste which contains grease or oil or any other substances that will solidify or become discernibly viscous at temperatures between thirty-two degrees Fahrenheit (32° F. or 0° Celsius) and one hundred fifty degrees Fahrenheit (150° F or 65.5° Celsius) and cause or contribute to Interference or Pass Through.

12. Any pollutant directly into a manhole or other opening in the POTW unless specifically authorized by the City or as otherwise permitted under Title 13, Chapter 12 of the Official Code of the City of Great Falls. Prohibited is the opening of a manhole or discharging into any opening in violation of Title 13, Chapter 12 of City Code.

13. Any radioactive wastes or isotopes of such half-life or concentration as may exceed limits established by the City in compliance with applicable state or federal regulations.

14. Liquid wastes from chemical toilets, and trailers, campers or other recreational vehicles which have been collected and/or held in tanks or other containers shall not be discharged into the POTW except at locations authorized by the City to collect such wastes.

Part III Monitoring and Reporting Requirements

A. Sample Collection

Compliance determinations with respect to prohibitions and limitations in Title 13, Chapter 12 of City Code may be made on the basis of either grab or composite samples of wastewater as specified by the City. Such samples shall be taken at a point or points which the City determines to be suitable for obtaining a representative sample of the discharge.

Composite samples may be taken over a twenty-four (24) hour period, or over a longer or shorter time span, as determined by the City to meet specific circumstances.

B. Sample Type

Samples collected to satisfy reporting requirements must be based on data obtained through appropriate sampling and analysis performed during the period covered by the report, and based on data that is representative of conditions occurring during the reporting period.

1. Except as indicated in subparagraphs 2 and 3 below, the Permittee must collect representative wastewater samples using 24-hour flow proportional composite sampling techniques, unless time-proportional composite sampling or grab sampling is required by the City. All samples must be representative of the permitted discharge. See Special Condition F.

2. Samples for oil and grease, temperature, pH, cyanide, total phenols, sulfides, and volatile organic compounds must be obtained using grab collection techniques. Using protocols (including appropriate preservation) specified in 40 CFR Part 136 and appropriate EPA guidance, multiple grab samples collected during a 24-hour period may be composited prior to the analysis as follows: for cyanide, total phenols, and sulfides the samples may be composited in the laboratory or in the field; for volatile organics and oil and grease, the samples may be composited in the laboratory. Composited samples for other parameters unaffected by the compositing procedures as documented in 40 CFR Part 136 may be authorized by the City, as appropriate. In addition, grab samples may be required to show compliance with instantaneous local limits, including pH.

3. For sampling required in support of Baseline Monitoring Reports and 90-Day Compliance Reports required in Section 13.12.080 of City Code, a minimum of four (4) grab samples must be used for pH, cyanide, total phenols, oil and grease, sulfide, and volatile organic compounds for facilities for which historical representative sampling data do not exist. Where historical data are available, the City may authorize a lower minimum. For the reports required by Section 13.12.080 of City Code and by this permit, the Permittee is required to collect the number of grab samples necessary to assess and assure compliance with applicable Pretreatment Standards and Requirements

C. Analytical Requirements

All pollutant analysis, including sampling techniques, to be submitted as part of a Permit requirements shall be performed in accordance with the techniques prescribed in 40 CFR Part 136 and amendments thereto, unless otherwise specified in an applicable Categorical Pretreatment Standard. If 40 CFR Part 136 does not contain sampling or analytical techniques for the pollutant in question, or where the EPA determines that the Part 136 sampling and analytical techniques are inappropriate for the pollutant in question,

sampling and analyses shall be performed by using validated analytical methods or any other applicable sampling and analytical procedures, including procedures suggested by the City or other parties approved by the EPA.

Self Monitoring for Monitoring Point 001 (MP001)

Parameter	Unit of Measurement	Frequency	Sample Type
Daily Flow	gallons	Continuous	Meter
pH[2]	Standard Units	Every 3 hours[1]	Grab
Oil and Grease	mg/l	Once per week	Grab
Sulfide, Total	mg/l	Once per month	Grab
Chromium, total	mg/l	Twice per year	Calculation
Chromium III	mg/l	Twice per year	Grab
Chromium VI	mg/l	Twice per year	Grab

Footnotes for table MP001
[1] No more than three hours may pass between sample events.
[2] Permittee shall submit the daily minimum and maximum pH values on the monthly Discharge Monitoring Report.

Self Monitoring for Monitoring Point 002 (MP002)

Parameter	Unit of Measurement	Frequency[1]	Sample Type
pH[2, 3]	standard units	Continuous	Meter
Ammonia, Total	mg/l	Once per month	Composite
Arsenic, Total	mg/l	Twice per year	Composite
Cadmium, Total	mg/l	Twice per year	Composite
Copper, Total	Lbs	Twice per year	Composite
Lead, Total	mg/l	Twice per year	Composite
Mercury, Total	mg/l	Twice per year	Composite
Nickel, Total	mg/l	Twice per year	Composite
Selenium, Total	Lbs	Twice per year	Composite
Silver, Total	mg/l	Twice per year	Composite
Zinc, Total	mg/l	Twice per year	Composite
BOD	mg/l	Once per week	Composite
TSS	mg/l	Once per week	Composite

Footnotes for table MP002
[1] Twice per year sampling for metals shall be completed during the first and third quarters or the second and fourth quarters.
[2] The continuous pH monitoring probe is located in this line.
[3] See Special Condition D.

D. Sampling Performed in Excess of Minimum Frequencies

If the Permittee monitors any regulated pollutant at the appropriate sampling location more frequently than required by this permit, using approved analytical methods as specified above, the results of such monitoring shall be included in the calculation and reporting of the parameters. Such increased frequency shall also be indicated.

E. Recordkeeping

1. The Permittee shall retain, and make available for inspection and copying, all records, reports, monitoring or other data, applications, permits and all other information and documentation required by Title 13, Chapter 12 of City Code including documentation associated with Best Management Practices.

2. Such records shall include for all samples:

   a. The date, exact place, method, and time of sampling and the names of the person or persons taking the samples;

   b. The date's analyses were performed;

   c. Who performed the analyses;

   d. The analytical techniques/methods use; and

   e. The results of such analyses.

F. Records Retention

The Permittee shall retain such records and shall keep such records available for inspection for at least three (3) years. This recordkeeping period shall be extended automatically for the duration of any litigation concerning the Permittee's compliance with any provision of Title 13, Chapter 12 of City Code, or when the Permittee has been specifically and expressly notified of a longer records retention period by the Director.

G. Signatory Certification

All reports and other submittals required to be submitted to the City shall include the following statement and signatory requirements.

1. The Authorized Representative of the Industrial User signing any application, questionnaire, report or other information required to be submitted to the City must sign and attach the following certification statement:

   "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 ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or the 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 a fine and imprisonment for knowing violations."

2. If the Authorized Representative is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, or overall responsibility for environmental matters for the company, a new authorization satisfying the requirements provided in the definition of Authorized Representative of the Industrial User (Section 13.12.020 of City Code) must be submitted to the City prior to or together with any reports to be signed by an authorized representative.

3. Reports, if mailed, shall be addressed to the Control Authority at the following address:

Industrial Pretreatment Program
City of Great Falls Public Works Department
P.O. Box 5021
Great Falls, MT 59403

4. Reports may be hand delivered to the Control Authority at the following address:

City of Great Falls Public Works Department
Administration Building
1005 25th Avenue Northeast
Great Falls MT 59404

H. Reporting Requirements

Compliance reports containing the following information shall be submitted monthly unless otherwise specified in Part III of this permit. The reports are due on or before the 28th day of the month following the reporting period. The report must be postmarked or received (if hand delivered) by the City on or before the due date.

1. Concentrations and measurements of all parameters for which there are self-monitoring requirements shall be submitted. Legible copies of completed chain-of-custody (COC) forms and laboratory analytical reports for all samples analyzed by a contract laboratory shall be included.

2. Daily average (average gallons per discharge day) and total monthly flows (gallons) reported for each month in the reporting period from all outfalls shall be submitted. If the permit contains a daily mass limit, the Permittee shall report

daily total flow for each day of the reporting period. Industrial Users subject to Categorical Pretreatment Standards shall report measured or estimated average and maximum daily flows for the reporting period for each of the following:

a. Regulated process streams, and
b. Other streams as necessary to allow use of Combined Wastestream Formula of 40CFR 403.6(e)

The City may allow for verifiable estimates of these flows where justified by cost or feasibility considerations.

3. Daily high and low pH during the reporting period shall be submitted. Each pH violation must be reported separately with an explanation for the violation. Additionally, records of all pH measurements for the reporting period shall be submitted.

4. If no discharge occurs during the reporting period, "no discharge" shall be reported in lieu of the requirements listed above for each calendar month during which no discharge occurred.

5. All reports and other documents required by this permit shall follow the signatory requirement outlined in Part III. G of this permit.

6. All wastewater samples must be representative of the Permittee's discharge. Wastewater monitoring and flow measurement facilities shall be properly operated, kept clean, and maintained in good working order at all times. The failure of an Industrial User to keep its monitoring facility in good working order shall not be grounds for the Industrial User to claim that the sample results are unrepresentative of its discharge.

7. The sampling and analyses required for the reporting outlined above may be performed by the City in lieu of the Permittee. Where the City itself makes arrangements with the Permittee to collect all the information required for the report, the Permittee will not be required to submit the report.

   If the Permittee monitors any regulated pollutant at the permitted sampling location more frequently than required by this permit, the Permittee shall use approved analytical methods and the results of such monitoring shall be reported on the monthly DMR.

8. Within 90 days following the date for final compliance with applicable Categorical Pretreatment Standards or in the case of a New Source following commencement of the introduction of wastewater into the POTW for which the Permittee reports a discharge, new Industrial Users subject to Categorical Pretreatment Standards are required to provide the report as described in 40 CFR 403.12 (d), which are listed below.

a. The Industrial User shall submit the measured average daily and maximum daily flow in gallons per day to the POTW from regulated process wastestreams other streams as necessary to allow the use of the combined wastestream formula in 40 CFR 403.6 (e). The Control Authority may allow for verifiable estimates o these flows where justified by cost of feasibility.

b. The Industrial User shall identify the pretreatment standards applicable to each regulated process.

c. The Industrial User shall submit the results of sampling and analysis identifying the nature and concentration (or mass, where required by the standard or Control Authority) of regulated pollutants in the discharge from each regulated process. Both daily maximum and average concentration (or mass where required) shall be reported. Samples shall be representative of daily operations. In cases where the standard requires compliance with a Best Management Practice or pollution prevention alternative, the Industrial User shall submit the documentation as required by the Control Authority or the applicable Standards to determine compliance with the Standard.

d. The Industrial User shall take a minimum of one representative sample to compile the data necessary to comply with the requirements of this section.

e. Samples shall be taken immediately downstream from pretreatment facilities if such exists or immediately downstream from the regulated process if no pretreatment exists. If other wastewaters are mixed with the regulated wastewater prior to pretreatment the Industrial User should measure the flows and concentrations necessary to allow the use of the combined wastestream formula in 40 CFR 403.6 (e) this adjusted limit along with supporting data shall be submitted to the Control Authority.

f. Sampling and analysis shall be performed in accordance with the techniques prescribed in 40 CFR 136 and amendments thereto. Where 40 CFR 136 does not contain sampling or analytical techniques for the pollutant in question or where the EPA determines that the parts 136 sampling and analytical are inappropriate for the pollutant in question, sampling and analysis shall be performed by using validated analytical methods or any other applicable sampling and analytical procedures including procedures suggested by the POTW or other parties approved by the EPA.

g. The 90 day compliance report shall indicate the time, date and place of sampling and methods of analysis and shall certify that such sampling and

analysis is representative or normal work cycles and expected pollutant discharges to the POTW.

h. A statement reviewed by the Authorized Representative of the Industrial User and certified to by a qualified professional, indicating whether pretreatment standards are being met on consistent basis, and, if not, whether additional operation and maintenance and/or additional pretreatment is required for the Industrial User to meet the Pretreatment Standards and requirements.

i. If additional pretreatment and/or operation and maintenance are required to meet the Pretreatment Standards, the completion date in this schedule shall not be later than the compliance date established for the applicable Pretreatment Standard.

j. Where the Industrial User's categorical Pretreatment Standard has been modified by a removal allowance (§ 403.7), the combined wastestream formula (§ 403.6 (e)) and/or a fundamentally different factors variance (§ 403.13) and after the Industrial User submits the report required by this section, the information required by paragraphs i and j of this section, shall be submitted by the user to the control authority within 60 days after the modified limit is approved.

k. For CIUs subject to equivalent mass or concentration limits established by the POTW [40 CFR 403.6(c)], the report must contain a reasonable measure of the IU's long-term production rate. For CIU subject to categorical pretreatment standards expressed in terms of allowable pollutant discharge per unit of production (or another measure of operation), the report must include the IU's actual production during the appropriate sampling period.

I. 24 Hour Notice and 30 Day Re-sampling

If sampling performed by the Permittee indicates a violation of Title 13, Chapter 12 of City Code, the Permittee shall notify the City within 24 hours of becoming aware of the violation. The Permittee shall also repeat the sampling and analysis and submit the results of the repeat analysis to the City within thirty (30) days after becoming aware of the violations. The certification statement in section III G 1 shall be submitted with the results of the repeat analysis The Permittee is not required to resample if the following occurs:

1. The City performs sampling at the Permittee's facility at a frequency of at least once per month.

2. The City performs sampling at the Permittee's facility between the time when the Permittee performs its initial sampling and the time when the Permittee receives the results of this sampling. It is the sole responsibility of the Permittee to verify if the

City has performed this sampling.

J. Notification of the Discharge of Hazardous Waste

1. The Permittee shall notify the City, in writing, of any discharge into the POTW of a substance which, if otherwise disposed of, would be hazardous waste under 40 CFR Part 261. Such notification to the City shall be made within the appropriate time frames specified in Section 13.12.080 paragraphs F, H, and L of City Code.

   Such notification must include:

   a. The name of the hazardous waste as set forth 40 CFR Part 261;

   b. The EPA hazardous waste number;

   c. The type of discharge (continuous, batch, or other);

   d. An identification of the hazardous constituents contained in the wastes;

   e. An estimation of the mass and concentration of such constituents in the wastestream discharged during that calendar month;

   f. An estimation of the mass of constituents in the wastestream expected to be discharged during the following twelve (12) months;

   g. Certification that the Permittee has a program in place to reduce the volume and toxicity of hazardous wastes generated to the degree it has determined to be economically practical and

   h. Signatory certification as required by Part III. G of this permit.

2. The Permittee shall notify the EPA Regional Waste Management Division Director, and state hazardous waste authorities, in writing, of the discharge into the POTW of a substance which, if otherwise disposed of, would be hazardous waste under 40 CFR Part 261 and meets the reporting criteria specified at 40 CFR 403.12(p). Notification to the State and EPA is the responsibility of the Permittee and shall be made as required under 40 CFR §403.12(p). .The Permittee shall copy the City on all notifications made to the State and EPA.

3. This provision does not create a right to discharge any substance not otherwise allowed to be discharged by Title 13, Chapter 12 of City Code, a permit issued hereunder, or any applicable federal or state law.

K. Change in Discharge or Operations

1. The Permittee shall file a notification to the City a minimum of fourteen (14) days

prior to any planned significant change in operations or wastewater characteristics. A significant change shall be a change equal to or greater than twenty (20) percent in the mass of a pollutant or volume of flow discharged to the POTW. In addition, this notification shall include:

a. Adding or removing processing, manufacturing or other production operations.

b. New substances used which may be discharged.

c. Changes in the listed or characteristic hazardous waste for which the Permittee has submitted or is required to submit information to the City as required by paragraph J above, Title 13, Chapter 12 of City Code and 40 CFR Section 403.12(p) as amended.

d. The certification statement in section III G 1.

L. Accidental Discharge Report

1. In the case of any discharge, including, but not limited to, spills, accidental discharges, discharges of a non-routine, episodic nature, a non-customary batch discharge, a slug discharge or a discharge that may cause potential problems of the POTW, the Permittee shall notify the City of the incident immediately. The Control Authority must be notified by telephone at 727-8390. The notification shall include:
   a. Name of the facility.
   b. Location of the facility.
   c. Name of the caller.
   d. Date and time of the discharge.
   e. Date and time discharge was halted.
   f. Location of discharge.
   g. Estimated volume of the discharge.
   h. Estimated concentration of pollutants in the discharge.
   i. Corrective actions taken to halt the discharge.
   j. Method of disposal, if applicable.

2. All instances of accidental discharge shall be followed up with a written report. This report shall be mailed within five (5) days of the discharge. The report shall contain the following as found in 40 CFR 403.16 (c) (3) and City Code:

   a. A description of the accidental discharge, upset, slug; the cause; and the impact on the Permittee's compliance status. The description should also include the location of the discharge, type, concentration, and volume of waste.

   b. Duration of noncompliance, including exact dates and times of

noncompliance. If the noncompliance continues, the time by which compliance is reasonably expected to occur.

c. All steps taken or to be taken to reduce, eliminate, and prevent recurrence of such an upset, slug, accidental discharge, or other conditions of noncompliance.

d. The reporting certification statement signed by an authorized representative:

3. Notification shall not relieve the Permittee of any expense, loss, damage, or other liability which may be incurred as a result of damage to the POTW, natural resources, or any other damage to person or property; nor shall such notification relieve the Permittee of any fines, penalties, or other liability which may be imposed by the City Code, or other applicable law.

Part IV General Conditions

A. Right of Entry

1. Whenever it shall be necessary for the purposes of this Chapter, the City may enter upon any Industrial User's facility, property, or premises subject to Title 13, Chapter 12 of City Code that is located or conducted or where records are required to be kept for the purposes of:

a. Performing all inspection, surveillance and monitoring procedures necessary to determine, independent of information supplied by Industrial Users, compliance or noncompliance with applicable Pretreatment Standards and Requirements by an Industrial User including the taking of photographs. Compliance monitoring and inspection shall be conducted at a frequency as determined by the City and may be announced or unannounced;

b. Examining and copying any records required to be kept under the provisions of this Chapter;

c. Inspecting any monitoring equipment or method, pretreatment system equipment and/or operation;

d. Sampling any discharge of wastewater into POTW; and/or

e. Inspecting any production, manufacturing, fabricating or storage area where pollutants, regulated under this Chapter, could originate, be stored, used, or be discharged to the POTW.

2. The occupant of such property or premises shall render all proper assistance in such activities. Where an Industrial User has security measures in place which

require proper identification and clearance before entry into its premises, the Industrial User shall make necessary arrangements with its security personnel so that authorized representatives of the City will be permitted to enter without delay to perform their specified functions.

3. The Director and other duly authorized agents and employees of the City are entitled to enter all private properties through which the City holds an easement.

B. Compliance with Permit

Compliance with this Permit does not relieve the Permittee of its obligation to comply with any and all applicable pretreatment regulations, standards, or requirements under local, State, and Federal laws whether or not they are specifically incorporated in this Permit, including any such regulations, standards, requirements, or laws that may become effective during the term of this Permit. The POTW is a domestic sewage treatment facility; industrial waste is accepted only when such waste is deemed acceptable to the POTW. This Permit is issued to the Permittee for specific activities at the above permitted address.

C. State and Federal Requirements

Nothing in the permit shall relieve the Permittee of the responsibility to meet the requirements of any applicable State or Federal regulations.

D. Confidential Information-Disclosure of Information and Availability to the Public

1. All records, reports, data or other information supplied by any person or Industrial User as a result of any disclosure required by Title 13, Chapter 12 of City Code, or information and data from inspections shall be available for public inspection, except as otherwise provided in this Section, 40 CFR Section 403.14 and the Montana Open Records Law (Mont. Code Ann. Section 2-6-401 et. seq.)

2. These provisions shall not be applicable to any information designated as a trade secret by the person supplying such information. Materials designated as a trade secret may include, but shall not be limited to processes, operations, style of work or apparatus, or confidential commercial or statistical data. Any information and data submitted by the Permittee which is desired to be considered a trade secret shall have the words, "Confidential Business Information," stamped on each page containing such information. The Permittee must demonstrate to the satisfaction of the City that the release of such information would divulge information, processes or methods of production entitled to protection as trade secrets of the Permittee.

3. Information designated as a trade secret pursuant to this Section shall remain confidential and shall not be subject to public inspection. Such information shall be available only to officers; employees or authorized representatives of the City charged with implementing and enforcing the provisions of this Chapter and properly identified representatives of the U.S. Environmental Protection Agency and

the Montana Department of Environmental Quality.

4. Effluent data from any Industrial User whether obtained by self-monitoring, monitoring by the City or monitoring by any State or Federal agency, shall not be considered a trade secret or otherwise confidential. All such effluent data shall be available for public inspection.

E. Permit Modification

The City may modify an Industrial Discharge Permit for good cause, including, but not limited to, the following reasons:

1. To incorporate any new or revised federal, state, or local Pretreatment Standards or Requirements;

2. To address significant alterations or additions to the Permittee's operation, processes, or wastewater volume or character since the time of the Industrial Discharge Permit issuance;

3. A change in the POTW that requires either a temporary or permanent reduction or elimination of the authorized discharge;

4. Information indicating that the permitted discharge poses a threat to the POTW, City personnel, or the receiving waters;

5. Violation of any terms or conditions of the Industrial Discharge Permit;

6. Misrepresentations or failure to fully disclose all relevant facts in the Industrial Discharge Permit application or in any required reporting; or

7. To correct typographical or other errors in the Industrial Discharge Permit.

F. Permit Revocation

A violation of the conditions of a permit or of this Chapter or of applicable state and federal regulations shall be reason for revocation of such permit by the City. Upon revocation of the permit, any wastewater discharge from the affected Industrial User shall be considered prohibited and in violation of this Chapter. Grounds for revocation of a permit include, but are not limited to, the following:

1. Failure of an Industrial User to accurately disclose or report the wastewater constituents and characteristics of their discharge;

2. Failure of the Industrial User to report significant changes in operations or wastewater constituents and characteristics;

3. Refusal of access to the Industrial User's premises for the purpose of inspection or monitoring;

4. Falsification of records, reports or monitoring results;

5. Tampering with monitoring equipment;

6. Violation of conditions of the permit;

7. Misrepresentation or failure to fully disclose all relevant facts in the Industrial Discharge Permit application;

8. Failure to pay fines or penalties;

9. Failure to pay sewer charges;

10. Failure to pay permit and sampling fees; or

11. Failure to meet compliance schedules.

G. Transfer Prohibited

Industrial Discharge Permits are issued to a specific Industrial User for a specific operation. An Industrial Discharge Permit shall not be reassigned or transferred or sold to a new owner, new Industrial User, different premises, or a new or changed operation without the prior written approval of the City. Any succeeding owner or Industrial User shall also comply with the terms and conditions of the existing permit until a new permit is issued.

H. Application for Permit Renewal

A Permittee with an expiring Industrial Discharge Permit shall apply for a new permit by submitting a complete permit application at least ninety (90) days prior to the expiration of the Permittee's existing discharge permit. The Permittee shall file a permit application on forms provided by the City containing the information specified in the application. A Permittee with an existing permit that has filed a complete and timely application may continue to discharge as approved by the City through an administrative extension of the existing permit.

I. Pretreatment and Monitoring Facilities

An industrial user shall provide necessary wastewater treatment, monitoring and/or equalization facilities as required to comply with Title 13, Chapter 12 of City Code and shall achieve compliance with all Pretreatment Standards and Requirements within the time limitations specified by EPA, the state, or the City, whichever is more stringent. Any facilities required to pretreat or monitor wastewater to a level acceptable to the Director shall be provided, operated and maintained at the industrial user's expense. Detailed plans showing the pretreatment facilities and operating procedures shall be submitted to the Director for review and shall be acceptable to the City before construction of the facility. The review of such plans and operating procedures will in no way relieve the industrial user from the responsibility of modifying the facility as necessary to produce an effluent acceptable to the City under the provisions of this Chapter. Any subsequent changes in the pretreatment facilities or method of operation shall be reported to and be acceptable to

the Director prior to the industrial user's initiation of the changes.

J. Prohibition of Bypass

1. For the purposes of this section:

   a. Bypass means the intentional diversion of wastestreams from any portion of the Permittee's treatment facility.

   b. Severe property damage means substantial physical damage to property, 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.

2. Bypass not violating applicable Pretreatment Standards or Requirements. The Permittee may allow any bypass to occur which does not cause Pretreatment Standards or requirements to be violated, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provision of paragraphs 3 and 4 of this section but are reportable under Section 13.12.080 L.

3. Notice

   a. If the Permittee knows in advance of the need for a bypass, it shall submit prior notice to the Director, if possible, at least ten (10) days before the date of the bypass.

   b. The Permittee shall submit oral notice of an unanticipated bypass that exceeds applicable Pretreatment Standards to the Director within twenty four (24) hours from the time the Permittee becomes aware of the bypass. A written submission shall also be provided within five (5) days of the time the Permittee becomes aware of the bypass. The written submission shall contain a description of the bypass and its cause; the duration of the bypass, including exact dates and times, and, if the bypass has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the bypass. The Director may waive the written report on a case-by-case basis if the oral report has been received within twenty four (24) hours.

4. Prohibition of Bypass

   a. Bypass is prohibited, and the Director may take enforcement action against the Permittee for a bypass, unless;

      i. Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

ii. There were no feasible alternatives to the 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 preventative maintenance; and

iii. The Permittee submitted notices as required under paragraph 3 of this Section.

b. The Director may approve an anticipated bypass, after considering its adverse effects, if the Director determines that it will meet the three (3) conditions listed in paragraph 4.a. of this Section.

K. Upset Provisions

1. For the purposes of this Section, Upset means an exceptional incident in which there is unintentional and temporary noncompliance with categorical Pretreatment Standards because of factors beyond the reasonable control of the Permittee. Upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

2. Effect of an upset

An Upset shall constitute an affirmative defense to an action brought for noncompliance with categorical Pretreatment Standards if the requirements of paragraph 3 are met.

3. 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:

a. An upset occurred and the Permittee can identify the cause(s) of the upset;

b. The facility was at the time being operated in a prudent and workman-like manner and in compliance with applicable operation and maintenance procedures;

c. The Permittee has submitted the following information to the Director within twenty-four (24) hours of becoming aware of the Upset (if this information is provided orally, a written submission must be provided within five (5) days):

i. A description of the Indirect Discharge and cause of noncompliance;

ii. The period of noncompliance, including exact dates and times or, if not corrected, the anticipated time the noncompliance is expected to continue;

iii. Steps being taken and/or planned to reduce, eliminate and prevent recurrence of the noncompliance.

4. Burden of proof

In any enforcement preceding the Permittee seeking to establish the occurrence of an Upset shall have the burden of proof.

5. User responsibility in case of Upset

The Permittee shall control production of all discharges to the extent necessary to maintain compliance with Categorical Pretreatment Standards upon reduction, loss, or failure of its treatment facility until the facility is restored or an alternative method of treatment is provided. This requirement applies in the situation where, among other things, the primary source of power of the treatment facility is reduced, lost or fails.

L. Compliance and Enforcement

1. Enforcement Response Plan

The City may adopt policies and procedures as set forth in the City's Enforcement Response Plan for carrying out the provisions of this permit, provided that such policies and procedures are not in conflict with this permit or any applicable state or federal law or regulation.

2. Publication of Industrial Users in Significant Noncompliance

The City shall publish annually, in a newspaper of general circulation that provides meaningful public notice within the jurisdictions served by the POTW, a list of the Significant Industrial Users which, at any time during the previous twelve (12) months, were in Significant Noncompliance as defined in Section 13.12.020 of City Code with applicable Pretreatment Standards and Requirements. In addition, any Industrial User found to be in Significant Noncompliance with paragraphs 3, 4, or 8 as shown in the definition of Significant Non-Compliance shall also be published in the newspaper.

3. Administrative Enforcement Actions

a. Notice of Violation (NOV)

When the City finds that an Industrial User has violated, or continues to violate, any provision of Title 13 Chapter 12 of City Code, an Industrial Discharge Permit, or order issued hereunder, or any other Pretreatment Standard or Requirement, the City may serve upon the Industrial User a written Notice of Violation. Within five (5) working days of the receipt of such notice, an explanation of the violation and a plan for the satisfactory correction of prevention thereof, to include specific required actions, shall be submitted by the Industrial User to the City. The Industrial User may also request a meeting with the Director to present further information and explanation. Submission of such a plan in no way relieves the Industrial User of liability for any violations occurring before or after receipt of the Notice of Violation. Nothing in this section shall limit the authority of the City to take any action, including emergency actions or any other enforcement action, without first issuing a Notice of Violation.

b. Suspension of Service

The City, through the Director of Public Works, may suspend water service and/or wastewater treatment service and/or revoke an Industrial Discharge Permit (Section 13.12.050, K. of City Code) when such revocation is necessary, in the opinion of the Director, in order to stop an actual or threatened discharge which presents or may present an imminent or substantial endangerment to the health or welfare of persons, to the environment, causes Pass Through or Interference or causes the City to violate any condition of its MPDES Permit.

Any person notified of a suspension of the water service and/or wastewater treatment service and/or the Industrial Discharge Permit shall immediately stop or eliminate the contribution. In the event of a failure of the person to comply voluntarily with the suspension order, the City shall take such steps as deemed necessary including immediate severance of the sewer connection, to prevent or minimize damage to the POTW system or endangerment to individuals or the environment. The City may reinstate the Industrial Discharge Permit, water service and/or the wastewater treatment service upon proof of the elimination of the non-complying discharge.

c. Administrative Compliance Order

When the City finds that an Industrial User has violated, or continues to violate, any provision of Title 13, Chapter 12 of City Code, an Industrial Discharge Permit, or order issued hereunder, or any other Pretreatment

Standard or Requirement, the City may issue an order to the Industrial User responsible for the discharge directing that the Industrial User come into compliance within a specific time. If the Industrial User does not come into compliance within the time provided, sewer service may be discontinued unless adequate treatment facilities, devices, or other related appurtenances are installed and properly operated. Compliance orders also may contain other requirements to address the noncompliance, including additional self-monitoring and management practices designed to minimize the amount of pollutants discharged to the sewer. A compliance order may not extend the deadline for compliance established for a Pretreatment Standard or Requirement, nor does a compliance order relieve the Industrial User of liability for any violation, including any continuing violation. Issuance of a compliance order shall not be a bar against, or a prerequisite for, taking any other action against the Industrial User.

d. Consent Orders

The City may enter into Consent Orders, assurances of compliance, or other similar documents establishing an agreement with any Industrial User responsible for noncompliance. Such documents shall include specific actions to be taken by the Industrial User to correct the noncompliance within a time period specified by the document. A consent order may include penalties, supplemental environmental projects, or other conditions and requirements as agreed to by the City and the Industrial User.

e. Show Cause Hearing

i. The City may order any Industrial User who causes or allows an unauthorized discharge to enter the POTW to show cause before an ad hoc committee appointed by the City Manager why the proposed enforcement action should not be taken. A notice shall be served on the Industrial User specifying the time and place of a hearing to be held by the ad hoc committee regarding the violation, the reasons why the proposed action is to be taken, and directing the Industrial User to show cause before the ad hoc committee why the proposed enforcement action should not be taken. The notice of the hearing shall be served personally or be registered or certified mail (return receipt requested) at least ten (10) days before the hearing. Service may be made on any agent or officer of a corporation or other Authorized Representative of the Industrial User.

ii. At any hearing held pursuant to Title 13, Chapter 12 of City Code, testimony taken must be under oath and recorded. The transcript of

testimony will be made available to any member of the public and any party to the hearing upon payment of charges for the preparation thereof. The hearing may be suspended or continued at the discretion of the presiding officer, provided that all evidence is received and the hearing is closed within sixty (60) days after it is commenced.

iii. After the ad hoc committee has reviewed the evidence, it shall issue an order to the Industrial User responsible for the discharge directing that, following a specified time period, the sewer service be discontinued unless adequate treatment facilities, devices or other related appurtenances shall have been installed or existing treatment facilities, devices or other related appurtenances are properly operated. Further orders and directives as are necessary and appropriate to correct the violation may be issued.

f. Administrative Fines

i. When the City finds that an Industrial User has violated, or continues to violate, any provision of Title 13, Chapter 12 of City Code, an Industrial Discharge Permit, or order issued hereunder, or any other Pretreatment Standard or Requirement, the City may fine such Industrial User in an amount not to exceed $1,000 per day per violation. Such fines shall be assessed on a per-violation, per day basis. In the case of monthly or other long-term average discharge limits, fines shall be assessed for each day during the period of violation.

ii. A lien against the Industrial User's property shall be sought for unpaid charges, fines, and penalties.

iii. A Permittee desiring to appeal such fines must file a written request for the City to reconsider the fine along with full payment of the fine amount within fifteen (15) days of being notified of the fine. Such notice or appeal shall set forth the nature of the order or determination being appealed, the date of such order or determination, the reason for the appeal, and request a hearing pursuant to procedures outlined in Section 13.12.100, C.5 of City Code.

iv. Issuance of an administrative fine shall not be a bar against, or prerequisite for, taking any other action against the Industrial User.

4. Judicial Enforcement Remedies

a. Injunctive Relief

When the City finds that an Industrial User has violated, or continues to violate, any provision of Title 13, Chapter 12 of City Code, an Industrial Discharge Permit, or order issued hereunder, or any other Pretreatment Standard or Requirement, the City may petition the District Court for the issuance of a temporary or permanent injunction, as appropriate, which restrains or compels the specific performance of the Industrial Discharge Permit, order, or other requirement imposed by Title 13, Chapter 12 of City Code on activities of the Industrial User. The City may also seek such other action as is appropriate for legal and/or equitable relief, including a requirement for the Industrial User to conduct environmental remediation. A petition for injunctive relief shall not be a bar against, or a prerequisite for, taking any other action against an Industrial User.

b. Civil Penalties

i. An Industrial User who has violated, or continues to violate, any provision of Title 13, Chapter 12 of City Code, an Industrial Discharge Permit, or order issued hereunder, or any other Pretreatment Standard or Requirement shall be liable to the City for a maximum civil penalty not to exceed $1,000 per day per violation. In the case of a monthly or other long-term average discharge limit, penalties shall accrue for each day during the period of violation.

ii. The City may recover reasonable attorneys' fees, court costs, and other expenses associated with enforcement activities, including sampling and monitoring expenses, and the cost of any actual damages incurred by the City.

iii. In determining the amount of civil liability, the Court shall take into account all relevant circumstances, including, but not limited to, the extent of harm caused by the violation, the magnitude and duration of the violation, any economic benefit gained through the Industrial User's violation, corrective actions by the Industrial User, the compliance history of the Industrial User, and any other factor as justice requires.

iv. Actions for civil penalties shall be civil actions brought in the name of the City. The City must prove alleged violations by a preponderance of the evidence.

v. Filing a suit for civil penalties shall not be bar against, or a

prerequisite for, taking any other action against an Industrial User.

c. Civil Fine Pass Through

In the event that an Industrial User discharges such pollutants which cause the City to violate any condition of its MPDES permit and the City is fined by EPA or the State for such violation, then such Industrial User shall be fully liable for the total amount of the fine and/or supplemental environmental project that results from such action by EPA and/or the State.

d. Criminal Prosecution

An Industrial User who purposely, knowingly or negligently violates any provision of this Chapter or willfully, negligently introduces any substance into the POTW which causes personal injury or property damage or knowingly makes any false statements, representations, or certifications in any application, record, report, plan, or other documentation filed or required to be maintained an Industrial Discharge Permit or order issued hereunder, or any other Pretreatment Standard or Requirement, shall upon conviction, be guilty of a misdemeanor, punishable by a fine not to exceed $1,000 per day per violation and be subject to imprisonment for not more than six (6) months, or both. In addition, these penalties may be sought for any person who maliciously, willfully, or negligently breaks, destroys, uncovers, defaces, tampers with, or otherwise destroys, or who prevents access to, any structure, appurtenance or equipment, or any part to the POTW.

5. Remedies Nonexclusive

The remedies provided for in Title 13, Chapter 12 of City Code are not exclusive of any other remedies that the City may have under the provisions of Montana law. The City may take any, all, or any combination of these actions against a noncompliant Industrial User. Enforcement of pretreatment violations will generally be in accordance with the Enforcement Response Plan. However, the City may take other action against any Industrial User when the circumstances warrant and may take more than one enforcement action against any noncompliant Industrial User.

6. Public Nuisance

Any violation of Title 13, Chapter 12 of City Code, a wastewater discharge permit, or any order issued pursuant to Title 13, Chapter 12 of City Code, is hereby declared a public nuisance and may be corrected or abated by the Director or his designee. Any person creating such a public nuisance may be subject to the provisions of the Great Falls Municipal Code governing nuisances, including the

provisions requiring reimbursement to the City for its costs of abatement. Action taken by the City to abate any nuisance shall not be a bar to criminal or other civil enforcement of City Code. The Director may initiate, on behalf of the City, an action in any court of competent jurisdiction concerning the abatement of any public nuisance created or caused by a violation of Title 13, Chapter 12 of City Code. In any such action, the Director may request any legal or equitable relief, including injunctive relief and civil damages, as provided by applicable law.

M. Severability

The provisions of this Permit are severable. If any provision 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 remainder of this Permit, shall not be affected thereby.

Part V Special Conditions

A. Sewer Meter Accuracy

The permittee has a flow meter (FC-09406) installed on the discharge line immediately prior to discharge to the POTW. This flow meter is the compliance point for determining the daily discharge flow rate to the city. The Permittee shall annually determine the accuracy of the sewer flow meter. The results shall be forwarded to the City with the DMR for that month.

B. Slug Control Plan

The Permittee shall develop and implement a Slug Control Plan to minimize the potential for spills and slug discharges. The Slug Control Plan shall be submitted to the City for approval within 90 days of the issuance of this permit. The Slug Control Plan shall include, at a minimum, the following:

1. Detailed plans (schematics) showing facility layout and plumbing representative of operating procedures;
2. Description of contents and volumes of any process tanks;
3. Description of discharge practices, including non-routine batch discharges;
4. Listing of stored chemicals, including location and volumes;
5. Procedures for immediately notifying the City of any spill or Slug Discharge. It is the responsibility of the industrial user to comply with the following reporting requirements:

   In the case of any discharge, including, but not limited to, spills, accidental discharges, discharges of a nonroutine, episodic nature, a noncustomary batch discharge, a slug discharge, a discharge containing unusual amounts of sulfur, or a discharge that may cause potential problems for the POTW, the industrial user shall immediately telephone and notify the City of the incident. This notification shall include:

a. Name of the facility.
b. Location of the facility.
c. Name of the caller.
d. Date and time of the discharge.
e. Date and time discharge was halted.
f. Location of the discharge.
g. Estimated volume of the discharge.
h. Estimated concentration of pollutants in the discharge.
i. Corrective actions taken to halt the discharge.
j. Method of disposal, if applicable.

6. Within five (5) days following such discharge, the industrial user shall submit a detailed written report describing the cause(s) of the discharge and the measures to be taken by the industrial user to prevent similar future occurrences. Such notification shall not relieve the industrial user of any expense, loss, damage, or other liability which might be incurred as a result of damage to the POTW, natural resources, or any other damage to person or property; nor shall such notification relieve the industrial user of any fines, penalties, or other liability which may be imposed pursuant to this Chapter.
7. Procedures to prevent adverse impact from any accidental or Slug Discharge. Such procedures include, but are not limited to, inspection and maintenance of storage areas, handling and transfer of materials, loading and unloading operations, control of plant site runoff, worker training, building of containment structures or equipment, measures for containing toxic organic pollutants, including solvents, measures to control discharges of sulfur, and/or measures and equipment for emergency response; and
8. Any other information as required by the City.
9. Notice to employees. A notice shall be permanently posted on the industrial user's bulletin board or other prominent place advising employees who to call in the event of an accidental or slug discharge. Employers shall ensure that all employees who work in any area where an accidental or slug discharge may occur or originate are advised of the emergency notification procedures
10. The plan shall be approved by the Director.
11. The control mechanisms (including postings, training, inspections, secondary containment structures and equipment) contained in The Slug Control Plan must be fully implemented and maintained at all times.
12. Failure of the plan to prevent violations of any provisions of the Permit in no way relieves the Permittee from its legal liability for noncompliance with the permit conditions.

C. Storm Water Diversion

1. The Permittee shall segregate as much stormwater from the refinery wastewater

system as is practicable.

2. One year from the issuance of this permit, the Permittee shall have completed a

   Design Assessment and submitted it to the City.

3. 90 days after submission of the Design Assessment Permittee shall provide to the City a Stormwater Diversion construction Plan. The City will review and approve or reject the plan within 90 days. If the plan is rejected by the City, Calumet Montana Refining Company LLC will have 30 days to resubmit the plan.

4. Upon failure of Calumet Montana Refining Company LLC to submit an acceptable plan to the City, the City shall direct Calumet Montana Refining Company LLC to install stormwater diversion facilities of the City's choosing.

5. The Design Assessment shall include at a minimum, the following elements:

a. A Site Map of sufficient scale which clearly shows current conditions including the following:
b. The site boundaries for the facility
c. Map scale;
d. North arrow;
e. Contour lines at 2 foot intervals;
f. The location and extent of structures and impervious surfaces;
g. Direction of stormwater flow (use arrows);
h. Locations of all existing structural stormwater control measures;
i. Drainage Basin boundaries;
j. Locations of all stormwater conveyances including ditches, pipes and swales;
k. Location of potential pollutant sources;
l. Locations where spills and leaks have occurred;
m. Locations of stormwater inlets and outfalls;
n. Locations and sources of run-on to your site from adjacent properties that contains pollutants;
o. Locations of the following activities where such activities are exposed to precipitation:
p. Fueling stations;
q. Vehicle and equipment maintenance and/or cleaning areas;
r. Loading/unloading areas;
s. Locations used for treatment, storage or disposal of wastes;
t. Location of storage tanks;
u. Processing and storage areas;
v. Immediate access roads and rail lines used or traveled by carriers of raw materials, manufactured products, waste material, or by products used or created by the facility;
w. Major permanent structures;
x. Transfer areas for substances in bulk;

y. Machinery
z. An estimate of the volume of stormwater generated by each of the Drainage Basins outlined in the Site Plan.
aa. Description of each basin in terms of pollution potential.
ab. Summary of Potential Pollution Sources

The Permittee shall document areas at the facility where industrial materials or activities are exposed to stormwater. Industrial materials or activities include, but are not limited to: material handling equipment or activities; industrial machinery; raw materials, industrial production and processes; and intermediate products, by products, final product or waste product. For each area identified the description must include:

1. A list of the industrial activities exposed to stormwater (e.g. material storage, equipment fueling, maintenance and cleaning).

2. A list of the pollutant(s) or pollutant constituents associated with each activity. 3. The pollutant list must include materials that have been handled, treated, stored or disposed and that have been exposed to stormwater in the past three years.

3. Permittee must document where potential spills and leaks could occur that could contribute pollutants to stormwater discharges.

4. Permittee shall document spills and leaks of oil or toxic or hazardous pollutants in reportable quantities that occurred at exposed areas in the past three years.

5. During year two of the permit term, the Permittee shall assess the options in the design assessment.

6. Two years from issuance of this permit the Permittee shall commence construction of the Storm Water Diversion Facility.

7. The Permittee shall submit a written report yearly on the progress of the Storm Water Diversion Project. The report shall be submitted to the Control Authority no later than March 1 following the reporting year.

8. Storm water diversion shall be completed by the end of permit term.

D. Continuous pH Monitoring.

1. The permittee shall continuously monitor pH through a continuous pH monitoring probe and a pH transmitter shall be tied into the Plant Distributed Control System (DCS).

2. When pH is out of the permitted range, the continuous monitoring system shall

automatically shut down the discharge to the POTW. Discharge to the POTW shall not be restarted until pH is within the permitted limits.

3. When the continuous pH monitoring system is inoperable due to calibration, routine maintenance or malfunction, the Permittee shall analyze a grab sample for pH once an hour at Monitoring Point 001.

4. The Permittee shall operate the continuous pH monitoring system in compliance with EPA Method 150.2

5. All Calibration records shall be recorded in a numbered and bound laboratory notebook.

6. When the continuous pH meter records a pH of 6.0 standard units or lower or a reading of 9.0 standard units or higher, an additional pH grab sample shall be taken within 15 minutes.

7. When pH is above the level known to generate hydrogen sulfide in the POTW, permittee shall take a grab sample within 15 minutes to verify the pH and if necessary take appropriate measures to prevent hydrogen sulfide liberation in the POTW.

8. Continuous pH monitoring is for process control only. Compliance with pH limits will be assessed from pH grab sample data.

9. Continuous pH monitoring shall be in operation within 60 days of the issuance of this permit.

E. Copper Allocation

Copper, Total 0.448 lbs/day

F. Copper compliance Requirements

1. The Permittee is required to sample for copper twice a year per Part III C of this permit. If the Permittee exceeds their copper allocation, they are required to resample within 30 days per the requirements in Part III I of this permit. If the second test exceeds the copper limit, then the following compliance schedule is initiated:

   a. Within one year Permittee shall complete a design assessment and assess the options for treating for copper.

   b. Within two years Permittee shall commence construction of a system to treat for copper.

   c. Within three years Permittee shall have treatment in place that will meet the copper limit.

d. The City retains the right to change the Permittee's pounds per day allocation based on a recalculation of the Local Limits.

1. If the City increases the permittee's allocation for copper at a level above their historic discharge, the City may allow the permittee to terminate the compliance schedule.

e. The City reserves the right to enter into an alternate compliance schedule.

G. Flow Proportional Sampling

The Permittee shall begin flow proportional sampling within 90 days of the effective date of this permit.

H. Use of Diffused Air Blower

The Permittee is required to operate a diffused air blower system continuously to strip H2S from the wastewater prior to discharge, unless Permittee can provide an alternate operating scenario that it can demonstrate is protective of the POTW. Any alternate operating scenario must be approved in writing by the City prior to Permittee discontinuing operation of the diffused air blower system.

Part VI - Definitions and Abbreviations

A. Definitions. Terms not specifically defined here shall have the meaning set forth in City Code or 40 C.F.R. Part 403.3. Unless the context specifically indicates otherwise, the meaning of terms used in this Permit shall be as follows:

"Act" or "the Act" means The Federal Water Pollution Control Act, also known as the Clean Water Act (33 U.S.C. 1251 et seq.), as amended.

"Approval Authority" means The State Director in an NPDES state with an approved State Pretreatment Program or the Regional Administrator of the EPA in a non-NPDES state or NPDES state without an Approved State Pretreatment Program.

"Authorized Representative of the Industrial User" means

1. If the Industrial User is a corporation:

a. The president, secretary, treasurer, or vice president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation, or

b. The manager of one or more manufacturing, production, or operating facilities, provided the manager is authorized to make management decisions that govern the operation of the regulated facility including

having the explicit or implicit duty of making major capital investment recommendations, and initiate and direct other comprehensive measures to assure long-term environmental compliance with environmental laws and regulations; can ensure that the necessary systems are established or actions taken to gather complete and accurate information for Industrial Discharge Permit requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

2. If the Industrial User is a partnership or sole proprietorship: a general partner or proprietor, respectively.

3. If the Industrial User is a federal, state, or local governmental facility: a city or highest official appointed or designated to oversee the operation and performance of the activities of the government facility, or their designee.

4. The individuals described in subsections 1 through 3 above, may designate another authorized representative if the authorization is made in writing, the authorization specifies the individual or a position responsible for the overall operation of the facility from which the discharge originates or having overall responsibility for environmental matters for the company, and the written authorization is submitted to the City.

"Best Management Practice" (BMP) means schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to implement the prohibitions listed in Section 13.12.030 of City Code. BMPs are Pretreatment Standards. BMPs may include, but are not limited to, treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw materials storage.

"Biochemical oxygen demand (BOD)" means the quantity of oxygen utilized in the biochemical oxidation of organic matter under standard laboratory procedure in five (5) days at twenty (20) degrees Celsius, expressed in milligrams per liter.

"Bypass" means the intentional diversion of waste streams from any portion of an Industrial User's treatment facility pursuant to Section 13.12.110 C of City Code.

"Categorical Pretreatment Standard" or "Categorical Standard" means any regulation containing pollutant discharge limits promulgated by EPA in accordance with sections 307(b) and (c) or the Act (33 U.S.C. Section 1317) that apply to a specific category of Industrial Users and that appear in 40 CFR chapter I, subchapter N, Parts 405-471.

"Composite sample" means a representative flow-proportioned sample generally collected within a twenty-four (24) hour period and combined according to flow. Time-proportional sampling may be approved or used by the City where time-proportional samples are believed representative of the discharge.

"Control Authority" means the City of Great Falls.

"Cooling water" means the water discharged from any use such as air conditioning, cooling or refrigeration, or to which the only pollutant added is heat.

"Daily Maximum" (Daily Max) is the maximum value allowable in any single sample or instantaneous measurement.

"Director" means the Director of Public Works, City of Great Falls or their duly authorized representative.

"Domestic (sanitary) wastes" means liquid wastes: 1. from the non-commercial preparation, cooking, and handling of food, or 2. containing only human excrement and similar matter from the sanitary conveniences of dwellings, commercial buildings, industrial facilities, and institutions.

"Environmental Protection Agency" or "EPA" means the U. S. Environmental Protection Agency, or where appropriate the term may also be used as a designation for the Administrator or other duly authorized official of said agency.

"Existing Source" means an Industrial User which is in operation at the time of promulgation of Categorical Pretreatment Standards and any Industrial User not included in the definition of "New Source".

"Fats, Oil and Grease" or "FOG" means non-petroleum organic polar compounds derived from animal or plant sources such as fats, non-hydrocarbons, fatty acids, soaps, waxes, and oils that contain multiple carbon chain triglyceride molecules. These substances are detectable and measurable using analytical procedures established in the 40 CFR Part136.

"Grab sample" means a sample which is taken from a waste stream on a one-time basis with no regard to the flow and over a period of time not to exceed fifteen (15) minutes.

"Hauled wastes" means any sewage or wastewater contained in a tank or similar apparatus and which is transportable by vehicle, rail car or other mode.

"Indirect discharge" means the discharge or the introduction of pollutants into the POTW from a non-domestic source regulated under Section 307(b), (c) or (d) of the Act (including hauled wastes).

"Industrial" means of, or pertaining to, industry, manufacturing, commerce, trade, or business as distinguished from domestic or residential.

"Industrial Discharge Permit" means the document or documents issued to a Industrial User by the City in accordance with the terms of City Code that allows, limits and/or prohibits the discharge of pollutants or flow to the POTW as set forth in Section

13.12.050 of City Code.

"Industrial User" means a source of Indirect Discharge.

"Industrial wastes" or "non-domestic wastes" mean the liquid or solid wastes from industrial manufacturing processes, trade, or business activities producing non-domestic or non-residential sewage as distinct from domestic wastewater.

"Instantaneous limit" means the maximum concentration of a pollutant or measurement of a pollutant property allowed to be discharged at any time. For pollutants, compliance is typically determined by use of a grab sample.

"Interference" means a discharge, which alone or in conjunction with a discharge or discharges from other sources, both:

1. Inhibits or disrupts the POTW, its treatment processes or operations or its sludge processes, use or disposal; and

2. Therefore, is a cause of violation of any requirement of the POTW's Montana Pollutant Discharge Elimination System (MPDES) permit or of the prevention of sewage sludge use or disposal in compliance with any of the following statutory/regulatory provisions or permits issued hereunder, or any more stringent state or local regulations: Section 405 of the Act; the Solid Waste Disposal Act, including Title II commonly referred to as the Resource Conservation and Recovery Act (RCRA); any state regulations contained in any state sludge management plan prepared pursuant to Subtitle D of the Solid Waste Disposal Act; the Clean Air Act; the Toxic Substances Control Act; and the Marine Protection, Research, and Sanctuaries Act.

"Local limit" means specific discharge limits and BMPs developed, applied, and enforced upon Industrial Users to implement the general and specific discharge prohibitions listed in Section 13.12.030 of City Code. Local limits are Pretreatment Standards.

"New Source" means:

1. Any building, structure, facility or installation from which there is or may be a Discharge of pollutants, the construction of which commenced after the publication of proposed Pretreatment Standards under section 307(c) of the Act which will be applicable to such source if such Standards are thereafter promulgated in accordance with that section, provided that:

    a. The building, structure, facility or installation is constructed at a site at which no other source is located; or

    b. The building, structure, facility or installation totally replaces the process

or production equipment that causes the discharge of pollutants at an Existing Source; or

c. The production or wastewater generating processes of the building, structure, facility or installation are substantially independent of an Existing Source at the same site. In determining whether these are substantially independent, factors such as the extent to which the new facility is integrated with the existing plant, and the extent to which the new facility is engaged in the same general type of activity as the Existing Source should be considered.

2. Construction on a site at which an Existing Source is located results in a modification rather than a New Source if the construction does not create a new building, structure, facility or installation meeting the criteria of paragraphs 1.b. or 1.c. of this section, but otherwise alters, replaces, or adds to existing process or production equipment.

3. Construction of a New Source as defined under this paragraph has commenced if the owner or operator has:

a. Begun, or caused to begin as part of a continuous onsite construction program:

i. Any placement, assembly, or installation of facilities or equipment; or

ii. Significant site preparation work including clearing, excavation, or removal of existing buildings, structures, or facilities which is necessary for the placement, assembly, or installation of New Source facilities or equipment; or

b. Entered into a binding contractual obligation for the purchase of facilities or equipment which is intended to be used in its operation within a reasonable time. Options to purchase or contracts which can be terminated or modified without substantial loss, and contracts for feasibility, engineering, and design studies do not constitute a contractual obligation under this paragraph.

"Normal domestic strength wastewater" means wastewater, when analyzed in accordance with procedures established by the EPA pursuant to 40 CFR Part 136, as amended, contains no more than two-hundred (200) mg/L of BOD and/or two-hundred and fifty (250) mg/L of TSS. Discharges that exceed the level of BOD and TSS are subject to charges for extra strength wastewater charges pursuant to Section 13.18.060 of City Code in addition to any Pretreatment Standards and Requirements established in City Code.

"Non-contact cooling water" means cooling water that does not come into direct contact

with any raw material, intermediate product, waste product, or finished product.

"Non-Significant Industrial User" means any Industrial User which does not meet the definition of a Significant Industrial User, but is otherwise required by the City through permit, order or notice to comply with specific provisions of City Code and is so notified by the City.

"Pass Through" means a discharge which exits the POTW into waters of the United States in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of any requirement of the City's Montana Pollutant Discharge Elimination System (MPDES) Permit (including an increase in the magnitude or duration of a violation).

"Person" means any individual, firm, company, association, society, corporation or group.

"pH" means the logarithm (base 10) of the reciprocal of the hydrogen ion concentration expressed in moles per liter of solution and reported as Standard Units (SU).

"Pollutant" means any dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, sewage sludge, explosives, munitions, medical waste, chemical wastes, corrosive substance, biological material, biological nutrient, toxic substance, radioactive material, heat, malodorous substance, wrecked or discharged equipment, rock, sand, slurry, cellar dirt, untreatable waste, or industrial, domestic, or agricultural wastes and certain characteristics of wastewater (e.g., pH, temperature, TSS, turbidity, color, BOD, COD, toxicity, or odor) discharged into or with water.

"POTW treatment plant" means that portion of the POTW designed to provide treatment to wastewater.

"Pretreatment" or "treatment" means the reduction of the amount of pollutants, the elimination of pollutants, or the alteration of the nature or properties of pollutants in wastewater to a less harmful state prior to or in lieu of discharging or otherwise introducing such pollutants into a POTW. The reduction or alteration can be obtained by physical, chemical or biological processes, or process changes other means, except as prohibited by 40 CFR Section 403.6(d).

"Pretreatment Requirement" means any substantive or procedural requirement related to Pretreatment, other than a Pretreatment Standard imposed on an Industrial User.

"Pretreatment Standard", "National Pretreatment Standard" or "Standard" means any regulation containing pollutant discharge limits promulgated by the EPA in accordance with section 307 (b) and (c) of the Act, which applies to Industrial Users. This term includes prohibitive discharge limits established pursuant to Section 13.12.030 and includes the Specific Prohibitions, local limits and Best Management Practices that are or may be established by the City. In cases of differing Standards or regulations, the more

stringent shall apply.

"Publicly Owned Treatment Works" or "POTW" means a treatment works as defined by Section 212 of the Act (33 U.S.C. 1292), which is owned in this instance by the City. This definition includes any sewers that convey wastewater to the POTW treatment plant, but does not include pipes, sewers or other conveyances not connected to a facility providing treatment. For the purposes of Title 13, Chapter 12 of the Official Code of the City of Great Falls, "POTW" shall also include any sewers that convey wastewaters to the POTW from persons outside the City who are by contract or agreement with the City, users of the City's POTW.

"Sector control program" means a program to control specific pollutants from Industrial Users with similar waste generation or treatment through the implementation of Pretreatment Standards and Requirements, including Best Management Practices. These sector control program requirements may be found at Section 13.12.090 of City Code.

"Significant Industrial User" is any Industrial User which:

1. Is subject to Categorical Pretreatment Standards under 40 CFR 403.6 and 40 CFR chapter I, subchapter N; or

2. Discharges an average of twenty-five thousand gallons per day or more of process wastewater to the POTW (excluding sanitary, non-contact cooling and boiler blow down wastewater); or

3. Contributes a process waste stream which makes up five percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant; or

4. Has reasonable potential for adversely affecting the POTW's operation or for violating any Pretreatment Standard or Requirement.

"Significant Noncompliance" applies to a Significant Industrial User (or any Industrial User which violates paragraphs 3, 4, or 8) if its violation meets one or more of the following criteria:

1. Chronic violations of wastewater discharge limits, defined here as those in which sixty-six (66) percent or more of all of the measurements taken during a six-month period exceed (by any magnitude) a numeric Pretreatment Standard or Requirement, including instantaneous limits.

2. Technical Review Criteria (TRC) violations, defined here as those in which thirty-three (33) percent or more of all of the measurements for each pollutant parameter taken during a six-month period equal or exceed the product of the numeric Pretreatment Standard or Requirement including instantaneous limits multiplied by the applicable TRC (TRC = 1.4 for BOD, TSS, fats, oil, and grease, and 1.2 for all other pollutants except pH).

3. Any other violation of a Pretreatment Standard or Requirement (daily maximum, long-term average, instantaneous limit, or narrative Standard) that the POTW determines has caused, alone or in combination with other discharges, Interference or Pass Through (including endangering the health of POTW personnel or the general public).

4. Any discharge of a pollutant that has caused imminent endangerment to human health, welfare, or the environment or has resulted in the POTW's exercise of its emergency authority to halt or prevent such a discharge.

5. Failure to meet, within ninety (90) days after the schedule date a compliance schedule milestone contained in a local control mechanism or enforcement order for starting construction, completing construction, or attaining final compliance.

6. Failure to provide, within thirty (30) days after the due date, required reports such as baseline monitoring reports, compliance reports, periodic self-monitoring reports, and reports on compliance with compliance schedules.

7. Failure to accurately report noncompliance.

8. Any other violation or group of violations, which may include a violation of Best Management Practices, which the POTW determines will adversely affect the operation or implementation of the local pretreatment program.

"Slug discharge" means a non-routine, episodic nature, including but not limited to an accidental spill or a non-customary batch Discharge, which has a reasonable potential to cause Interference or Pass Through, or in any other way violate Title 13, Chapter 12 of City Code, including a discharge which exceeds the hydraulic or design of an Industrial User's treatment system or any part of the treatment unit.

"Total Suspended Solids" or "TSS" means the total suspended matter, expressed in milligrams per liter, that either floats on the surface of, or is in suspension in, water, wastewater, or other liquids, and that is removable by laboratory filtering in accordance with procedures approved in 40 CFR Part 136.

"Toxic pollutants" includes but is not limited to any pollutant or combination of pollutants listed as toxic in regulations promulgated by the Administrator of the EPA under the provisions of Section 307(a) of the Act (33 U.S.C. §1317(a)) or as otherwise listed at 40 CFR Part 122, Appendix D.

"Upset" means an exceptional incident in which a treatment works is unintentionally and temporarily in a state of noncompliance with Categorical Pretreatment Standards pursuant to Section 13.12.110 B.

Any other term not herein defined shall be defined as presented in the "Glossary -- Water and

Sewage Control Engineering," A.P.H.A., A.S.C.E. and W.P.C.F., latest edition or 40 CFR Part 403.

B. Abbreviations

ASTM	American Society Testing Materials
BMP	Best Management Practices
BOD	Biochemical Oxygen Demand
°C	degrees Celsius
CFR	Code of Federal Regulations
CWA	Clean Water Act
EPA	Environmental Protection Agency
FOG	Fats, Oils and Grease
mg/L	milligrams per Liter
MPDES	Montana Pollutant Discharge Elimination System
O&M	Operation and Maintenance
POTW	Publicly Owned Treatment Works
SIC	Standard Industrial Classification
SIU	Significant Industrial User
SNC	Significant Noncompliance
USC	United States Code
TSS	Total Suspended Solids
WPCF	Water Pollution Control Federation

Calumet Montana Refining
Industrial Wastewater Discharge Permit 13-01
Response to Comments
Public Notice of Intent to Modify and Reissue Permit To Discharge Industrial Wastewater Issued March 15, 2015

On March 15, 2015 the City of Great Falls published in the Great Falls Tribune a Public Notice of Intent to Modify and Reissue a Permit to Discharge Industrial Wastewater to Calumet Montana Refining (CMR). The notice required that written comments be accepted until April 14, 2015.

The City of Great Falls received timely written comment from Hadley Bedbury, Health, Safety and Environmental Manager for CMR. Following are the comments received and the City's response to those comments.

COVER LETTER:
CMR Comment:
"As an initial matter, we note the March 15, 2015 Public Notice is defective and does not meet applicable requirements."

Response:
The issuance of the Public Notice was done in compliance with all applicable requirements and is valid.

[Note: The CMR cover letter contains additional comments that appear to summarize the attached document titled "CMR Comments to Proposed Permit Change 3/15/15 Public Notice". Those comments will be addressed below.]

CMR COMMENTS TO PROPOSED PERMIT CHANGE 3/15/15 PUBLIC NOTICE:
CMR Comment:
1. "In the public notice, the City recognized the EPA v. City of Great Falls and Malteurop Order dated April 14, 2014. CMR was not a party to this Order. In fact, Calumet Montana Refining (CMR) provided over 2 years of additional sampling and investigations for hydrogen sulfide (H2S) in the treatment system, discharge and the City sewer system. There was no basis for CMR to be part of that Order, and EPA concluded CMR was in compliance (See EPA letter dated May 20, 2013 attached as Exhibit 1.) Accordingly, CMR's current operation as of May 20, 2013 should not be considered in need of additional changes to be protective to the City for excess H2S concentrations in the discharge."

Response:
Under the Consent Decree, the City is under obligations required by EPA regarding any SIU Permit, including that of CMR. (Consent Decree, pages 10, 12, 13 and 14.) It is clear to the City that EPA intended that CMR's Industrial Discharge Permit be modified to include an upper pH limit of approximately 7.5, a BMP to operate its aerator and for the Slug Control Plan to be modified. Documentation of this intent is included in the Permit Modification Rationale. The date on the correspondence regarding this issue is dated February 13, 2014 and is attached as Exhibit A.

CMR Comment:
2. "All data should be considered by the City of Great Falls. Data used to support the proposed pH limit was not inclusive of all data, not representative of the discharge, and only identified elevated H2S

concentrations that resulted in CMR stopping the discharge until corrected. The extensive amount of data that has been submitted to the City on a monthly basis over-whelmingly demonstrates and is conclusive that CMR is doing more than is required to verify that elevated H2S concentrations are not discharged. CMR requests the City consider all of the data, which shows CMR effectively monitors its treatment processes, and that CMR's discharge can be completely stopped within minutes of identifying abnormal conditions potentially impacting the discharge limits."

Response:
At issue is the prohibition of discharges of "Pollutants which result in the presence of toxic gases, vapors, or fumes within the POTW in a quantity that may cause acute health and safety hazards for employees of the City employed at the POTW". This might be something that is released directly by the discharger or caused by a reaction to something that is in the POTW. The correlation between the pH of CMR's discharge and the H2S levels in the POTW is based on relevant and representative data. While most H2S data is below 10ppm, the risk of H2S generation in the POTW increases with the pH of CMR's discharge. CMR is to be commended for monitoring its treatment process more closely and acting in a timely manner, however, this does not preclude the City from modifying the discharge permit in the manner proposed. As provided in the permit modification rationale, setting the specifically identified pH limit was directed by EPA representatives David Gwisdalla and Stephanie Gieck in the e-mails attached to the permit modification rationale document, which are attached as Exhibits A and B. Because the EPA required the City to enforce this limit, the City has no real option but to make this requirement. If CMR were to obtain from EPA a written variance or exemption from EPA's requirement in this regard, then the City could reconsider its position.

CMR Comment:
2.1 "The proposed upper pH limit of 7.6 is erroneously based on irrelevant data. The Data Set 1 used to support the proposed limit was reported to be data from the 2009- 2011 time frame. (See S. DeJong 4/8/2015 email with attachments, attached as Exhibit 2.) The proposal also recognized that the facility made changes to the treatment system that improved the performance by April of 2011which included a new aeration blower into tank 146 to improve aeration performance which would help to reduce H2S. Therefore, the pre-improvement data is not representative of the operations or the discharge quality of the facility after the April 2011 improvements to the aeration system. Recent data shows that the changes already made have improved the performance of the wastewater treatment plant. EPA's 2014 memo to the City did not include data since 12/31/13, or all the H2S monitoring data that was provided in CMR's monthly reports. Specifically, this data set did not include data where the H2S was zero which was over 99% of the time which creates a mis-leading representation of the data. All of the reported data needs to be shown to reflect the overall quality of CMR's discharge, not just data reported above zero. Since the improvements in 2011, over 99% of the data shows zero hydrogen sulfide present in the discharge. The Proposed Condition #1 noted that "the number of H2S exceedances (i.e. great than 10mg/L) in the collection system has reduced significantly in the last two years (2011-2013)." All the concentrations reported above 10 ppm H2S occurred prior to 12/1/2011 in Data Set #2."

Response:
The City believes the Permit Modification Rationale provided is clear and the data relevant. See also the response to the comment numbered "2" above, by this reference is incorporated into this response.

CMR Comment:
2.2 "Data Set 2 for the time period 5/1/11 – 12/31/13 fails to show all the zero concentration data that were reported for H2S. No data points exceeded 5 ppm H_2S after 12/1/2011. There were1538 measured

and reported H_2S results in 2013 and 2840 measured and reported data results for H_2S in 2012 with no exceedences of 10 ppm H_2S."

Response:
See the response to the comment numbered "2" above, by this reference is incorporated into this response. The City agrees that most of the H2S readings from CMR's discharge are zero. That was the case for Data Set #2 on which the modification rationale was based. A cursory review of the data set provided by CMR after the comment period closed shows a similar pattern to Data Set #2.

Comment:
2.3 "CMR has the ability to block in, or to stop its discharge to the City, for up to 3 days. Between 12/1/11 and 12/31/13, CMR blocked in at a 5 ppm concentration and when pH was elevated at 10 on 9/17/13 but H_2S was still zero. When discharge was resumed at 9.0 pH, H2S concentrations were still zero. There were no exceedences of the 10 ppm H_2S at any time in this period."

Response:
See the response to the comment numbered "2" above, by this reference is incorporated into this response.

Comment:
2.4 "Copies of the monthly reports from May 2011 - December 2013 have been submitted previously and are on file with the City."

Response:
The City agrees that it has received the identified documentation from CMR.

Comment:
2.5 "In summary, CMR has demonstrated that it can block in at any time after deviations are identified in the wastewater treatment system even if permit limits are met at the time. Between this ability to shut down when pH is above 9, multiple measurement events taken per day CMR has demonstrated that a pH limit of 9.0 can be achieved."

Response:
See the response to the comment numbered "2" above, by this reference is incorporated into this response.

CMR Comment:
3. "The few events that were identified were related to upsets involving sodium hydrosulfide solutions or spent caustic solutions after treatment of vapor phase hydrogen sulfide. With the current monitoring program pH changes are identified and assessed, with the ability to block in the discharget[sic]. These instances have been reducing in number and the current wastewater treatment system with its improved pH controls added over the last 2 years have shown that compliance with the 10 ppm H2S discharge limit."

Response:
See the response to the comment numbered "2" above, by this reference is incorporated into this response.

CMR Comment:

4. "There have been no reports of any H_2S problems in the sewer related to CMR's discharge and only the 6 measurements before shutting in since 5/31/11. Three of these six measurement events were related."

Response:
EPA's Order for Compliance dated April 21, 2011, issued to Montana Refining Company (Docket no. CWA-08-2011-0011) states, under Finding of Fact paragraph #18 "Respondent's discharge resulted in levels of hydrogen sulfide in the sewer line, a part of the POTW that may cause acute worker health and safety problems".

CMR Comment:
5. "CMR believes its demonstrated history for the few upset events (3 or less annually) that can potentially create elevated H_2S concentrations shows that monitoring, storage capacity, block in response, and recycling for treatment has been effective in managing the potential for upsets."

Response:
See the response to the comment numbered "2" above , by this reference is incorporated into this response.

CMR Comment:
5.1 "The few upset elevated concentration events were related to the unusual source of elevated sulfide concentrations from sodium hydrosulfide and spent caustic solutions that are not normally in the wastewater. Neither one of the two data sets mentioned above show a cause and effect relationship between pH and H_2S concentrations. If the data plots were revised to show all the zero and 1 ppm concentrations, not just the elevated concentrations reported, this would be visually obvious that there is no cause and effect relationship between pH and H_2S. Zero concentrations of H_2S occur at pH 9. The data plots only show that when there was an upset historically prior to 12/1/2011, that excess H_2S needs treatment prior to discharge. That is not the case today. CMR's practice of pH adjustment, aeration and adding peroxide when required to treat for H_2S has been effective. The monthly reports submitted by CMR show the frequency of H_2S monitoring and our responses to pH or to H_2S deviations by shutting in, recycling, and additional treatment prior to resuming discharging."

Response:
Data Sets #1 and #2 clearly shows that the risk of H2S being present either in CMR's discharge (Data Set #2) or in the POTW as a result of CMR's discharge (Data Set #1) increase at pH levels above 7.6. See also the response to the comment numbered "2" above, by this reference is incorporated into this response.

CMR Comment:
5.2 "Optimal treatment for sulfides, metals and ammonia can occur at pH 8.2 and higher. Requiring a lower pH than is industry standard practice will require the use of tail-end acidification. Tail-end acidification can lead to pH probe, controller or valve failure on the acid injection system to overshoot the intended target and to even threaten our minimum pH of 5.5. A pH limit of 9 as used by CMR for a block in limit suffices as additional protection."

Response:
Examination of the data making up Data Set #2 shows that fewer than 1% of the discharge pH readings provided by CMR were 8.2 or above. Cursory examination of data provided by CMR after meeting on

April 29th shows similar results. See also the response to the comment numbered "2" above , by this reference is incorporated into this response.

CMR Comment:
6. "CMR requests the proposed aerator continuous operation requirement, Condition 2 be withdrawn: This condition assumes that sulfide treatment is always required. This is not the case as we have demonstrated that we can block in if needed during periods of maintenance or use peroxide addition. No changes are required. There is no justification for a change to continuous aeration. In addition, planned changes to be in place within 4 months will significantly increase our treatment capabilities. CMR's frequent monitoring has proven to be successful and the current permit requirements are sufficient, CMR has demonstrated that it can prevent H_2S discharges, and that our system is capable of responding and properly treating upsets prior to discharge. The EPA NEIC investigation and 2+ years of review saw no need to make a change and closed the matter on May 20, 2013. (See attached Exhibit 1.) This should be recognized that CMR had a good program in place by that time that had proven to be effective. CMR requests that this change be withdrawn."

Response:
As provided in the permit modification rationale, this condition is specifically mentioned by David Gwisdalla and Stephanie Gieck in the e-mails attached to the permit modification rationale document and attached as Exhibits A and B. Because the EPA required the City to have this condition, the City has no real option but to make this requirement. If CMR were to obtain from EPA a written variance or exemption from EPA's requirement in this regard, then the City could reconsider its position.

The City has provided CMR the ability to provide an alternate operating scenario that it can demonstrate is protective of the POTW and encourages CMR to do so.

CMR Comment:
7. "CMR requests the Slug Plan requirement, Condition 3 be withdrawn: There have been no significant upsets in over 2 years based on changes made in our monitoring and response program. The proposed slug control plan overbroadly requires a slug plan that addresses every chemical, every drum, every tote and every process vessel that is in the facility and is not limited to H_2S related causes. Technically, this plan would need to be changed every time we update a chemical, change storage or injection points change from drum to tote supply sources, etc. With our capacity to block in for up to 3 days, there is no reason to require a slug plan that would be subject to constant updating. Additionally, this requirement would be redundant. The wording in the current permit is sufficient as CMR is to prevent slug discharges to the City. CMR has demonstrated that its monitoring, storage and treatment capacity prevent slugs to the City WWTP. Therefore, CMR requests that this unwarranted change be withdrawn."

Response:
CMR is already required to have a slug control plan to minimize the potential for spills and slug discharges in accordance with Part V, B of the industrial discharge permit. This requirement only adds sulfur-containing compounds to this list of chemicals that must be managed. As provided in the permit modification rationale, this condition is specifically mentioned by David Gwisdalla and Stephanie Gieck in the e-mails attached to the permit modification rationale document, Exhibits A and B, attached. Because the EPA required the City to have this plan, the City has no real option but to make this requirement. If CMR were to obtain from EPA a written variance or exemption from EPA's requirement in this regard, then the City could reconsider its position.

Exhibit A

Mike Jacobson

From: Gieck, Stephanie [Gieck.Stephanie@epa.gov]
Sent: Thursday, February 13, 2014 2:16 PM
To: Mike Jacobson; Chris Sorensen
Subject: Paragraph 9 - Refinery H2S

Hi Mike and Chris,

Our DOJ attorney is sending Alan a slightly changed version of the changes you suggested for paragraph 9 of the CD regarding other SIUs that may cause H2S. I wanted to provide you some information on our understanding of what the refinery is/should continue to do and how that can be implemented through the permit. Below are three permit provisions that would implement this.

1. SIU specific pH limit - At a pH 7, the sulfide will occur approximately 50% in the water and 50% in the headspace. The higher the pH, the more sulfide will be in the water. We want a lower pH in the discharge so the sulfide leaves the water prior to discharge, and it can be controlled as an air emission from the refinery. If you had a high pH in the discharge, you will have more sulfide in the discharge, but when it mixes with the lower pH wastewater already in the sewer, the total pH will lower and the sulfide will come out in the sewer as H2S. Based on what David Gwisdalla, who was our technical person on the EPA case with the refinery, the upper pH limit should be approximately 7.5. The upper pH is based off of the daily sample data from the refinery. You could ask for this data to justify an upper pH limit. The lower pH limit would be 5.5 based on the City's lower limit in its ordinance.

2. BMP - The refinery should operate its aerator in its pretreatment system to help remove sulfides from the water prior to discharge.

3. Slug Plan - The slug plan for the refinery should specifically be required to address discharges of sulfur in addition to any other slug discharges. The refinery removes sulfur from fuel during its processes. This includes training and practices to prevent slugs of sulfur, as well as notification to the City in the event there is a slug. When slugs have occurred, there have been spikes of H2S.

These are easier to continuously monitor than a sulfide limit; but you could choose to go that route too. Let me know if you have any questions.

Thanks,

Stephanie Gieck

NPDES Unit
Water Technical Enforcement Program
U.S. EPA Region 8
1595 Wynkoop St., 8ENF-W-NP
Denver CO, 80202
303.312.6362

Mike Jacobson

From: Chris Sorensen [csorensen@greatfallsmt.net]
Sent: Tuesday, February 25, 2014 12:53 PM
To: Mike Jacobson
Subject: FW: Paragraph 9 - Refinery H2S

From: Gwisdalla, David [mailto:Gwisdalla.David@epa.gov]
Sent: Tuesday, February 25, 2014 11:54 AM
To: Chris Sorensen
Cc: Gieck, Stephanie
Subject: FW: Paragraph 9 - Refinery H2S

Chris,

Here is my background on Calumet's operations as you requested. Without comprehensive data from Calumet, the Region relied on operational and other data collected by Calumet, the City (specifically its manhole monitoring information), and Malteurope from 2009 to 2011 for the basis of our input. Based upon a review of this data we observed the following. From January 2009 to April 2011, when Calumet's discharge pH was less than 8.0 (434 instances) two events were noted with an H2S level above 10 ppm at Manhole 4067; which were not attributable to Malteurope's operations. One instance (126 ppm on 3/31/2011) the City did not record data at the manhole at the time of the release, but Calumet reported excessively high H2S in its discharge. During this same time there were 21 events when the pH was above 8.0 where the H2S values were 10 ppm or higher at Manhole 4067 (with the 21 event's average H2S readings being 60 ppm H2S). There may also be other issues with elevated H2S numbers that were masked by on-going issues with Malteurope at that same time, or the fact that the City did not measure the H2S levels at the manhole at that time. For instance, on 3/20/2011 when Calumet shut-in, while its pH was 8.4, because its H2S at the discharge was recorded at greater than 400 ppm H2S.

Please note that all the above values were collected prior to Calumet installing the aeration system in March/April 2011. Since the system was installed, Calumet consistently operated below a pH of 8.0 and had four events with elevated H2S levels from April 2011 until April 2013. There was one event that makes it particularly clear that Calumet's operations (i.e., pH control and aeration) are needed to prevent excessive H2S from entering the POTW; see the December 19, 2012 event outlined in the background materials below.

From this, it is clear that Calumet's operations of its pH control and aeration system are having positive impacts on the reduction of H2S events witnessed by the City in the collection system. What is also apparent is that major events can and will occur, based upon information from Calumet for each of the four events between 2011 and 2013, operational controls outlined in a slug control plan are needed.

Here is some additional relevant background information for your use and consideration:

In March 2011, Calumet changed its pretreatment operations and made physical pretreatment unit modifications. Operationally, since that time, Calumet has kept the discharge pH near 7.5 standard units. This is almost two orders of magnitude lower than historic pH discharge level of 9.0 to 9.5 standard units. This is relevant since at a pH of 9.5 almost 99% of the sulfide is in held in solution and at a pH of 7 almost 50% of the sulfide is held in solution; meaning more sulfide converts to H2S and off-gases in Calumet's pretreatment unit before being discharged. This is significant since the wastewater in the POTW's collection system has a pH around 6.5. Historically, the combination of the two wastewaters in the collection system would cause H2S to off-gas due to Calumet's wastewater undergoing a pH adjustment from around 9.0 to 7.0 when mixed with the wastewater in the POTW's collections system. The pretreatment unit was also reconfigured, at a cost of $315,030, in March 2011 to use a diffused air blower system to strip the H2S from the

wastewater prior to discharge. At a lower pH more of the sulfide is removed as H2S in the pretreatment system before it is discharged into the POTW. H2S levels in the discharge samples taken by Calumet since 2011 operation and physical changes were consistently at or near zero for H2S in the headspace. Sulfide levels in Calumet's discharge have also been relatively low (between 2 and 10 mg/L).

The number of H2S exceedances (i.e., H2S greater than 10 mg/L) in the collection system has reduced significantly in the last two years (2011-2013). Most all of the H2S issues in the collection system are now attributable to other dischargers. Since the AO was issued to Calumet in 2011, Calumet had four instances where the H2S in its discharge exceeded 10 mg/L for H2S in its discharge. During each incident, once Calumet personnel were aware of the H2S concentrations, the plant has shut-in its operations (i.e., stopped discharging to the POTW). Though in each instance, there was no indication that the discharge caused the POTWs' collection system to exceed the 10 mg/L H2S worker safety threshold. The Calumet discharges exceeding 10 mg/L since the 2011 order was issued were:

a) November 25, 2011; Calumet's discharge was 196 mg/L H2S. This particular incident was significant given the extreme H2S level. Calumet's report for this incident illustrated the high level of H2S was related to a discharge of sulfide from the sodium hydrosulfide (NASH) unit. The company put in place operational controls and physical infrastructure to prevent this from happening again in the future.

b) November 26, 2011; Calumet's discharge was 32 mg/L H2S. This event is related to the one above.

c) September 16, 2012; Calumet's discharge was 28 mg/L H2S. This event was caused by operators preparing the Merox Reactor (i.e., a gasoline caustic treating vessel) for maintenance with water and washed the residual caustic into the sewer. This caused the pH to increase and led to the elevated H2S readings. Worker training and education was enhanced to prevent this from recurring.

d) December 19, 2012; Calumet's discharge was 48 mg/L H2S. During a pretreatment system upgrade, the equalization basin was lowered to support the installation of isolation valves for a new system able to increase the unit's pH acid injection capacity. The lowered basin significantly reduced the system's retention time and thus its buffering capacity. During the system upgrade, the pretreatment system was unable to lower the pH aggressively enough. When combined with a decreased retention time significantly reduce the removal of H2S. This resulted in a discharge with a pH of 9.2 and high H2S levels being discharged. The completed project increased the control of pH and is not likely to be repeated.

Calumet's On-going Sampling Costs: In February 2012, Calumet requested a reduction in sampling required by the Order. Calumet requested, due to the time and expense, to eliminate BOD, O&G, and sulfide sampling. Sulfide sampling alone costs the company approximately $560 per week and the plant has sampled daily for the last two years ($58,240). Calumet requested again in February 2013 to reduce the sampling.

Regards, David

David A. Gwisdalla, P.E., MSEE
Commander, U.S. Public Health Service
PHS Commissioned Corps Officer Detailed to EPA

Environmental Engineer
NPDES Enforcement Branch
Region 8 Water Technical Enforcement Division
U.S. Environmental Protection Agency

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Mailing Address:
EPA-Region 8 (8ENF-W-NP)
1595 Wynkoop Street
Denver, CO 80202-1129

City of Great Falls
Industrial Pretreatment Program
Permit Modification Rationale
Calumet Montana Refining LLC
Permit No. 13-01
March 2015

Completed by Mike Jacobson, Environmental Division Supervisor

PURPOSE:
The City of Great Falls is proposing to modify Calumet Montana Refining, LLC's Industrial Discharge Permit to comply with requirements of a Consent Decree negotiated with USEPA, Malteurop North America and the City of Great Falls, specifically; *United States of America and State of Montana v. The City of Great Falls, MT and Malteurop North America, Inc.*, United States District Court, Montana, Cause No CV-14-16-GF-BMM , United States Department of Justice Reference Number 90-5-1-108955.

PROPOSED MODIFICATIONS:
Paragraph 9 of the referenced Consent Decree reads as follows:

> No later than 30 Days from the Date of Entry, the City shall review existing information for SIUs other than Malteurop to determine whether the Indirect Discharge from any SIU has been documented to result in hydrogen sulfide in the POTW in quantities that may cause acute worker health and safety problems. Within 60 Days from the Date of Entry, the City shall provide to the EPA, for approval, proposed SIU permit limits and conditions, along with supporting rationale, to address hydrogen sulfide for any SIUs identified as meeting the criteria above. No later than 60 Days after the EPA's approval of the proposed limits and conditions, the City shall publish in the local newspaper notice of intent to issue an SIU Permit to each such discharger consistent with permit limits and conditions that have been approved by the EPA or, if the proposed limits or conditions have not been approved by the EPA, are consistent with comments provided by the EPA on the proposed limits or conditions. Following a 30-Day public comment period, the City will respond to any comments as appropriate and within a reasonable time thereafter proceed with issuance of the SIU Permit(s).

Discharges from Montana Refining caused the release of hydrogen sulfide in the POTW such that, on April 21, 2011 Montana Refining Company was issue an Order for Compliance by the Environmental Protection Agency to, among other things, cease any discharge of any pollutants that result in the presence of toxic gases, vapors, or fumes within the POTW that may cause an acute danger to human health and worker health and safety. Therefore, the City identified Montana Refining as an SIU with an Indirect Discharge that has been documented to result in hydrogen sulfide in the POTW in quantities that may cause acute worker health and safety problems. Montana Refining has since changed their name to Calumet Montana Refining.

Attachment A contains the proposed SIU permit limits and conditions, along with supporting rationale, to address hydrogen sulfide discharges for Calumet Montana Refining.

Attachment B contains EPA's approval of the City's proposed permit limits and conditions.

The City is proposing to modify Calumet Montana Refining's Industrial Wastewater Discharge Permit to include to changes described in Attachment A.

Attachment A

Proposed Permit Limits and Conditions

(i.e., H2S greater than 10 mg/L) in the collection system has reduced significantly in the last two years (2011-2013)".

The City's analysis of this information is as follows:
The graph of Data Set #1 clearly shows that H2S in the POTW can occur when CMR's discharge pH is high. The pH level of CMR's discharge at which the H2S levels in the POTW result in violations of City Ordinance is difficult to interpret exactly, however it is clear that H2S levels in the POTW have exceeded 10 mg/L at pHs as low as 6.8 standard units and seem to begin rising more dramatically starting at about pH 7.7. The examination of this graph should be done with the understanding that this data set reflects performance of CMR's pretreatment system prior to improvements made in March of 2011 and that the known contributions of H2S from the Malt Plant may have influenced the POTW readings despite efforts to correct the data for this influence.

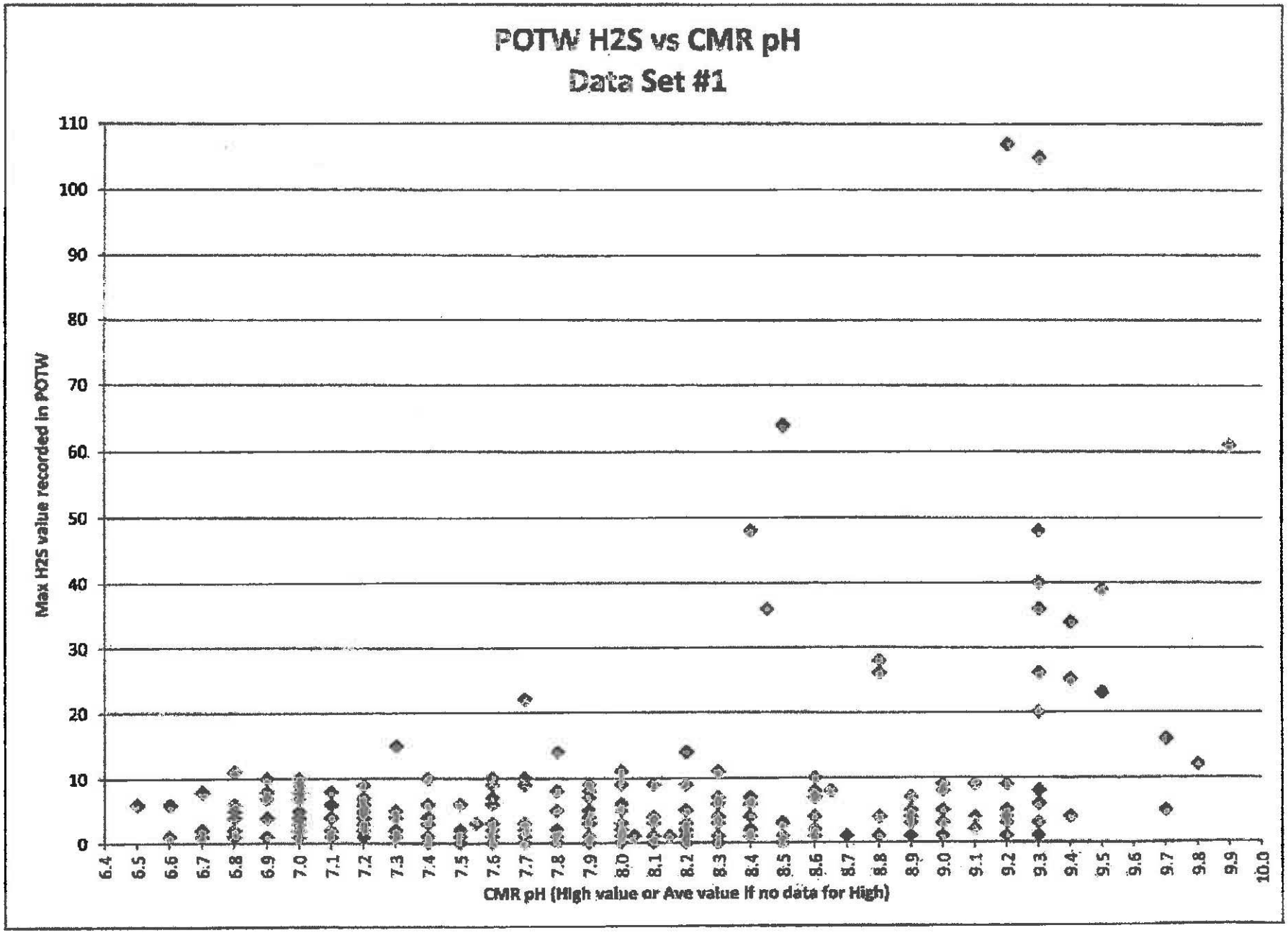
The graph of Data Set #2 shows that H2S in CMR's discharge appears to remain below 10 mg/L at pHs below 7.8 standard units. No attempt was made to correlate H2S measured by CMR with measurements taken in the POTW, but the City would agree with Mr. Gwisdalla's observation that the number of H2S issues in the POTW has reduced significantly during the period reflected in Data Set #2.

Mr. Gwisdalla's e-mail suggests that the current CMR pretreatment operation, including keeping the discharge pH near 7.5 standard units is adequate to maintain compliance with H2S limits. A Histogram of the pH data in Data Set #2 (attached) shows that a significant number of CMR's discharge pH measurements occurred at values as high as 7.6 standard units.

The City believes that an upper pH limit of 7.6 standard units, in combination with the other provisions being proposed in this document, is protective of the POTW. We believe this limit is consistent with the data examined and with the analysis of Mr. Gwisdalla provided by EPA.

Proposed Condition #2
Require that CMR employ the use of their diffused air blower system to strip the H2S from their wastewater discharge. The City proposes requiring CMR to utilize the blower continuously during discharge activities unless CMR can provide an alternate operating scenario that it can demonstrate is protective of the POTW (i.e. operating the blower only at times that the pH of the discharge is greater than 7.0 standard units).

Supporting Rationale:
This proposal is based on discussion and recommendations from EPA in the e-mails from Ms. Stephanie Gieck and Mr. David Gwisdalla listed above. Ms. Geick's e-mail discusses the relationship between pH and solubility of H2S and the desire to strip H2S from the wastewater prior to discharge and have CMR manage the H2S as an air emission. Mr. Gwisdalla's e-mail describes the effectiveness of this system in controlling the H2S levels being discharged to the POTW. It's not clear to the City that the system would need to operate continuously be effective and would allow CMR to provide an alternate operating scenario if they could provide adequate demonstration that H2S levels in the discharge can be controlled. As mentioned in Ms. Gieck's e-mail, as pH is reduced, the proportion of H2S in the gas phase increases. In fact, the proportion of H2S in the gas phase increases dramatically as pH is reduced from 7.0 standard


POTW H2S vs CMR pH
Data Set #1
Max H2S value recorded in POTW
CMR pH (High value or Ave value if no data for High)
0
10
20
30
40
50
60
70
80
90
100
110
6.4
6.5
6.6
6.7
6.8
6.9
7.0
7.1
7.2
7.3
7.4
7.5
7.6
7.7
7.8
7.9
8.0
8.1
8.2
8.3
8.4
8.5
8.6
8.7
8.8
8.9
9.0
9.1
9.2
9.3
9.4
9.5
9.6
9.7
9.8
9.9
10.0

CMR Ex 2:56

Mike Jacobson

From: Chris Sorensen [csorensen@greatfallsmt.net]
Sent: Tuesday, February 25, 2014 12:53 PM
To: Mike Jacobson
Subject: FW: Paragraph 9 - Refinery H2S

From: Gwisdalla, David [mailto:Gwisdalla.David@epa.gov]
Sent: Tuesday, February 25, 2014 11:54 AM
To: Chris Sorensen
Cc: Gieck, Stephanie
Subject: FW: Paragraph 9 - Refinery H2S

Chris,

Here is my background on Calumet's operations as you requested. Without comprehensive data from Calumet, the Region relied on operational and other data collected by Calumet, the City (specifically its manhole monitoring information), and Malteurope from 2009 to 2011 for the basis of our input. Based upon a review of this data we observed the following. From January 2009 to April 2011, when Calumet's discharge pH was less than 8.0 (434 instances) two events were noted with an H2S level above 10 ppm at Manhole 4067; which were not attributable to Malteurope's operations. One instance (126 ppm on 3/31/2011) the City did not record data at the manhole at the time of the release, but Calumet reported excessively high H2S in its discharge. During this same time there were 21 events when the pH was above 8.0 where the H2S values were 10 ppm or higher at Manhole 4067 (with the 21 event's average H2S readings being 60 ppm H2S). There may also be other issues with elevated H2S numbers that were masked by on-going issues with Malteurope at that same time, or the fact that the City did not measure the H2S levels at the manhole at that time. For instance, on 3/20/2011 when Calumet shut-in, while its pH was 8.4, because its H2S at the discharge was recorded at greater than 400 ppm H2S.

Please note that all the above values were collected prior to Calumet installing the aeration system in March/April 2011. Since the system was installed, Calumet consistently operated below a pH of 8.0 and had four events with elevated H2S levels from April 2011 until April 2013. There was one event that makes it particularly clear that Calumet's operations (i.e., pH control and aeration) are needed to prevent excessive H2S from entering the POTW; see the December 19, 2012 event outlined in the background materials below.

From this, it is clear that Calumet's operations of its pH control and aeration system are having positive impacts on the reduction of H2S events witnessed by the City in the collection system. What is also apparent is that major events can and will occur, based upon information from Calumet for each of the four events between 2011 and 2013, operational controls outlined in a slug control plan are needed.

Here is some additional relevant background information for your use and consideration:

In March 2011, Calumet changed its pretreatment operations and made physical pretreatment unit modifications. Operationally, since that time, Calumet has kept the discharge pH near 7.5 standard units. This is almost two orders of magnitude lower than historic pH discharge level of 9.0 to 9.5 standard units. This is relevant since at a pH of 9.5 almost 99% of the sulfide is in held in solution and at a pH of 7 almost 50% of the sulfide is held in solution; meaning more sulfide converts to H2S and off-gases in Calumet's pretreatment unit before being discharged. This is significant since the wastewater in the POTW's collection system has a pH around 6.5. Historically, the combination of the two wastewaters in the collection system would cause H2S to off-gas due to Calumet's wastewater undergoing a pH adjustment from around 9.0 to 7.0 when mixed with the wastewater in the POTW's collections system. The pretreatment unit was also reconfigured, at a cost of $315,030, in March 2011 to use a diffused air blower system to strip the H2S from the

From: Gieck, Stephanie
Sent: Tuesday, February 25, 2014 8:36 AM
To: Gwisdalla, David
Subject: FW: Paragraph 9 - Refinery H2S

From: Gieck, Stephanie
Sent: Thursday, February 13, 2014 2:16 PM
To: Mike Jacobson; 'Chris Sorensen'
Subject: Paragraph 9 - Refinery H2S

Hi Mike and Chris,

Our DOJ attorney is sending Alan a slightly changed version of the changes you suggested for paragraph 9 of the CD regarding other SIUs that may cause H2S. I wanted to provide you some information on our understanding of what the refinery is/should continue to do and how that can be implemented through the permit. Below are three permit provisions that would implement this.

1. SIU specific pH limit - At a pH 7, the sulfide will occur approximately 50% in the water and 50% in the headspace. The higher the pH, the more sulfide will be in the water. We want a lower pH in the discharge so the sulfide leaves the water prior to discharge, and it can be controlled as an air emission from the refinery. If you had a high pH in the discharge, you will have more sulfide in the discharge, but when it mixes with the lower pH wastewater already in the sewer, the total pH will lower and the sulfide will come out in the sewer as H2S. Based on what David Gwisdalla, who was our technical person on the EPA case with the refinery, the upper pH limit should be approximately 7.5. The upper pH is based off of the daily sample data from the refinery. You could ask for this data to justify an upper pH limit. The lower pH limit would be 5.5 based on the City's lower limit in its ordinance.

2. BMP - The refinery should operate its aerator in its pretreatment system to help remove sulfides from the water prior to discharge.

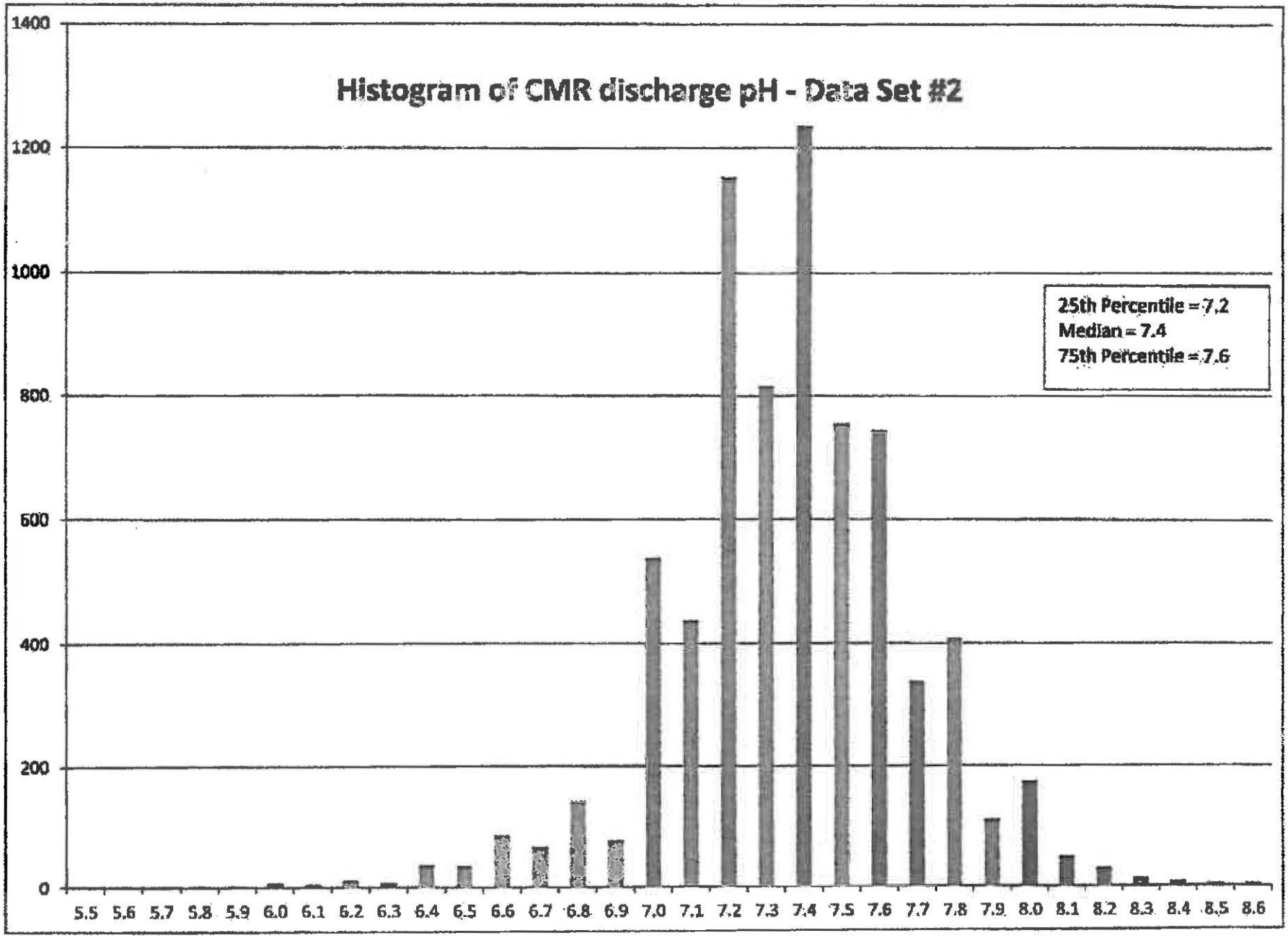
3. Slug Plan - The slug plan for the refinery should specifically be required to address discharges of sulfur in addition to any other slug discharges. The refinery removes sulfur from fuel during its processes. This includes training and practices to prevent slugs of sulfur, as well as notification to the City in the event there is a slug. When slugs have occurred, there have been spikes of H2S.

These are easier to continuously monitor than a sulfide limit, but you could choose to go that route too. Let me know if you have any questions.

Thanks,

Stephanie Gieck

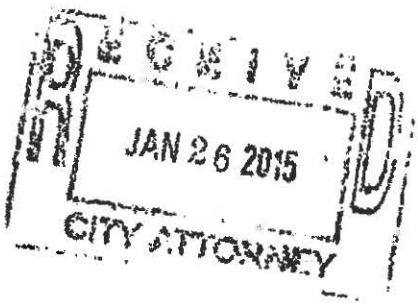
NPDES Unit
Water Technical Enforcement Program
U.S. EPA Region 8
1595 Wynkoop St., 8ENF-W-NP
Denver CO, 80202
303.312.6362


Histogram of CMR discharge pH - Data Set #2
25th Percentile = 7.2
Median = 7.4
75th Percentile = 7.6
1400
1200
1000
800
600
400
200
0
5.5 5.6 5.7 5.8 5.9 6.0 6.1 6.2 6.3 6.4 6.5 6.6 6.7 6.8 6.9 7.0 7.1 7.2 7.3 7.4 7.5 7.6 7.7 7.8 7.9 8.0 8.1 8.2 8.3 8.4 8.5 8.6

CMR Ex 2:59

7. Procedures to prevent adverse impact from any accidental or Slug Discharge. Such procedures include, but are not limited to, inspection and maintenance of storage areas, handling and transfer of materials, loading and unloading operations, control of plant site runoff, worker training, building of containment structures or equipment, measures for containing toxic organic pollutants, including solvents, and/or measures and equipment for emergency response; and
8. Any other information as required by the City.
9. Notice to employees. A notice shall be permanently posted on the industrial user's bulletin board or other prominent place advising employees who to call in the event of an accidental or slug discharge. Employers shall ensure that all employees who work in any area where an accidental or slug discharge may occur or originate are advised of the emergency notification procedures
10. The plan shall be approved by the Director.
11. The control mechanisms (including postings, training, inspections, secondary containment structures and equipment) contained in The Slug Control Plan must be fully implemented and maintained at all times.
12. Failure of the plan to prevent violations of any provisions of the Permit in no way relieves the Permittee from its legal liability for noncompliance with the permit conditions.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 8
1595 Wynkoop Street
DENVER, CO 80202-1129
Phone 800-227-8917
http://www.epa.gov/region08



Ref: 8ENF-W-NP

JAN 16 2015

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Sara Sexe
City Attorney
City of Great Falls
P.O. Box 5021
Great Falls, MT 59403

Re: Permit Limits for Calamut Montana Refinery – Paragraph 9 of *United States and State of Montana v. The City of Great Falls, MT and Malteurop North America, Inc.* Civil Action No. 4:14-cv-00016-BMM

Dear Ms. Sexe:

The Environmental Protection Agency (EPA) has received proposed limits for Calamut Montana Refining post marked June 12, 2014 and received by the EPA on June 17, 2014. These limits were submitted pursuant to paragraph 9 of the consent decree. These limits have been reviewed by both enforcement and program staff at the EPA, and they are approved.

As a reminder, paragraph 9 provides 60 days from EPA approval to public notice these limits. The EPA requests a copy of the public notice to include in our records.

If you have any questions regarding this matter, you may contact Stephanie DeJong at 303-312-6362.

Sincerely,

Gwenette C. Campbell, Unit Chief
NPDES Enforcement Unit
Office of Enforcement, Compliance
and Environmental Justice

CALUMET
Montana Refining, LLC
1900 10th Street NE Great Falls, MT 59404
Phone: 406-761-4100 Main Fax: 406-761-0174 Refinery Building Fax: 406-761-0777 www.calumetspecialty.com

HAND DELIVERED
Mike Jacobson
Environmental Division Supervisor
City of Great Falls Public Works Department
P.O. Box 5021
Great Falls, Mt. 59403-5021

April 14, 2015

Re: Comments on Wastewater Public Notice March 15, 2015 re: "Montana Refining LLC" Limits

Dear Mr. Jacobson:

Below are our comments in response to the public notice posted March 15, 2015. We appreciate your consideration of the information presented. As an initial matter, we note the March 15, 2015 Public Notice is defective and does not meet applicable requirements.

When ***all of the data*** is considered, not just the plotted data provided by EPA, it is apparent that CMR is continuously monitoring, treating, blocking in, and recycling as required to prevent excessive discharges of H_2S. Over 4000 data points of zero H_2S concentrations were not included in the EPA plots that skews the appearance of the data.

CMR has gone to significant efforts to more than meet requirements to vigilantly monitor our wastewater treatment process and to voluntarily shut in at pH 9 or other signs of treatment upsets to prevent discharges. CMR has gone to considerable efforts to be one of the few refineries in the country that has the capability to stop our discharge to the City's WWTP. Secondly, we should be allowed to operate our treatment plant at optimal pH conditions which includes up to 9.0 for a final discharge. Requiring tail-end acidification after treatment but prior to discharge can lead to potential over-acidification from pH probe, control valve or injections system failures that would be worse than discharging at pH 9.0. We are requesting that the pH limit be modified to an industry

reasonable and customary pH maximum limit of 9.0 that will enable optimal treatment methods to be applied efficiently. There is no basis for pH 7.6 and it should be withdrawn.

As stated below, our ability to block in negates the need to require continuous operation of our aeration system when the potential for an H_2S upset only occurs from a few situations per year. We are requesting that Condition 2 be withdrawn and that our current permit conditions are sufficient to be protective to the City as we have demonstrated since 12/1/2011.

The proposed Condition 3 for a Slug Control plan would require considerable documentation of every chemical, drum, tote, tank and vessel and would require updates every time there is a change. This request is not limited to H_2S concerns, is vague and overbroad. As shown within our comments below, we have demonstrated since 12/1/11 that we can consistently meet permit conditions, we are willing to stop our discharge when we have deviations to pH including shutting in at pH 9, and we have sufficient storage capacity to enable retreatment even if it requires additional peroxide treatment to meet our permit limits. We are requesting that Condition 3 be withdrawn because our current permit requirements are sufficient to be protective.

Thank you for your consideration.

Please call me if you have any questions.

Sincerely,

Hadley Bedbury

Hadley Bedbury
Health, Safety and Environmental Manager

ATTACHMENT: Comments to Proposed Permit Change, EPA 5/20/2013 closure to 2011 Order, S. DeJong 4/8/2015 email

cc: Dana Leach, Cathy Laughner, Gary Lindgren

CMR Comments to Proposed Permit Change 3/15/15 Public Notice

1. In the public notice, the City recognized the EPA v. City of Great Falls and Malteurop Order dated April 14, 2014. CMR was not a party to this Order. In fact, Calumet Montana Refining (CMR) provided over 2 years of additional sampling and investigations for hydrogen sulfide (H2S) in the treatment system, discharge and the City sewer system. There was no basis for CMR to be part of that Order, and EPA concluded CMR was in compliance (See EPA letter dated May 20, 2013 attached as Exhibit 1.) Accordingly, CMR's current operation as of May 20, 2013 should not be considered in need of additional changes to be protective to the City for excess H2S concentrations in the discharge.

2. All data should be considered by the City of Great Falls. Data used to support the proposed pH limit was not inclusive of all data, not representative of the discharge, and only identified elevated H2S concentrations that resulted in CMR stopping the discharge until corrected. The extensive amount of data that has been submitted to the City on a monthly basis over-whelmingly demonstrates and is conclusive that CMR is doing more than is required to verify that elevated H2S concentrations are not discharged. CMR requests the City consider all of the data, which shows CMR effectively monitors its treatment processes, and that CMR's discharge can be completely stopped within minutes of identifying abnormal conditions potentially impacting the discharge limits. Specifically:

   2.1 The proposed upper pH limit of 7.6 is erroneously based on irrelevant data. The Data Set 1 used to support the proposed limit was reported to be data from the 2009– 2011 time frame. (See S. DeJong 4/8/2015 email with attachments, attached as Exhibit 2.) The proposal also recognized that the facility made changes to the treatment system that improved the performance by April of 2011 which included a new aeration blower into tank 146 to improve aeration performance which would help to reduce H2S. Therefore, the pre-improvement data is not representative of the operations or the discharge quality of the facility after the April 2011 improvements to the aeration system. Recent data shows that the changes already made have improved the performance of the wastewater treatment plant. EPA's 2014 memo to the City did not include data since 12/31/13, or all the H2S monitoring data that was provided in CMR's monthly reports. Specifically, this data set did not include data where the H2S was zero which was over 99% of the time which creates a mis-leading representation of the data. All of the reported data needs to be shown to reflect the overall quality of CMR's discharge, not just data reported above zero. Since the improvements in 2011, over 99% of the data shows zero hydrogen sulfide present in the discharge. The Proposed Condition #1 noted that "the number of H2S exceedances (i.e. great than 10mg/L) in the collection system has reduced

significantly in the last two years (2011-2013)." All the concentrations reported above 10 ppm H2S occurred prior to 12/1/2011 in Data Set #2.

2.2 Data Set 2 for the time period 5/1/11 – 12/31/13 fails to show all the zero concentration data that were reported for H2S. No data points exceeded 5 ppm H_2S after 12/1/2011. There were1538 measured and reported H_2S results in 2013 and 2840 measured and reported data results for H_2S in 2012 with no exceedences of 10 ppm H_2S.

2.3 CMR has the ability to block in, or to stop its discharge to the City, for up to 3 days. Between 12/1/11 and 12/31/13, CMR blocked in at a 5 ppm concentration and when pH was elevated at 10 on 9/17/13 but H_2S was still zero. When discharge was resumed at 9.0 pH, H2S concentrations were still zero. There were no exceedences of the 10 ppm H_2S at any time in this period.

2.4 Copies of the monthly reports from May 2011 – December 2013 have been submitted previously and are on file with the City.

2.5 In summary, CMR has demonstrated that it can block in at any time after deviations are identified in the wastewater treatment system even if permit limits are met at the time. Between this ability to shut down when pH is above 9, multiple measurement events taken per day CMR has demonstrated that a pH limit of 9.0 can be achieved.

3 The few events that were identified were related to upsets involving sodium hydrosulfide solutions or spent caustic solutions after treatment of vapor phase hydrogen sulfide. With the current monitoring program pH changes are identified and assessed, with the ability to block in the discharget. These instances have been reducing in number and the current wastewater treatment system with its improved pH controls added over the last 2 years have shown that compliance with the 10 ppm H2S discharge limit.

4 There have been no reports of any H_2S problems in the sewer related to CMR's discharge and only the 6 measurements before shutting in since 5/31/11. Three of these six measurement events were related.

5 CMR believes its demonstrated history for the few upset events (3 or less annually) that can potentially create elevated H_2S concentrations shows that monitoring, storage capacity, block in response, and recycling for treatment has been effective in managing the potential for upsets.

5.1 The few upset elevated concentration events were related to the unusual source of elevated sulfide concentrations from sodium hydrosulfide and spent caustic solutions that are not normally in the wastewater. Neither one of the two data sets mentioned above show a cause and effect relationship between pH and H_2S concentrations. If the data plots were revised to show all the zero and 1 ppm concentrations, not just the elevated concentrations reported, this would be visually obvious that there is no cause and effect relationship between pH and

H_2S. Zero concentrations of H_2S occur at pH 9. The data plots only show that when there was an upset historically prior to 12/1/2011, that excess H_2S needs treatment prior to discharge. That is not the case today. CMR's practice of pH adjustment, aeration and adding peroxide when required to treat for H_2S has been effective. The monthly reports submitted by CMR show the frequency of H_2S monitoring and our responses to pH or to H_2S deviations by shutting in, recycling, and additional treatment prior to resuming discharging.

5.2 Optimal treatment for sulfides, metals and ammonia can occur at pH 8.2 and higher. Requiring a lower pH than is industry standard practice will require the use of tail-end acidification. Tail-end acidification can lead to pH probe, controller or valve failure on the acid injection system to overshoot the intended target and to even threaten our minimum pH of 5.5. A pH limit of 9 as used by CMR for a block in limit suffices as additional protection.

6 CMR requests the proposed aerator continuous operation requirement, Condition 2 be withdrawn: This condition assumes that sulfide treatment is always required. This is not the case as we have demonstrated that we can block in if needed during periods of maintenance or use peroxide addition. No changes are required. There is no justification for a change to continuous aeration. In addition, planned changes to be in place within 4 months will significantly increase our treatment capabilities. CMR's frequent monitoring has proven to be successful and the current permit requirements are sufficient, CMR has demonstrated that it can prevent H_2S discharges, and that our system is capable of responding and properly treating upsets prior to discharge. The EPA NEIC investigation and 2+ years of review saw no need to make a change and closed the matter on May 20, 2013. (See attached Exhibit 1.) This should be recognized that CMR had a good program in place by that time that had proven to be effective. CMR requests that this change be withdrawn.

7 CMR requests the Slug Plan requirement, Condition 3 be withdrawn: There have been no significant upsets in over 2 years based on changes made in our monitoring and response program. The proposed slug control plan overbroadly requires a slug plan that addresses every chemical, every drum, every tote and every process vessel that is in the facility and is not limited to H_2S related causes. Technically, this plan would need to be changed every time we update a chemical, change storage or injection points change from drum to tote supply sources, etc. With our capacity to block in for up to 3 days, there is no reason to require a slug plan that would be subject to constant updating. Additionally, this requirement would be redundant. The wording in the current permit is sufficient as CMR is to prevent slug discharges to the City. CMR has demonstrated that its monitoring, storage and treatment capacity prevent slugs to the City WWTP. Therefore, CMR requests that this unwarranted change be withdrawn.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 8
1595 Wynkoop Street
DENVER, CO 80202-1129
Phone 800-227-8917
http://www.epa.gov/region08

RECEIVED
MAY 24 2013
CALUMET MONTANA REFINING

Ref: 8ENF-W-NP

MAY 20 2013

CERTIFIED MAIL NO. 7009 3410 0000 2595 6010
RETURN RECEIPT REQUESTED

Mr. Dana Leach, Plant Manager
Calumet Montana Refining, LLC
1900 Tenth Street North East
Great Falls, Montana 59404-0000

Dear Mr. Leach:

This letter is to inform you of the U.S. Environmental Protection Agency's (EPA) decision to close Administrative Order No. CWA-08-2011-0011 (Order), which the EPA issued to Montana Refining Company, Inc., on April 21, 2011. It is the EPA's understanding that since the Order was issued, Montana Refining Company, Inc., has been renamed Calumet Montana Refining, LLC (Calumet). The EPA has determined that Calumet has complied substantially with the requirements of the Order and, therefore, the EPA is closing the Order at this time.

Please be aware that Calumet is required to comply with all applicable pretreatment standards and requirements, including, but not limited to, its industrial user permit from the City of Great Falls (City). The EPA reserves the right to pursue further action, as appropriate, for any hydrogen sulfide in the City's publicly owned treatment works attributable to Calumet.

If you have any questions, the most knowledgeable persons on my staff are David Gwisdalla, who can be reached at (303) 312-6193, or for questions from counsel, Peggy Livingston, who can be reached at (303) 312-6858.

Sincerely,

Andrew M. Gaydosh
Assistant Regional Administrator
Office of Enforcement, Compliance,
and Environmental Justice

cc: Tina Artemis, U.S. EPA Regional Hearing Clerk
Mr. Randall Rappe, City of Great Falls Environmental Compliance Technician
Mr. John Arrigo, Montana DEQ Enforcement Division Administrator

EXHIBIT
1

CMR Ex 3:6

From: DeJong, Stephanie [mailto:DeJong.Stephanie@epa.gov]
Sent: Wednesday, April 08, 2015 2:58 PM
To: Hadley Bedbury
Cc: M Jacobson; Jim Rearden
Subject: FW: Calumet Permit change in pH discussions

Dear Mr. Hadley,

Per our phone call this afternoon, attached is the information submitted to the EPA describing the City's rationale for the proposed limits. Beyond providing you this publicly available information, it would not be appropriate for the EPA to discuss the proposed limits during the public comment period. As I stated in our call, these limits were determined and proposed by the City. Any comments should be directed to the City as part of the public notice process.

Sincerely,

Stephanie DeJong

NPDES Unit

Water Technical Enforcement Program

U.S. EPA Region 8

1595 Wynkoop St., 8ENF-W-NP

Denver CO, 80202

303.312.6362

CMR Ex 3:7

From: Gwisdalla, David
Sent: Monday, April 06, 2015 5:14 PM
To: DeJong, Stephanie
Cc: Campbell, Gwen
Subject: FW: Calumet Permit change in pH discussions

From: Hadley Bedbury [mailto:Hadley.Bedbury@calumetspecialty.com]
Sent: Monday, April 06, 2015 5:03 PM
To: Gwisdalla, David
Cc: Dana Leach; Shannon Chouinard; Cathy Laughner; Greg Morical; Gary Lindgren
Subject: Calumet Permit change in pH discussions

We want to speak with you about the incorrect information that is in the public notice for our order pH change to our system. In our conversation with the City, they referred you as they were only acting on their consent order. However, I couldn't get any one to answer the phone today at your office after lunch. Please return my call.

Just a few areas of concern to discuss:

* the pH change will have a significant compliance impact, there were over 100 days a year from 2012-2014 that exceeded 7.6 pH, this is far in excess of the 75% compliance reported and since when does EPA accept 75% compliance?;

* the pH vs H2S plot provided in the notice does not prove any correlation, there is no direct correlation as is readily observable at pH above 8.5 and there is also no correction below that pH, fact is we only have potential for H2S when we have upsets involving sodium hydrosulfide or spent caustics;

* the current permit already prevents us from discharges that will let excessive concentrations into the City sewer system; and

*most importantly, we have demonstrated that we can provide low H2S concentrations under our current permit conditions and there is no need for additional requirements to enforce lower pH maximum limits when the H2S concentrations are already protected.

We will be submitting formal comments to the City's public notice, but wanted talk to you early about our concerns.

Thank you for your consideration. I will be on travel Wednesday through Friday but I should have time to respond to calls to my cell phone.

Hadley Bedbury

Manager Safety, Environment, Health and Security

Calumet Montana Refining, LLC.

1910 10th St. NE

Great Falls, Mt. 59404

Office: 406 454-9887

Mobile: 406 788-5901

Fax: 406 761-0777

Hadley.bedbury@calumetspecialty.com

Exhibit C

Attachments:

1. Proposed Permit Limits for Calumet Montana Refining to Address Hydrogen Sulfide.
2. Graph: POTW H2S vs CMR pH, Data Set #1.
3. Graph: CMR Discharge, H2S vs pH 2011 – 2013, Data Set #2.
4. E-mail from Mr. David Gwisdalla dated February 25, 2014.
5. E-mail from Ms. Stephanie Gieck dated February 13, 2014.
6. Graph: Histogram of CMR discharge pH – Data Set #2.
7. Existing Slug Control Language in Calumet Montana Refining Industrial Discharge Permit

PROPOSED PERMIT LIMITS FOR CALUMET MONTANA REFINING TO ADDRESS HYDROGEN SULFIDE

Proposed Permit Condition #1:
Set an upper pH limit for Calumet Montana Refining (CMR) discharge of 7.6 standard units.

Supporting Rationale:
This proposal is based on analysis of two data sets and discussion from EPA regarding CMR's hydrogen sulfide (H2S) emissions.

Data Set #1 was contained in a spreadsheet provided by Mr. David Gwisdalla, an Environmental Engineer with EPA Region 8. The spreadsheet (MRC Data 2009 to 2011.xlsx, e-mailed to the City by Mr. Gwisdalla on 3/5/2014) contained daily CMR discharge information, including High, Low and Average pH as well as the City's H2S measurements in the POTW for that day. Mr. Gwisdalla identified, among other things, days where the discharge was within acceptable levels, days where the discharge data was elevated and days where the data was suspect or was influenced by H2S discharges likely originating from the Malt Plant. The City extracted the data from the spreadsheet that was identified by Mr. Gwisdalla as being within acceptable levels and that data identified as being elevated. The City further removed data where no POTW H2S readings were taken and data where there was no Average pH discharge data. The City then graphed the maximum recorded H2S value in the POTW against CMR's measured pH in its discharge, using either the High pH value if it existed, or the Average pH value if it did not. The result is attached in a graph titled "POTW H2S vs CMR pH Data Set #1". Note that three data points ([8.6,190], [8.9,291], [9.0,171]) do not appear on the graph. These points were omitted to magnify and add clarity to the y-axis of the graph.

Data Set #2 was contained in a spreadsheet provided by CMR (EPA Waste Water Report. xlsx) on or about February 24, 2014. The spreadsheet included daily discharge information for, among other things, pH and H2S in CMR's discharge from the period 5/1/2011 through 12/31/2013. This included multiple sets of pH and H2S readings each day. The City extracted the data sets where both pH and H2S data were present and graphed H2S reading against the pH reading of the discharge. The result is attached in a graph titled "CMR Discharge, H2S vs pH 2011-2013 Data Set #2". One data point was deleted – an H2S reading of 196 that occurred on November 25, 2011. An explanation of the cause of this event was included in an e-mail from Mr. Gwisdalla to Chris Sorensen dated February 25, 2014 (attached). A second data point (8.0, 151) was omitted from the graph to magnify and add clarity to the y-axis of the graph.

Among e-mail correspondence received from EPA were two of note: One from Ms. Stephanie Gieck dated February 13, 2014 (attached) and one from Mr. David Gwisdalla dated February 25, 2014 (attached). In her e-mail, Ms. Gieck states "*Based on what David Gwisdalla, who was our technical person on the EPA case with the refinery, the upper pH limit should be approximately 7.5*". Mr. Gwisdalla makes no recommendation for an upper pH limit in his e-mail but make statements about the performance of CMR's pretreatment system, including "*In March 2011, Calumet changed its pretreatment operations and made physical pretreatment unit modifications. Operationally, since that time, Calumet has kept the discharge pH near 7.5 standard units.*", and "*The number of H2S exceedances*

(i.e., H2S greater than 10 mg/L) in the collection system has reduced significantly in the last two years (2011-2013)".

The City's analysis of this information is as follows:
The graph of Data Set #1 clearly shows that H2S in the POTW can occur when CMR's discharge pH is high. The pH level of CMR's discharge at which the H2S levels in the POTW result in violations of City Ordinance is difficult to interpret exactly, however it is clear that H2S levels in the POTW have exceeded 10 mg/L at pHs as low as 6.8 standard units and seem to begin rising more dramatically starting at about pH 7.7. The examination of this graph should be done with the understanding that this data set reflects performance of CMR's pretreatment system prior to improvements made in March of 2011 and that the known contributions of H2S from the Malt Plant may have influenced the POTW readings despite efforts to correct the data for this influence.

The graph of Data Set #2 shows that H2S in CMR's discharge appears to remain below 10 mg/L at pHs below 7.8 standard units. No attempt was made to correlate H2S measured by CMR with measurements taken in the POTW, but the City would agree with Mr. Gwisdalla's observation that the number of H2S issues in the POTW has reduced significantly during the period reflected in Data Set #2.

Mr. Gwisdalla's e-mail suggests that the current CMR pretreatment operation, including keeping the discharge pH near 7.5 standard units is adequate to maintain compliance with H2S limits. A Histogram of the pH data in Data Set #2 (attached) shows that a significant number of CMR's discharge pH measurements occurred at values as high as 7.6 standard units.

The City believes that an upper pH limit of 7.6 standard units, in combination with the other provisions being proposed in this document, is protective of the POTW. We believe this limit is consistent with the data examined and with the analysis of Mr. Gwisdalla provided by EPA.

Proposed Condition #2
Require that CMR employ the use of their diffused air blower system to strip the H2S from their wastewater discharge. The City proposes requiring CMR to utilize the blower continuously during discharge activities unless CMR can provide an alternate operating scenario that it can demonstrate is protective of the POTW (i.e. operating the blower only at times that the pH of the discharge is greater than 7.0 standard units).

Supporting Rationale:
This proposal is based on discussion and recommendations from EPA in the e-mails from Ms. Stephanie Gieck and Mr. David Gwisdalla listed above. Ms. Geick's e-mail discusses the relationship between pH and solubility of H2S and the desire to strip H2S from the wastewater prior to discharge and have CMR manage the H2S as an air emission. Mr. Gwisdalla's e-mail describes the effectiveness of this system in controlling the H2S levels being discharged to the POTW. It's not clear to the City that the system would need to operate continuously be effective and would allow CMR to provide an alternate operating scenario if they could provide adequate demonstration that H2S levels in the discharge can be controlled. As mentioned in Ms. Gieck's e-mail, as pH is reduced, the proportion of H2S in the gas phase increases. In fact, the proportion of H2S in the gas phase increases dramatically as pH is reduced from 7.0 standard

units[1]. It is possible that, at some pH level, the stripping of H2S will occur without the introduction of air. The City also believes that air stripping consumes significant electricity and that it serves no-one's interest to require this energy consumption and expense if it is not necessary. The City believes this is consistent with Ms. Geicks recommendation that the refinery "should" operate its aerator.

Proposed Condition #3.

Edit CMR's Industrial Discharge Permit Part V.B. Slug Control Plan, to read:

> The permittee shall develop and implement a Slug Control Plan to minimize the potential for spills and slug discharges. The Slug Control Plan shall include, at a minimum, the following:
>
> [Items 1 – 4 remain the same.]
>
> 5. Procedures for immediately notifying the City of any spill or Slug Discharge. It is the responsibility of the industrial user to comply with the following reporting requirements:
>
> In the case of any discharge, including, but not limited to, spills, accidental discharges, discharges of a nonroutine, episodic nature, a noncustomary batch discharge, a slug discharge, a discharge containing unusual amounts of sulfur or a discharge that may cause potential problems for the POTW, the industrial user shall immediately telephone and notify the City of the incident. This notification shall include: [sub-items a-j remain the same.]
>
> [Item 6 remains the same.]
>
> 7. Procedures to prevent adverse impact from any accidental or Slug Discharge. Such procedures include but are not limited to inspection and maintenance of storage areas, handling and transfer of materials, loading and unloading operations, control of plant site runoff, worker training, building of containment structures or equipment, measures for containing toxic organic pollutants, including solvents, measures to control of discharges of sulfur, and/or measures and equipment for emergency response; and
>
> [Items 8 through 12 remain the same]

Supporting Rationale

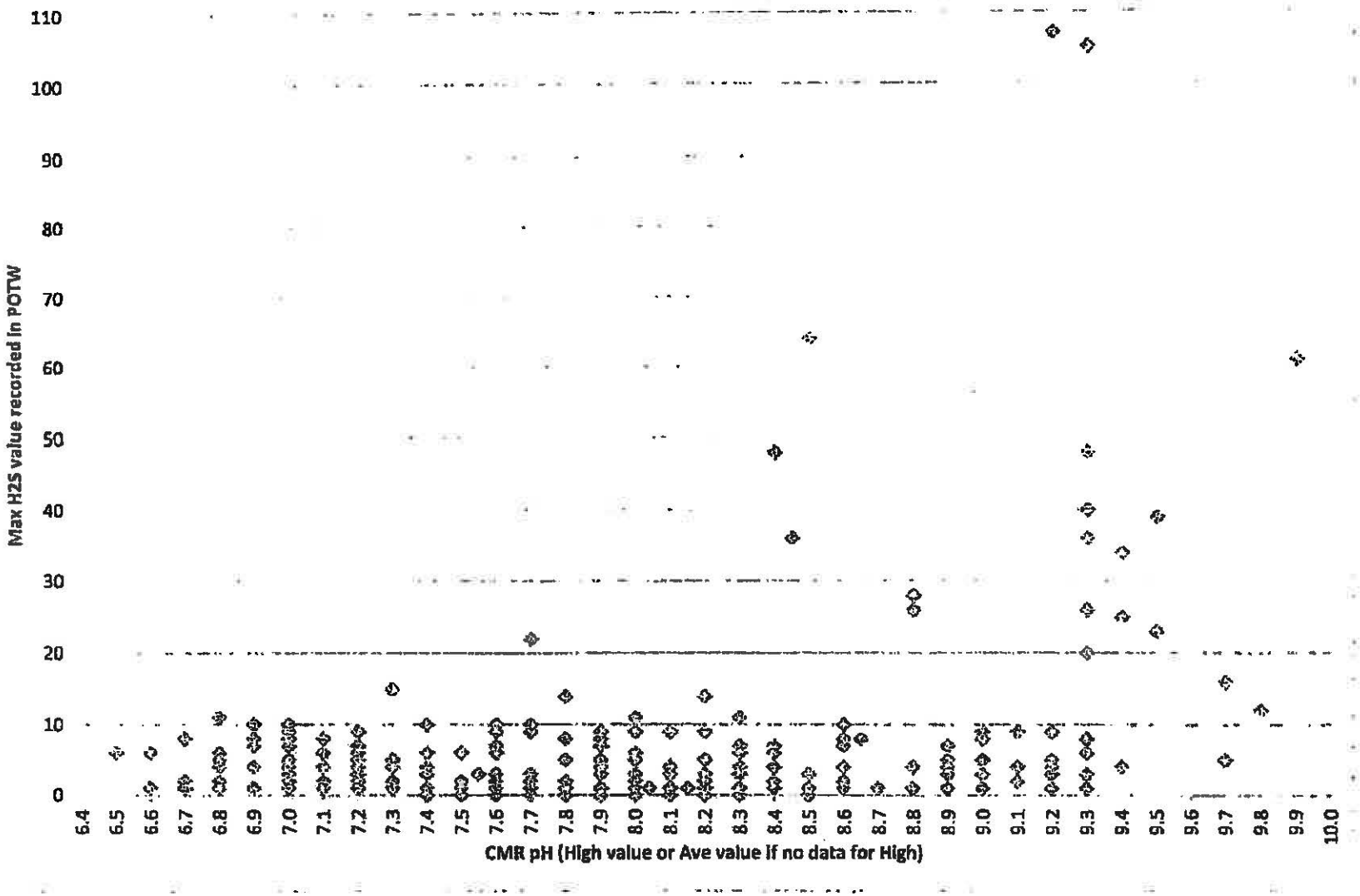
In Mr. Gwisdalla's February 25, 2014 letter, he recommends that operational controls outlined in a slug control plan are needed and describes two incidents where slug discharges created high H2S discharges. The City agrees with this analysis and believes that the Slug Control Plan needs to include protection from discharges of sulfur. Existing Slug Control language in CMR's permit is attached.

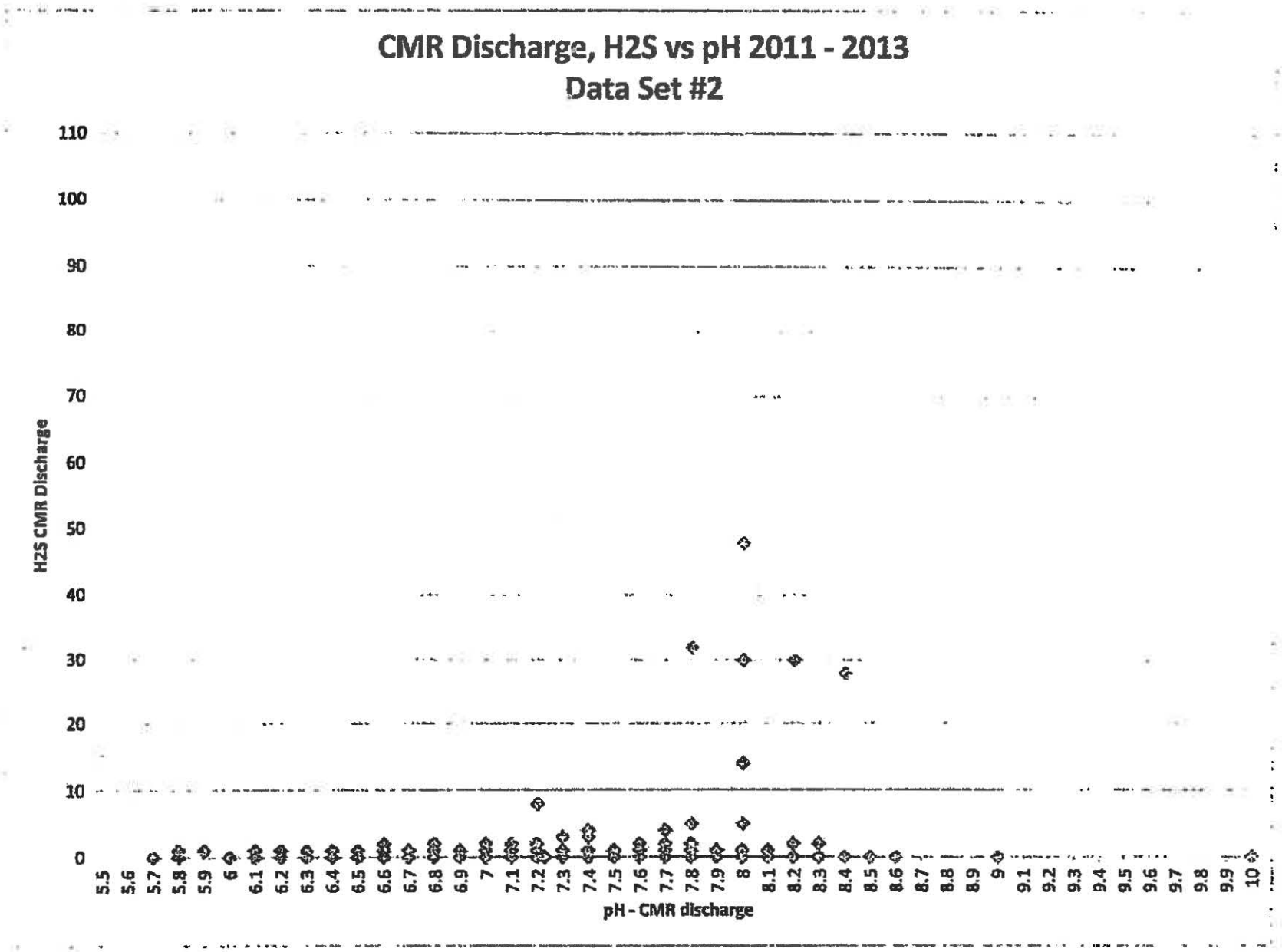
---

[1] Sulfide in Wastewater Collection and Treatment Systems, American Society of Civil Engineers, Table 6-5. Proportions of Dissolved Sulfide Present As H2S, p.93.

CMR Ex 3:14

POTW H2S vs CMR pH
Data Set #1




CMR Discharge, H2S vs pH 2011 - 2013
Data Set #2
H2S CMR Discharge
110
100
90
80
70
60
50
40
30
20
10
0
5.5
5.6
5.7
5.8
5.9
6
6.1
6.2
6.3
6.4
6.5
6.6
6.7
6.8
6.9
7
7.1
7.2
7.3
7.4
7.5
7.6
7.7
7.8
7.9
8
8.1
8.2
8.3
8.4
8.5
8.6
8.7
8.8
8.9
9
9.1
9.2
9.3
9.4
9.5
9.6
9.7
9.8
9.9
10
pH - CMR discharge

Mike Jacobson

From: Chris Sorensen
Sent: Tuesday, February 25, 2014 12:53 PM
To: Mike Jacobson
Subject: FW: Paragraph 9 - Refinery H2S

From: Gwisdalla, David [mailto:Gwisdalla.David@epa.gov]
Sent: Tuesday, February 25, 2014 11:54 AM
To: Chris Sorensen
Cc: Gieck, Stephanie
Subject: FW: Paragraph 9 - Refinery H2S

Chris,

Here is my background on Calumet's operations as you requested. Without comprehensive data from Calumet, the Region relied on operational and other data collected by Calumet, the City (specifically its manhole monitoring information), and Malteurope from 2009 to 2011 for the basis of our input. Based upon a review of this data we observed the following. From January 2009 to April 2011, when Calumet's discharge pH was less than 8.0 (434 instances) two events were noted with an H2S level above 10 ppm at Manhole 4067; which were not attributable to Malteurope's operations. One instance (126 ppm on 3/31/2011) the City did not record data at the manhole at the time of the release, but Calumet reported excessively high H2S in its discharge. During this same time there were 21 events when the pH was above 8.0 where the H2S values were 10 ppm or higher at Manhole 4067 (with the 21 event's average H2S readings being 60 ppm H2S). There may also be other issues with elevated H2S numbers that were masked by on-going issues with Malteurope at that same time, or the fact that the City did not measure the H2S levels at the manhole at that time. For instance, on 3/20/2011 when Calumet shut-in, while its pH was 8.4, because its H2S at the discharge was recorded at greater than 400 ppm H2S.

Please note that all the above values were collected prior to Calumet installing the aeration system in March/April 2011. Since the system was installed, Calumet consistently operated below a pH of 8.0 and had four events with elevated H2S levels from April 2011 until April 2013. There was one event that makes it particularly clear that Calumet's operations (i.e., pH control and aeration) are needed to prevent excessive H2S from entering the POTW; see the December 19, 2012 event outlined in the background materials below.

From this, it is clear that Calumet's operations of its pH control and aeration system are having positive impacts on the reduction of H2S events witnessed by the City in the collection system. What is also apparent is that major events can and will occur, based upon information from Calumet for each of the four events between 2011 and 2013, operational controls outlined in a slug control plan are needed.

Here is some additional relevant background information for your use and consideration:

In March 2011, Calumet changed its pretreatment operations and made physical pretreatment unit modifications. Operationally, since that time, Calumet has kept the discharge pH near 7.5 standard units. This is almost two orders of magnitude lower than historic pH discharge level of 9.0 to 9.5 standard units. This is relevant since at a pH of 9.5 almost 99% of the sulfide is in held in solution and at a pH of 7 almost 50% of the sulfide is held in solution; meaning more sulfide converts to H2S and off-gases in Calumet's pretreatment unit before being discharged. This is significant since the wastewater in the POTW's collection system has a pH around 6.5. Historically, the combination of the two wastewaters in the collection system would cause H2S to off-gas due to Calumet's wastewater undergoing a pH adjustment from around 9.0 to 7.0 when mixed with the wastewater in the POTW's collections system. The pretreatment unit was also reconfigured, at a cost of $315,030, in March 2011 to use a diffused air blower system to strip the H2S from the

wastewater prior to discharge. At a lower pH more of the sulfide is removed as H2S in the pretreatment system before it is discharged into the POTW. H2S levels in the discharge samples taken by Calumet since 2011 operation and physical changes were consistently at or near zero for H2S in the headspace. Sulfide levels in Calumet's discharge have also been relatively low (between 2 and 10 mg/L).

The number of H2S exceedances (i.e., H2S greater than 10 mg/L) in the collection system has reduced significantly in the last two years (2011-2013). Most all of the H2S issues in the collection system are now attributable to other dischargers. Since the AO was issued to Calumet in 2011, Calumet had four instances where the H2S in its discharge exceeded 10 mg/L for H2S in its discharge. During each incident, once Calumet personnel were aware of the H2S concentrations, the plant has shut-in its operations (i.e., stopped discharging to the POTW). Though in each instance, there was no indication that the discharge caused the POTWs' collection system to exceed the 10 mg/L H2S worker safety threshold. The Calumet discharges exceeding 10 mg/L since the 2011 order was issued were:

a) November 25, 2011; Calumet's discharge was 196 mg/L H2S. This particular incident was significant given the extreme H2S level. Calumet's report for this incident illustrated the high level of H2S was related to a discharge of sulfide from the sodium hydrosulfide (NASH) unit. The company put in place operational controls and physical infrastructure to prevent this from happening again in the future.

b) November 26, 2011; Calumet's discharge was 32 mg/L H2S. This event is related to the one above.

c) September 16, 2012; Calumet's discharge was 28 mg/L H2S. This event was caused by operators preparing the Merox Reactor (i.e., a gasoline caustic treating vessel) for maintenance with water and washed the residual caustic into the sewer. This caused the pH to increase and led to the elevated H2S readings. Worker training and education was enhanced to prevent this from recurring.

d) December 19, 2012; Calumet's discharge was 48 mg/L H2S. During a pretreatment system upgrade, the equalization basin was lowered to support the installation of isolation valves for a new system able to increase the unit's pH acid injection capacity. The lowered basin significantly reduced the system's retention time and thus its buffering capacity. During the system upgrade, the pretreatment system was unable to lower the pH aggressively enough. When combined with a decreased retention time significantly reduce the removal of H2S. This resulted in a discharge with a pH of 9.2 and high H2S levels being discharged. The completed project increased the control of pH and is not likely to be repeated.

Calumet's On-going Sampling Costs: In February 2012, Calumet requested a reduction in sampling required by the Order. Calumet requested, due to the time and expense, to eliminate BOD, O&G, and sulfide sampling. Sulfide sampling alone costs the company approximately $560 per week and the plant has sampled daily for the last two years ($58,240). Calumet requested again in February 2013 to reduce the sampling.

Regards, David

David A. Gwisdalla, P.E., MSEE
Commander, U.S. Public Health Service
PHS Commissioned Corps Officer Detailed to EPA

Environmental Engineer
NPDES Enforcement Branch
Region 8 Water Technical Enforcement Division
U.S. Environmental Protection Agency

office 303.312.6193
fax 303.312.6116
gwisdalla.david@epa.gov

Mailing Address:
EPA-Region 8 (8ENF-W-NP)
1595 Wynkoop Street
Denver, CO 80202-1129

From: Gieck, Stephanie
Sent: Tuesday, February 25, 2014 8:36 AM
To: Gwisdalla, David
Subject: FW: Paragraph 9 - Refinery H2S

From: Gieck, Stephanie
Sent: Thursday, February 13, 2014 2:16 PM
To: Mike Jacobson; 'Chris Sorensen'
Subject: Paragraph 9 - Refinery H2S

Hi Mike and Chris,

Our DOJ attorney is sending Alan a slightly changed version of the changes you suggested for paragraph 9 of the CD regarding other SIUs that may cause H2S. I wanted to provide you some information on our understanding of what the refinery is/should continue to do and how that can be implemented through the permit. Below are three permit provisions that would implement this.

1. SIU specific pH limit - At a pH 7, the sulfide will occur approximately 50% in the water and 50% in the headspace. The higher the pH, the more sulfide will be in the water. We want a lower pH in the discharge so the sulfide leaves the water prior to discharge, and it can be controlled as an air emission from the refinery. If you had a high pH in the discharge, you will have more sulfide in the discharge, but when it mixes with the lower pH wastewater already in the sewer, the total pH will lower and the sulfide will come out in the sewer as H2S. Based on what David Gwisdalla, who was our technical person on the EPA case with the refinery, the upper pH limit should be approximately 7.5. The upper pH is based off of the daily sample data from the refinery. You could ask for this data to justify an upper pH limit. The lower pH limit would be 5.5 based on the City's lower limit in its ordinance.

2. BMP - The refinery should operate its aerator in its pretreatment system to help remove sulfides from the water prior to discharge.

3. Slug Plan - The slug plan for the refinery should specifically be required to address discharges of sulfur in addition to any other slug discharges. The refinery removes sulfur from fuel during its processes. This includes training and practices to prevent slugs of sulfur, as well as notification to the City in the event there is a slug. When slugs have occurred, there have been spikes of H2S.

These are easier to continuously monitor than a sulfide limit, but you could choose to go that route too. Let me know if you have any questions.

Thanks,

Stephanie Gieck

NPDES Unit
Water Technical Enforcement Program
U.S. EPA Region 8
1595 Wynkoop St., 8ENF-W-NP
Denver CO, 80202
303.312.6362

Mike Jacobson

From: Gieck, Stephanie [Gieck.Stephanie@epa.gov]
Sent: Thursday, February 13, 2014 2:16 PM
To: Mike Jacobson; Chris Sorensen
Subject: Paragraph 9 - Refinery H2S

Hi Mike and Chris,

Our DOJ attorney is sending Alan a slightly changed version of the changes you suggested for paragraph 9 of the CD regarding other SIUs that may cause H2S. I wanted to provide you some information on our understanding of what the refinery is/should continue to do and how that can be implemented through the permit. Below are three permit provisions that would implement this.

1. SIU specific pH limit - At a pH 7, the sulfide will occur approximately 50% in the water and 50% in the headspace. The higher the pH, the more sulfide will be in the water. We want a lower pH in the discharge so the sulfide leaves the water prior to discharge, and it can be controlled as an air emission from the refinery. If you had a high pH in the discharge, you will have more sulfide in the discharge, but when it mixes with the lower pH wastewater already in the sewer, the total pH will lower and the sulfide will come out in the sewer as H2S. Based on what David Gwisdalla, who was our technical person on the EPA case with the refinery, the upper pH limit should be approximately 7.5. The upper pH is based off of the daily sample data from the refinery. You could ask for this data to justify an upper pH limit. The lower pH limit would be 5.5 based on the City's lower limit in its ordinance.

2. BMP - The refinery should operate its aerator in its pretreatment system to help remove sulfides from the water prior to discharge.

3. Slug Plan - The slug plan for the refinery should specifically be required to address discharges of sulfur in addition to any other slug discharges. The refinery removes sulfur from fuel during its processes. This includes training and practices to prevent slugs of sulfur, as well as notification to the City in the event there is a slug. When slugs have occurred, there have been spikes of H2S.

These are easier to continuously monitor than a sulfide limit, but you could choose to go that route too. Let me know if you have any questions.

Thanks,

Stephanie Gieck

NPDES Unit
Water Technical Enforcement Program
U.S. EPA Region 8
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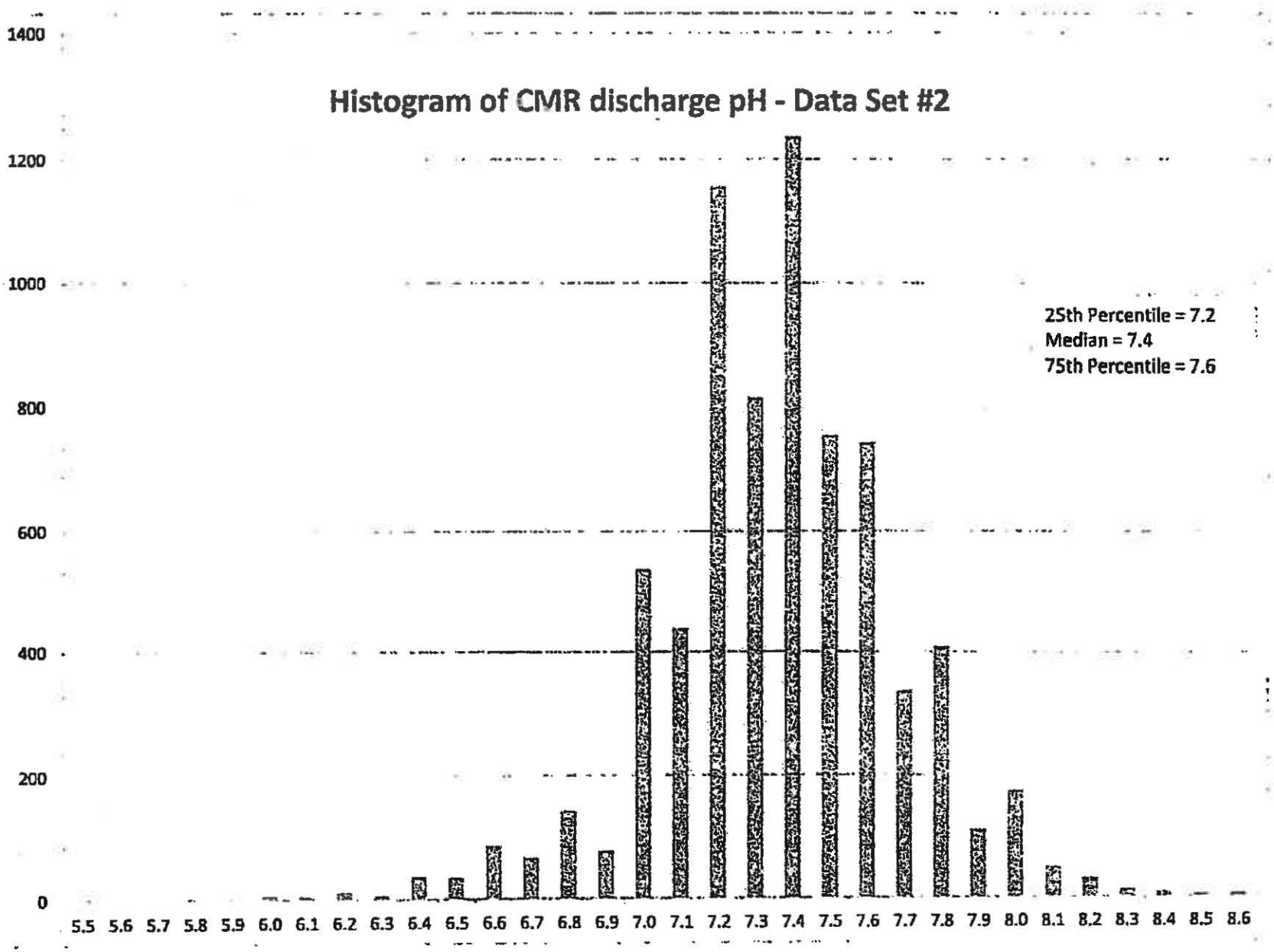
Histogram of CMR discharge pH - Data Set #2
25th Percentile = 7.2
Median = 7.4
75th Percentile = 7.6
1400
1200
1000
800
600
400
200
0
5.5 5.6 5.7 5.8 5.9 6.0 6.1 6.2 6.3 6.4 6.5 6.6 6.7 6.8 6.9 7.0 7.1 7.2 7.3 7.4 7.5 7.6 7.7 7.8 7.9 8.0 8.1 8.2 8.3 8.4 8.5 8.6

CMR Ex 3:20

EXISTING SLUG CONTROL LANGUAGE IN CALUMET MONTANA REFINING INDUSTRIAL DISCHARGE PERMIT

Slug Control Plan

The Permittee shall develop and implement a Slug Control Plan to minimize the potential for spills and slug discharges. The Slug Control Plan shall include, at a minimum, the following:

1. Detailed plans (schematics) showing facility layout and plumbing representative of operating procedures;
2. Description of contents and volumes of any process tanks;
3. Description of discharge practices, including non-routine batch discharges;
4. Listing of stored chemicals, including location and volumes;
5. Procedures for immediately notifying the City of any spill or Slug Discharge. It is the responsibility of the industrial user to comply with the following reporting requirements:

   In the case of any discharge, including, but not limited to, spills, accidental discharges, discharges of a nonroutine, episodic nature, a noncustomary batch discharge, a slug discharge or a discharge that may cause potential problems for the POTW, the industrial user shall immediately telephone and notify the City of the incident. This notification shall include:

   a. Name of the facility.
   b. Location of the facility.
   c. Name of the caller.
   d. Date and time of the discharge.
   e. Date and time discharge was halted.
   f. Location of the discharge.
   g. Estimated volume of the discharge.
   h. Estimated concentration of pollutants in the discharge.
   i. Corrective actions taken to halt the discharge.
   j. Method of disposal, if applicable.

6. Within five (5) working days following such discharge, the industrial user shall, unless waived by the City, submit a detailed written report describing the cause(s) of the discharge and the measures to be taken by the industrial user to prevent similar future occurrences. Such notification shall not relieve the industrial user of any expense, loss, damage, or other liability which might be incurred as a result of damage to the POTW, natural resources, or any other damage to person or property; nor shall such notification relieve the industrial user of any fines, penalties, or other liability which may be imposed pursuant to this Chapter.
7. Procedures to prevent adverse impact from any accidental or Slug Discharge. Such

procedures include, but are not limited to, inspection and maintenance of storage areas, handling and transfer of materials, loading and unloading operations, control of plant site runoff, worker training, building of containment structures or equipment, measures for containing toxic organic pollutants, including solvents, and/or measures and equipment for emergency response; and

8. Any other information as required by the City.
9. Notice to employees. A notice shall be permanently posted on the industrial user's bulletin board or other prominent place advising employees who to call in the event of an accidental or slug discharge. Employers shall ensure that all employees who work in any area where an accidental or slug discharge may occur or originate are advised of the emergency notification procedures.
10. The plan shall be approved by the Director.
11. The control mechanisms (including postings, training, inspections, secondary containment structures and equipment) contained in The Slug Control Plan must be fully implemented and maintained at all times.
12. Failure of the plan to prevent violations of any provisions of the Permit in no way relieves the Permittee from its legal liability for noncompliance with the permit conditions.

CALUMET
Montana Refining, LLC
1900 10th Street NE Great Falls, MT 59404
Phone: 406-761-4100 Main Fax: 406-761-0174 Refinery Building Fax: 406-761-0777 www.calumetspecialty.com

June 5, 2015

HAND DELIVERED and EMAIL
Mike Jacobson
Environmental Division Supervisor
Industrial Pretreatment Program
City of Great Falls Public Works Department
P.O. Box 5021
Great Falls, Mt. 59403-5021

Re: Updated Submittal of the Engineering Design Plan for the Calumet Montana Refining, LLC Wastewater Treatment Expansion to Manage Wastewater from the Low Sulfur Fuel Expansion Project

Mr. Jacobson:

Attached is an updated wastewater treatment Basic Engineering Design document for your approval for our expansion application provided to you previously on May 8, 2015. We are willing to meet with you as required to process this application smoothly.

Additional Wastewater Treatment Equipment

Generally, CMR is doubling the wastewater handling volume capability while increasing our aeration capacity more than three times that of the existing system. There will be two different DAF systems, and a greatly expanded aeration capability in the Aeration/Biotreatment Tank 146 providing three areas for oxidation treatment such as for converting sulfides to sulfates. This will enable compliant treatment with any two of these systems in place for normal wastewater quality. Similarly, having a spare collection/skimming tank will also enable for routine tank maintenance or inspections.

EQUIPMENT CHANGES:

- New Tank 143 is a similarly constructed floating roof tank with a surface oil skimmer, similar in design to the existing collection/skimming Tank 145;

CALUMET
Montana Refining, LLC
1900 10th Street NE Great Falls, MT 59404
Phone: 406-761-4100 Main Fax: 406-761-0174 Refinery Building Fax: 406-761-0777 www.calumetspecialty.com

- New DAF system to be added after the collection skimming tanks. This includes a DAF Pretreatment Tank, DAF Float Pump, DAF Effluent Mix Tank and a DAF Decant Storage tank and an air supply;
- The new DAF system will also include new pH fine tuning and chemical addition system for managing pH at 7.8 – 8.2 near optimum treatment levels for metals and sulfides will also enable improved peroxide, ferric chloride, polymer flocculent and/or other chemical addition and treatment prior to the aeration/biotreatment tank Tk 145. For example, injection of 35% hydrogen peroxide into this mixing system prior to the aeration tank will provide superior mixing versus the previous method of a single tube dropping peroxide in one location in the aeration tank for sulfide oxidation;
- The course air diffuser system located in the bottom of aeration Tank 146 will be greatly expanded to keep the tank effectively aerated.
- A 4000 gpm stormwater pump is added to the wastewater treatment area to help manage peak stormwater flows through recycling on site;
- A stormwater collection tank for incoming flows greater than 500 gpm will be used for storage to reduce the demand on the treatment system;
- pH as proposed in the BED document is expected to have a maximum limit of 9.0 based on the need to optimize treatment efficiency which prevents recycling and storage increases that could impact discharge quality;
- New ORP probe will be added for early detection of a chemical upset coming into wastewater treatment. This is in addition to our pH probe for early detection of NaHS or Spent Caustic will aid in the treatment of those two primary causes of H2S in our system;
- Aeration/Biotreatment tank will receive a second blower capable of 1600 SCFM versus 456 SCFM from the existing blower.
- A replacement slop oil tank with a larger capacity of 570 bbls;
- Six new or upgraded flow pumps will be added in addition to the chemical mixing pumps; and
- Existing Blue and Yellow DAFs will remain in service as a final treatment option with improved aeration capabilities. These 250 gpm units will be operated in parallel versus series for the higher expansion flow rate. The wastewater by this time will already meet discharge oil and grease and sulfide limits, these DAFs are providing supplemental treatment to remove biologic, non-hazardous waste sludge.

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One change from the attached BED document is that current Tank 147 will not be used for the new stormwater collection tank as stated in Section 2.1 For construction scheduling and keeping Tk 147 in service longer prior to new construction startup, we will be using a different tank as the stormwater collection tank. Once the expanded equipment is put into service, Tk 147 will be removed from service. The replacement tank will be renumbered Tk 147.

Note that the stormwater increase is due to two factors: additional areas that were not managing hazardous chemicals and did not have containment for routing to wastewater treatment are now required to have containment per SPCC requirements. Secondly, former earthen tank containment areas have been replaced with concrete and paved ground surfaces that will not allow for water adsorption into the soil and will be collected and treated in the wastewater treatment system.

This package supports CMR's continued efforts to design ahead and operate safely and efficiently within permit limits with capacity to handle peak and upset conditions.

This design system with our current monitoring procedures for H2S within the process and our ability to block our discharge for up to 2 days helps to ensure safe and compliant discharges. Our Discharge Monitoring Reports have confirmed this with immediate blocking when we are exceeding permit limits and at times have blocked in prior to limit exceedances based on trends. Accordingly, we believe our request for a pH limit of 9.0 is justified based on past performance and the increased capabilities of this new system.

One other permit change is requested. We are also requesting an increase in summer discharge temperature limits from 104 Fahrenheit to 110 Fahrenheit for June 1 to September 30. Recent summer temperatures have been cooler than past years and we would like to have this capability.

Below is other information required by permit Section III.K.

a) CMR is adding 5 units for increasing refinery capacity to approximately 25000 lbs per day. Increased production will occur in the asphalt and diesel/jet type fuels, no changes to the gasoline production. We may use an alternate source of crude oil in the future or other petroleum feedstocks. Initial operations will start up with

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the same crude oil sources. Major production units being added are a second Crude Unit and a Mild Hydrocracker Unit. Other support units and changes being made are a new Hydrogen plan to supply the new production units, Sodium Hydrosulfide Unit (NaHS) to treat our fuel gas, a Sour Water Stripper Unit to treat and recover for resale ammonia from production, and a Flare Gas Scrubber Unit to treat off-gases going to our flare for destruction.

b) No new substances are expected in our future discharges, commencing in August or later.
c) No changes are expected in the listed or characteristic hazardous waste types to be generated.
d) Certification Statement is enclosed.

Please call me if you have any questions.

Thank you for your consideration.

Sincerely,

Hadley Bedbury

Hadley Bedbury
Health, Safety and Environmental Manager

Certification Statement

"I hereby 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 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 or imprisonment for knowing violations."

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Dana Leach
Vice President – Refining Operations
Calumet Montana Refining, LLC.

ATTACHMENT: Basic Engineering Design Plan (electronic and hard copy provided to addressee)
cc: Dana Leach, Cathy Laughner, Gary Lindgren

CDM Smith Design Document (Final).pd

BASIC ENGINEERING DESIGN REPORT

Wastewater Treatment Plant Upgrade

Calumet Refinery
Great Falls MT

Calumet Montana Refining, LLC

May 7, 2015

CDM Smith

CMR Ex 4:6

Table of Contents

List of Tables

CMR Ex 4:7

List of Figures

Appendices

Section 1
Introduction

The Calumet Refinery is currently undergoing a major facility expansion to increase the crude capacity from 10,000 to 30,000 barrels per day (BPD). To support the expansion, changes are required in the wastewater treatment plant (WWTP) to increase capacity and address several issues with the current design and operations. This report provides a summary of the proposed upgrades for implementation.

1.1 Existing Wastewater Treatment System

The existing wastewater system is shown in **Figure 1-1** and consists of the following treatment steps:

1. **Upper Collection Box.** The Upper Collection Box (UCB) is an API separator that receives process and stormwater sources from the refinery and provides three phase gravimetric separation of heavy solids, water and oil. Solids collected in the bottom of the box is periodically (approximately once per week) removed by a vacuum truck and disposed of as a hazardous waste. The oil is skimmed and pumped to the Slop Oil Tank. The water phase is transferred using Moyno pumps to the Equalization Tank (Tank 145). The UCB tank level is monitored and controlled at a setpoint using variable frequency drives (VFD) that operate the Moyno pumps. A diesel driven pump is periodically used during high flow stormwater events to transfer water from the UCB to Tank 145. Sulfuric acid can be added to the UCB to control pH if necessary via a slip stream recirculation loop.

2. **Equalization Tank (Tank 145).** The Equalization Tank (EQ) is a floating roof tank that collects all process and stormwater prior to treatment and discharge. The tank is equipped with an oil skimmer that removes free oil that separates in the tank. The skimmed oil is pumped to the Slop Oil Tank. Effluent from the tank flows by gravity through a flow control valve to the Aeration/Biotreatment Tank. The tank level is maintained at a low-level setpoint automatically by the control valve in order to maintain sufficient storage in the event of a storm event or process water spill. As a result, the flow rate to the downstream treatment facility is not constant but instead varies as the flow into the EQ Tank changes. A new EQ Tank (Tank 143) is currently being installed that will increase the storage capacity while adding redundancy.

3. **Aeration/Biotreatment Tank (Tank 146).** The Aeration/Biotreatment Tank is an open top tank that is equipped with a course bubble diffuser in the center section of the tank. Air is delivered to a common air header that supplies the diffuser using a 35 HP positive displacement blower. Influent enters the tank at the center by gravity flow from the EQ Tank and discharges via an overflow weir on the inside perimeter of the tank. Carbon dioxide is sometimes used to neutralize the pH in the tank by adding it to the air header. Treated overflow is discharged by gravity to the Blue and Yellow Dissolved Air Flotation (DAF) Units for further treatment.

4. **Blue and Yellow DAFS.** The Blue and Yellow DAFs are used to remove dissolved solids and remaining oil from the Aeration/Biotreatment Tank discharge. Each unit is rated for 250 gpm and together they can be operated either in series or parallel. The DAF float overflows to the DAF Float Collection Box where it is combined with DAF sludge underflow and pumped to the

DAF Slop Tank (Tank 149) where it is drummed and disposed of off-site as a hazardous waste. The effluent discharges by gravity to the Lower Collection Box (LCB) where it is pumped to the Final Aeration Tank prior to discharge to the POTW.

5. **Final Aeration Tank (Tank 147).** The final Aeration Tank is a 16-foot diameter by 32-foot tall cone bottomed pressure tank. Water enters the top of the tank and discharges from the bottom. Air is injected into the tank to help oxidize residual sulfide. In addition, hydrogen peroxide can also be added to destroy sulfide if necessary. The treated effluent is discharged to the City of Great Falls, MT publically owned treatment works (POTW).

1.2 Project Objectives

The current wastewater system pretreats the refinery wastewater prior to discharge to the City of Great Falls POTW less than one mile away. The refinery has a pretreatment permit, #13-01. The refinery generally complies with the permit conditions which are principally to achieve effluent of <100 mg/L each for Oil & Grease (O&G) and Ammonia (derived from USEPA Federal Categorical pretreatment limits for refineries), as well as some limits on hydrogen sulfide and metals. The pretreatment permit requires immediate notification for spills and upsets followed by written reports on cause and control.

While Calumet complies with the requirements of the permit, there are several objectives that will be addressed by the new wastewater treatment system. They are:

- **Increased Flow Capacity.** The refinery expansion will increase its potential average dry weather flow from a little more than 100 gpm (dry weather) to about 290 gpm and higher flows during wet weather conditions. The permit limits discharge to 350,000 gallons per day (243 gpm). Consequently, a permit change to increase the discharge capacity will need to be requested.

- **Removal of Emulsified Oil.** The refinery relies on the Upper Collection Box and the EQ Tank (Tank 145) as oil water separators. Calumet is installing an additional EQ Tank, Tank 143, next to Tank 145 to provide additional oils separation and surge/spill capacity. These units remove free phase oil but do not remove emulsions. The refinery will require a method of removing emulsified oil as part of the expansion to better comply with oil and grease discharge limits.

- **Treat Chemical Spills.** The refinery occasionally experiences sudden increases in sulfide concentration and pH due to inadvertent spills of water from the Sodium Hydrosulfide (NaHS) unit and caustic tanks. The NaHS water contains sodium bisulfide, which dissociates to sulfide (S^{-2}) at higher pH's and to hydrogen sulfide (H_2S) at lower pH's. A means for reliably destroying and adjusting the pH prior to discharge will be addressed by the upgraded treatment facility.

- **Metals and Selenium.** The refinery has some elevated copper and selenium in its effluent. While it is unclear about the origin of these metals, the new facility will be designed with improved solids separation and some flexibility to address these issues. The refinery operates two non-chromium cooling towers in addition to a number of fin fans to provide process cooling. The design will enable pH adjustment for the treatment of metals that may be found in the future to require treatment below maximum allowed quantities in the permit. The optimum pH range is between 8 and 9, with the higher pH providing better removal of metals.

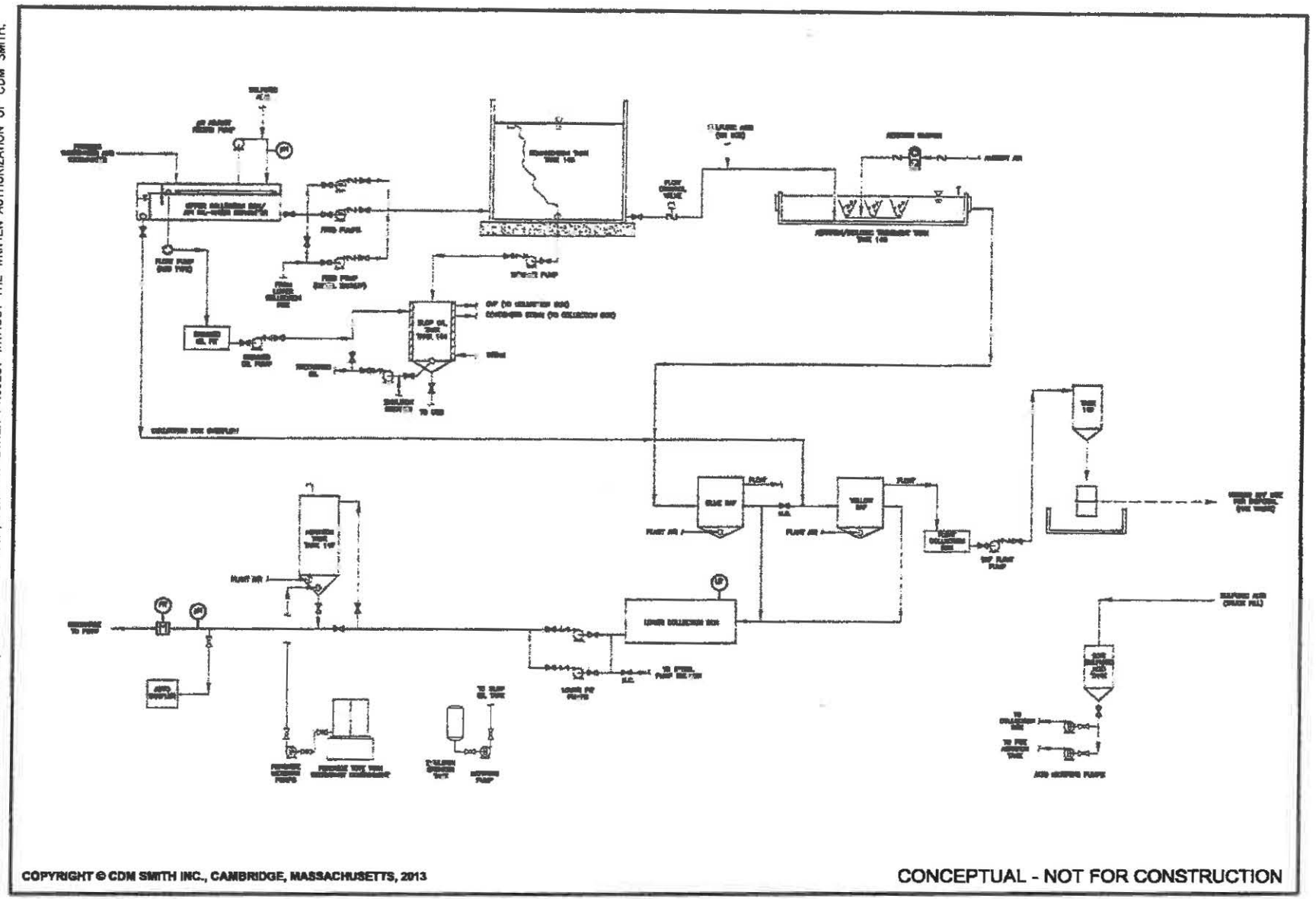

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Figure No 1-1
PROCESS FLOW DIAGRAM - EXISTING WWTP
APRIL 2015

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Section 2

Basis of Design

This section describes the design basis for the proposed improvements to the existing wastewater treatment system in conjunction with the Calumet Great Falls Refinery expansion.

2.1 Design Flows

The design flow basis is summarized in **Table 2-1**. As noted, flow information was either provided by Calumet or estimated where specific data was not available.

Table 2-1
Design Flows

Source	Units	Existing Average Annual Flow	Future Average Annual Flow	Comments
Process Sources				
Desalter	gpm	19.0	56.9	5% to 7% of Plant Capacity.
Poly/Gas Plant	gpm	8.3	8.3	Calumet Data
Reformer	gpm	1.1	3.2	Calumet Data
Treating	gpm	3.5	10.5	Calumet Data
Tank Farm/Product Loading	gpm	0.9	2.8	Calumet Data
Isomerization	gpm	3.9	11.7	Calumet Data
Sodium Hydrosulfide	gpm	3.3	9.8	Calumet Data
Hydrotreating	gpm	7.8	23.3	Calumet Data
Misc	gpm	0.0	0.0	Calumet Data
Subtotal	gpm	**47.6**	**126.4**	
Other Process Flows				
Area Washdown	gpm	10.0	30.0	Estimate
Seal Water	gpm	10.0	30.0	Estimate
Batch Transfers	gpm	1.7	5.2	Calumet Data
Subtotal	gpm	**21.7**	**65.2**	
Utility Flows				
Cooling Tower Blowdown	gpm	12.0	36.0	Estimate
Boiler Blowdown	gpm	10.0	30.0	Estimate
RO Reject	gpm	10.0	30.0	Estimate
Subtotal	gpm	**32.0**	**96.0**	
Total Dry Weather Flows	gpm	101.4	287.6	
	gpd	145,992	414,100	
	bbl/d	3,476	9,860	
Stormwater				
Stormwater	gpm	16.9	26.1	Based on avg annual precip of 14.7 inch/yr
Total Wet Weather Flows	gpm	118.3	314	
	gpd	170,343	451,613	
	bbl/d	4,056	10,753	

As shown, the average daily flow during the wet season will increase from approximately 118 gpm to 314 gpm. Based on input from Calumet, a WWTP design flow of 500 gpm was selected for this upgrade since the extra capacity of nearly 200 gpm will be needed to treat stormwater produced and contained on the plant site (described below) during high flow storm events.

2.1.1 Process and Utility Flows

Process water streams are generated from a variety of process operations within the refinery. A majority of the stream flows were derived from yearly operations data provided by Calumet, which are identified in the table above.

Utility flows and some process flows were estimated with feedback from Calumet because operating data was not immediately available. These flows included mostly plant wash down, pump seal water and utility blowdown streams. For most streams, it was assumed that flows would triple along with the plant expansion capacity, unless noted otherwise in the above table.

2.1.2 Stormwater

Stormwater flows for the expanded refinery footprint were evaluated in five separate areas by an outside consultant; these areas are listed in **Table 2-2.** Areas 1 through 4 are areas consisting of tank farms and other bermed areas that collect and hold contaminated wastewater. These areas will collect and temporarily store stormwater after a rain event. When WWTP capacity allows, the contained water will be released to the process sewer for treatment and discharge to the POTW. Stormwater from Area 5, on the other hand, is not mitigated by berms or other containment and will instead flow directly to the upper collection box (UCB) during a rain event. As a result, stormwater generated from Area 5 was used to evaluate and determine plant capacity, storage requirements and flows for equipment sizing and selection.

Table 2-2
Stormwater Areas
Calumet Refinery

Stormwater Area	Description	Area ft²	Volume per inch of precipitation gal/inch
1	Tank Farm (Bermed Area)	64,860	40,429
2	Tank Farm (Bermed Area)	40,727	25,386
3	Tank Farm (Bermed Area)	387,552	241,574
4	Tank Farm (Bermed Area)	110,482	68,867
5	Refinery Floor and WWTP	891,728	555,844
Total		1,495,349	932,100

Potential stormwater flows were evaluated based on two perspectives: 1) the total potential stormwater that could be collected during a storm event, and 2) the potential peak discharge rate to the treatment system. Average stormwater flows for the entire site were calculated simply as the average annual precipitation for Great Falls (14.7 inches/year) multiplied by the runoff area of the refinery. Stormwater flow from Area 5 was evaluated using HydroCAD® 9 software modeling. Rainfall data was collected from the National Oceanic and Atmospheric Administration (NOAA) isopluvial maps contained in the Precipitation-Frequency Atlas of the Western United States, Volume I-Montana (NOAA Atlas 2, Volume V, 1974). The results of this stormwater modeling are summarized in **Table 2-3** below, and are included in **Appendix B.**

Table 2-3
Area 5 Stormwater Runoff

Storm Event	Precipitation	Peak Runoff Rate		Total Runoff Volume
	inches	cfs	gpm	gal
1 hr historical record	1.13	N/A	N/A	1,053,273
2 yr/24 hr	1.60	17.06	7,657	759,560
25 yr/24 hr	2.75	30.33	13,613	1,388,453
100 yr/24 hr	3.50	38.91	17,464	1,800,329

1. NOAA Weather Center, Great Falls, MT.
2. NOAA Precipitation Atlas
3. Calculated runoff rates from HydroCAD.

Because of the very high instantaneous runoff rates from Area 5, an extremely large stormwater system would be required for these infrequent events. If stormwater cannot be processed or stored at these very high rates, stormwater in Area 5 could daylight from the manhole near the railroad tracks or back up into the process area. While pooling of stormwater in the process area is not ideal, it is acceptable on an intermittent basis. Water which collects near the railroad tracks may require clean up and soil removal, and should be avoided.

With input from Calumet, it was determined that installation of a new Stormwater Overflow Tank (re-purposed, existing Aeration Tank) and a 4,000 gpm Stormwater Pump in the WWTP area, combined with existing storage, would sufficiently mitigate peak runoff rate surges. An overflow in the Stormwater Tank would allow any excess water entering the WWTP to overflow to the WWTP sump, mitigating the potential for stormwater pooling in the plant area or over-topping the manhole. Water collected in the sump will be pumped back to the WWTP for treatment.

2.2 Influent Quality and Treatment Objectives

The wastewater treatment system improvements were selected using the design basis and anticipated characteristics presented in **Table 2-4**. Wastewater quality is based upon operational data collected by Calumet. Where this data was not available, parameters were estimated from typical refinery wastewater.

Table 2-4
Design Water Quality

Parameter[1]	EQ Tank Effluent	Maximum Daily Limit to POTW
Flow, GPD	720,000 [2]	350,000 [3,4]
pH, s.u.	5.5 – 12.5 [5]	5.5 – 12.5 [3]
Total Suspended Solids (TSS)	30 – 50 [6,7]	250 – 300 [8]
Total Dissolved Solids (TDS)	500 – 2,500 [6]	N/A
Chemical Oxygen Demand (COD)	1,000 – 1,250 [6]	N/A
Biochemical Oxygen Demand (BOD_5)	-	250 – 300 [8]
Oil and Grease	100 – 250 [6,9]	100 [3]
Sulfide, Total	10 [6,10]	3,608 [3]
Ammonia	100 [6]	100 [3]
Benzene	2.242 [11]	0.5 [12]
Ethylbenzene	0.818 [11]	N/A
Toluene	6.820 [11]	N/A
Total Xylenes	4.233 [11]	N/A

Table 2-4
Design Water Quality

Parameter[1]	EQ Tank Effluent	Maximum Daily Limit to POTW
Arsenic, Total	-	1.57 [3]
Cadmium, Total	-	3.51 [3]
Chromium, III	-	0.57 [3]
Chromium, VI	-	0.04 [3]
Chromium, Total		5.92[3]
Copper, Total	-	Monitor Twice Annually[13]
Lead, Total	-	0.14 [3]
Mercury, Total	-	0.02 [3]
Nickel, Total	-	0.59 [3]
Silver, Total	-	0.62 [3]
Selenium, Total	-	0.2540 lbs/day [3] (0,0423 mg/L @ 500 gpm)
Zinc, Total	-	2.13 [3]

1. All units mg/L except as noted.
2. Based on new maximum flow of 500 gpm, will require permit amendment.
3. Source: City of Great Falls, MT Wastewater Discharge Permit #13-01, issued 12/23/13. Mass limits not expected to change with increased flow limit.
4. Flow limit based on historical data and existing refinery treatment plant capacity.
5. Acid is currently added upstream at Upper Collection Box to comply with permit limits.
6. Based on CDM Smith experience at other refineries with similar crudes and with similar vendor equipment.
7. Upstream solids removal expected at Upper Collection Box and Eq Tank.
8. Typical pretreatment limit that may be required in the future.
9. EQ Tank 145 effluent oil and grease is highly dependent on effectiveness of Upper Collection Box and the EQ Tank to remove free phase oil at increased flow rates.
10. Sulfide content may be higher due to influence of NHS.
11. Maximum concentration detected during 2013 in effluent to POTW as reported by Calumet.
12. Recommended regulatory action level.
13. City of Great Falls is reviewing POTW allocation.

2.3 Process Upsets

Process upset conditions occasionally occur due to spills of sodium hydrosulfide (NaHS) and spent caustic. Based on past operational experience, a spill of either chemical can occur as follows:

- Maximum of 1,000 gallons NaHS, 45% by weight
- Maximum of 1,000 gallons Caustic, 50% by weight

Spilled NaHS or caustic flow to the WWTP through local process drains and are currently detected by an elevated pH spike in the UCB.

2.4 Other Design Assumptions

The following are other major design assumptions used in the preparation of the conceptual design:

- Process water will flow to the existing Upper Collection Box (UCB). Water will be processed at a rate of up to 500 gpm through the UCB; process and stormwater in excess of this rate will be diverted to the Stormwater Overflow Tank.
- Process equipment will be suitable for service in a Class I/Division II hazardous environment, except for select equipment such as the aeration blower and polymer make-down system.

- The aeration blower will be located in an unclassified (non-hazardous) area by installing the unit on an elevated platform, similar to the existing aeration blower.
- The polymer make-down system will be located on the elevated berm above the WWTP area, outside of the classified area.

Section 3

Wastewater Treatment Plant Upgrades

This section provides an overview of the process upgrades and a description of the process operation and controls for each new major component added as part of the plant improvements.

3.1 Summary of Plant Upgrades

Upgrades to the existing WWTP include the following:

- One (1) new Upper Collection Box Effluent Pump
- One (1) Stormwater Overflow Tank (re-purposed Aeration Tank) with Oil Skimmer and Pump, and one (1) new Stormwater Pump
- One (1) new Equalization Tank (Tank 143) with Oil Skimmer and Pump.
- Relocation of the existing Slop Oil Tank and installation of one (1) new Slop Oil Tank
- Two (2) new Equalization Tank Effluent Pumps
- One (1) new DAF Pretreatment Mix Tank
- One (1) new DAF system, including air supply, (1) DAF Float Pump, one (1) DAF Effluent Mix Tank, and one (1) DAF Decant Storage Tank
- Two (2) new Course Bubble Diffuser grids and One (1) Blower to service the Aeration/Biotreatment Tank (Tank 146)
- Five (5) new chemical feed systems, including:
  - Hydrogen Peroxide: (1) bulk storage tank and (2) metering pumps
  - Sulfuric Acid: (1) bulk storage tank and (2) metering pumps
  - Ferric Chloride: (1) bulk storage tank and (2) metering pumps
  - Sodium Hydroxide: (2) metering pumps (tote feed tank provided by chemical vendor)
  - Polymeric Flocculant: (1) automated polymer make-down system, storage tank and duplex metering pumps
- Two (2) new upgraded whitewater systems (aeration) for the existing Blue and Yellow DAF units
- Miscellaneous new ancillary facilities, including piping, valves, instrumentation, etc.

3.2 Process Description

This section provides a description of the plant upgrades, including a discussion of the operations and controls. **Figure 3-1** shows the revised Process Flow Diagram (PFD) and highlights the major upgrades

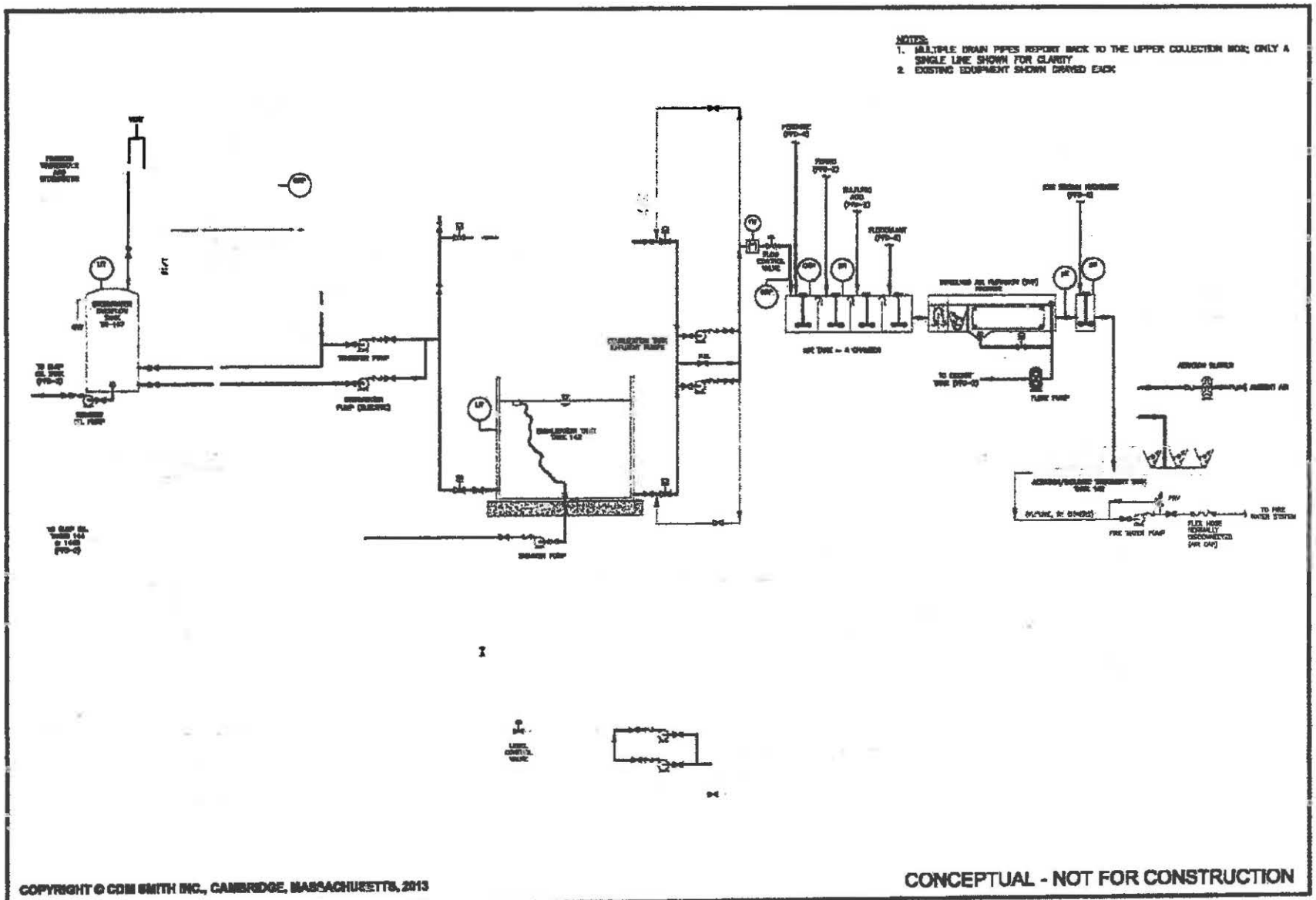

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Figure No. 3-1
PROCESS FLOW DIAGRAM - FUTURE WWTP
APRIL 2015

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to the existing WWTP. Additional drawings, including the PFD, a General Arrangement Drawing and detailed Equipment List are included in **Appendix A.**

3.2.1 Upper Collection Box

The UCB is an in-ground API separator and is the first treatment step in the WWTP. The UCB receives process and contaminated stormwater streams by gravity from the refinery via the underground process sewer system. The UCB is designed to provide initial oil/water separation and solids/grit settling. The separated oil layer is pumped to the Slop Oil tank and the settled sludge is periodically removed by a vacuum truck and disposed of as hazardous waste. The resulting process wastewater stream is transferred to the downstream Equalization Tank (Tank 145) using two Moyno pumps (one duty, one standby). The pumps operate on VFD's in order to maintain a steady tank level.

Occasionally, the UCB also receives decanted water from the existing Slop Oil Tank and off-spec effluent that is recycled back to the front of the WWTP. Plant spills may also be routed to the UCB via the sewer system. A pH probe in the slip stream neutralization system at the UCB is used to determine when a plant spill may have occurred. A plant spill is usually indicated by a very high pH (above 11) which may occur from either sodium hydrosulfide (NaHS) or sodium hydroxide (NaOH). When the pH is high, sulfuric acid is added to the slip stream neutralization system to bring the pH down to neutral levels.

During high stormwater events, the level in the UCB increases to a point where the Moyno pumps cannot maintain tank level. When this occurs, an operator starts the existing diesel pump to transfer water to the EQ Tank at a much higher rate. When this can't keep up, a manual valve is opened by an operator to allow gravity discharge directly to the Blue and Yellow DAFs for treatment prior to POTW discharge. In this case, the EQ Tank is bypassed. While not ideal, this is currently the only means of managing excess water generated in the refinery due to high flow events.

Plant upgrades to the UCB system are designed to address several issues and objectives, including 1) increasing treatment plant flow, 2) enhancing the ability to detect and manage treatment of chemical spills, 3) significantly reduce or eliminate the need to bypass the EQ Tank during high flow events and 4) allow the UCB to be taken out of service for maintenance without shutting down plant operations. Plant upgrades consist of the following new equipment and controls:

- **ORP Probe.** A new Oxidation-Reduction Potential (ORP) probe will be added next the existing pH probe in the slip stream neutralization system to detect NaHS spills. Because sulfide compounds are very reducing, high concentrations of sulfide in the water will cause the ORP to show a lower reading than normal. When a low-ORP setpoint is reached, an alarm will notify the operator that a NaHS spill has or is occurring. If detected early enough, it is anticipated that the volume of a spill can be minimized by notifying an operator in the plant to take action.

- **pH Monitoring/Neutralization System.** The existing neutralization system will be kept in place but disabled. However, the existing pH probe in the slip stream neutralization system will continue to be used to detect pH excursions, indicating a spill. By knowing both the ORP and pH of the water in the UCB, the operator will be able to determine whether the spill was from caustic or NaHS and allow the appropriate action to be taken. For example, if the pH increases above 11 and the ORP remains at near normal levels, then the spill is likely due to caustic. If however, the pH increases and the ORP probe dramatically decreases, then the spill is likely due to NaHS. If necessary, a final confirmation can be made by taking a sample and analyzing it for sulfide.

- **Stormwater Capture System.** A new Stormwater Overflow Tank (the existing Aeration Tank, relocated and re-purposed), Stormwater Pump, and Transfer Pump will be installed to capture flows above 500 gpm to system. The Stormwater Overflow Tank will be approximately 14' diameter by 30' tall and have a capacity of about 800 bbl. The Stormwater Pump has a capacity of approximately 4,000 gpm at 37 psig. The Transfer Pump has a capacity of 500 gpm. The tank and pumps will be located in the area below the UCB which will allow gravity flow into the tank; a goose-neck in the pipe will direct flow to the UCB in favor of the Stormwater Overflow Tank under normal operating conditions. Normally, at flows below about 500 gpm, influent water will to be discharged into the UCB for normal oil/water separation and transfer to the EQ Tank. If the UCB is removed from service, or high flows from stormwater are experienced, water will back up in the inlet piping and be diverted to the Stormwater Tank.

  When the water level in the Stormwater Overflow Tank reaches a mid-point depth, first the transfer pump will start, and then the Stormwater Pump will start (if needed based on high flows) and transfer water to the EQ Tank along with flow from the Moyno pumps. The Stormwater Pump will be operated in an effort to maintain the Stormwater Overflow Tank level at a mid-point. The Moyno pumps will continue to operate to process water through the UCB. As influent flows subside, the Stormwater Tank will receive less water until eventually all flow is routed back to the UCB to regain "normal" operations.

  An overflow in the Stormwater Tank will be set below the level of the upstream manhole feeding the WWTP, such that if flows exceed the total capacity of the Stormwater and UCB pumping systems, water will flow from the Stormwater Tank Overflow to the area sump. Water in the sump is transferred back to the UCB.

3.2.2 Equalization Tanks and Effluent Pumps

The existing Equalization Tank (EQ) is a floating roof tank that acts both as an oil/water separator and water storage tank. Currently, the tank discharges by gravity through a control valve into the Aeration/Biotreatment Tank (Tank 146). The EQ tank level is maintained at a low level setpoint by adjusting the flow through the control valve. A new EQ Tank (Tank 143) is currently being installed to increase storage capacity and provide redundancy. The major tank dimensions and capacities are shown in Table 3-1.

Table 3-1
EQ Tank Dimensions

Description	Safe Working Capacity bbl	Tank Diameter feet	Side Shell Height feet	Min Operating Level feet	Max Operating Level feet
Tank 145	33,100	80	42	4	38
Tank 143	16,700	48	59	4	54
Total	49,800	-	-	-	-

Plant upgrades to the EQ Tank system are designed to address several issues and objectives, including: 1) providing steady flow to the new DAF system, 2) providing better equalization of feed sources (including spills) which will produce a more uniform water quality to the treatment system, resulting in better plant performance, 3) provide surge capacity to capture large stormwater events and 4) allow either tank to be removed from service for maintenance without shutting down plant operations.

Plant upgrades consist of the following new equipment and controls:

- **New EQ Tank.** Calumet is in the process of installing a second EQ Tank. The tank will add an additional storage capacity of 16,700 bbl to the existing tank which has a capacity of 33,100 bbl. Once installed, CDM Smith proposes that the new tank (Tank 143) become the primary operational tank and the existing tank (Tank 145) be used as surge capacity during a high flow stormwater event. The storage capacity of 33,100 bbl in Tank 145 is approximately equal to the volume that would be generated from runoff in the refinery process area (excluding tank farms) during a 25 year/24 hour storm event.

- **Oil Skimmer and Pump.** The new Oil Skimmer and Oil Pump will be installed in the new EQ Tank. Oil collected in this tank will be diverted to the Slop Oil Tanks. The Oil Skimmer and Pump will be approximately the same as in Tank 145.

- **EQ Tank Actuated Valves.** New actuated valves (open/close) will be installed at the inlet and outlet of both Tanks 145 and 143 to allow automatic control of tank filling and draining operations. Automated operation is desirable to prevent inadvertently overfilling the shorter tank (and "floating the roof off") and to maximize the benefits of the increased storage and flow equalization without requiring operators to manually open/close valves at the tanks.

- **Effluent Pumps/Flow Control.** Two new centrifugal pumps (one duty, one standby) will be installed and be used to transfer water to the DAF system. Each pump will be rated for 500 gpm at 15 psig. In addition, a new magnetic flowmeter will be installed in the effluent pipe. The flow rate to the DAF system will be controlled at a fixed flow setpoint using a feedback control loop between the existing actuated valve and the new flowmeter.

The EQ Tank control system will be designed to allow one or both tanks to be selected by the operator as "operational" tanks. If both tanks are selected as operational tanks, both inlet and outlet valves on each tank will be open under normal conditions. If only one tank is selected as operations, the inlet and outlet valves on the operational tank will be open and the inlet and outlet valves on the standby tank will be closed.

The actuated valves will be configured so that the two tanks can be equalized with one another by opening the inlet valves; however, there will be check valves on the outlet side so that the tanks cannot be equalized from that end. This will allow Calumet to simplify DCS programming and add the flexibility to feed the DAF system from both tanks simultaneously without overflowing the shorter tank. A high-high level alarm on each tank will automatically close the inlet valve to that tank to prevent overfilling. A low-low level alarm on each tank will result in one of two actions depending on water supply: 1) if the low-low level alarm is active on both tanks, the effluent pump will shut-off or 2) if there is water in one of the tanks, the DCS could be programmed to automatically switch to the tank with water.

Under normal operations, CDM Smith suggests that Tank 143 be the operational tank. In this scenario, the actuated valve at both the inlet and outlet of this tank will be open while the actuated valves on Tank 145 will normally be closed. The operator will input the flow setpoint to the DAF system and the control valve in the discharge of the effluent pump will modulate to maintain the flow setpoint. The level in Tank 143 will be maintained near its midpoint to allow both flow and water quality equalization. Tank 145 would be left empty. As the influent flow to Tank 143 decreases to a low level setpoint, the control system (DCS) will automatically lower the flow setpoint (in step increments) to

the DAF. Similarly, if the influent flow to Tank 143 increases to a high level setpoint, the DSC system will automatically increase the flow setpoint to the DAF system. If Tank 143 reaches a high-high level, the inlet valve to Tank 143 will close and the valve to Tank 145 will open. This flow control scheme which maintains a steady flow rate will significantly improve downstream plant performance.

3.2.3 Dissolved Air Flotation System

The new DAF system will be installed between the EQ Tanks and the Aeration/Biotreatment Tank and consist of: 1) a four-chamber mix tank, 2) dissolved air flotation unit, and 3) DAF Float Collection Sump. The EQ Tank Effluent Pumps will deliver water to the mix tank at a steady flow rate.

The mix tank will be an open top, rectangular tank with four separate mixing chambers. Each chamber will have a center mount mixer. The first chamber will provide approximately 10 minutes of reaction time at full flow (500 gpm) for destruction of sulfide with hydrogen peroxide. The second chamber will serve as a rapid mix chamber for coagulation using ferric chloride having a residence time of 2.5 minutes. The third chamber will provide 10 minutes of residence time for pH adjustment using sulfuric acid. The last chamber is a slow mix tank with 5 minutes of residence time for flocculation using a polymer flocculant.

Hydrogen peroxide will be injected into the first mix tank. Two ORP probes will monitor the presence of hydrogen sulfide. The first ORP probe will be located upstream of the chemical injection point and the second will be located in the first mixed chamber. The dose of hydrogen peroxide will be automatically controlled by the ORP probe in the first mix chamber to achieve the desired ORP setpoint. Most of the time, the dosage will be very low or zero. Following a chemical spill of NaHS, the peroxide dosage will be much higher. Assuming a 1,000 gallon spill of 45% NaHS, it is estimated that approximately 4,300 gallons of 35% peroxide would be required to completely convert sulfide to sulfate. This calculation assumes a 20% excess.

Ferric chloride will be added to the second rapid mix chamber at the desired flow-proportioned dosage to help destabilize particles and emulsified oil and grease. The ferric chloride will also aid in the removal of selenium and other metals. Concentrated sulfuric acid will be added to the third mix chamber to automatically adjust the pH to the desired pH setpoint using a pH probe and feedback control loop. The last step is to add a polymer flocculant to condition the floc prior to entering the dissolved air unit.

Pressurized air is added to a recirculated effluent slip stream on the DAF unit via an educator loop on the recycle pump. The aerated slip stream mixes with the incoming wastewater in a contact chamber, releasing dissolved air bubbles. The chemical addition and release of fine bubbles facilitate the removal of remaining free phase oil and chemically and mechanically emulsified oil. Most of the suspended solids will also be removed. Oil and other contaminants adhere to the bubbles and float to the top of the tank, forming a floating bed of material. Float material will be removed by a chain and flight skimmer which pushes the float up a beach and into a float hopper. The float will then be routed via gravity to the DAF Float Collection Sump where it will be pumped to a new Decant Tank (discussed later).

The DAF also features a full length screw auger to remove settled solids. These solids will periodically gravity-flow to the DAF Float Collection Sump using an actuated valve. DAF manufacturers typically recommend flushing the settled solids for about 5 seconds every four hours to prevent compaction of the settled solids which over time could damage the auger. Treated wastewater will flow by gravity to

an effluent mix tank for final pH adjustment with sodium hydroxide, if needed. Treated wastewater will flow by gravity from the mix tank to the Aeration/Biotreatment Tank (Tank 146).

3.2.4 Aeration/Biotreatment Tank

The existing Aeration/Biotreatment Tank (Tank 146) is an open top tank, 92' in diameter by 10' tall and has a working capacity of about 10,000 bbl. The tank is equipped with a course bubble diffuser in the center section of the tank only. Air is delivered to a common air header that supplies the diffuser using a 35 HP blower that has a capacity of 456 standard cubic feet per minute (SCFM). Influent enters the tank at the center and discharges via an overflow weir on the inside perimeter of the tank.

Plant upgrades to the Aeration/Biotreatment Tank are designed to address several issues and objectives, including: 1) solids settling and accumulation at the outer edges of the tank, 2) minimize the potential for short-circuiting of water through the tank, 3) remove residual hydrogen sulfide that may be present and 4) improve the reliability of meeting effluent limits for oil/grease and BOD and 5) provide supplemental fire water to the refinery.

DAF effluent will flow by gravity to the center of the existing Aeration/Biotreatment Tank by gravity through a new flanged inlet. The tank will be upgraded by adding a two new course bubble diffusers to the outer ring of the tank while leaving the existing diffuser in place. The existing diffuser will be upgraded with an additional 22 diffusers. The new diffuser grids will be attached to the tank bottom. Air will be provided by adding a new blower. The existing blower will remain in place as a backup. The new blower is 100 HP and rated for about 1,600 SCFM. The blower and diffuser will provide full-tank mixing thus preventing solids from settling and water from short-circuiting. The aeration rate is designed to remove approximately 10 mg/L of sulfide and 100 mg/L of BOD at the average flow rate. Effluent from the Aeration/Biotreatment Tank will flow by gravity to the Blue and Yellow DAFs.

A new Fire Water Pump will be added to pump water from the Aeration/Biotreatment Tank to the fire water system. This upgrade will be designed and implemented as part of the refinery fire system

3.2.5 Slop Oil Tank

A new Slop Oil Tank will be installed to collect and store skimmed oil from the UCB and the EQ Tanks. The new tank will be designed to be similar to the existing tank but with a larger capacity of 570 bbl; however, the tank height will be kept the same. The tank will be cone-bottom, insulated and equipped with a mixer, recirculation/discharge pump and steam heating. Decant water will be routed to the UCB by gravity and the oil will be pumped to the existing product tank.

3.2.6 Decant Tank

A new Decant Tank will be used to collect and store float and settled sludge material removed from the DAF unit. The tank is sized to hold 570 bbls. For purposes of our cost estimate, we have assumed that this tank will be identical to the new Slop Oil Tank, with a cone-bottom, mixer, pump and steam heating. Currently, we assume that the decant water will be routed to the UCB by gravity and any remaining residue will be put in drums and hauled off-site for disposal. However, we also recommend pilot testing to determine a more efficient and cost-effective approach to managing and disposing of this sludge. Options may include installing a new centrifuge, a rotary vacuum filter, a recessed plate filter press or other alternative.

3.2.7 Chemical Feed Systems

Five new chemical feed systems will be added as part of the plant upgrades. A brief description of each system is as follows:

3.2.7.1 Hydrogen Peroxide

A new bulk storage and feed system will be installed for hydrogen peroxide. The primary use of this chemical is for oxidation of hydrogen sulfide ahead of the new DAF. The feed system consists of a 6,600 gallon double-walled plastic storage tank with fill connection and ladder, a duplex metering pump skid (one duty, one standby) with enclosure and associated tank level and metering pump controls. The peroxide tank is suitable for receiving either 35% or 50% strength solution in full truck load quantities. The tank does not require insulation or heat tracing due to the low freezing point of this chemical.

3.2.7.2 Sulfuric Acid

A new bulk storage and feed system will be installed for sulfuric acid. The system is essentially the same setup as the peroxide system. The primary use of this chemical is for pH control ahead of the new DAF. The feed system consists of a 4,400 gallon double-walled plastic storage tank with fill connection and ladder, a duplex metering pump skid (one duty, one standby) with enclosure and associated tank level and metering pump controls. The sulfuric acid tank is suitable for receiving 93% to 98% strength solution in full truck load quantities. The tank does not require insulation or heat tracing due to the low freezing point of this chemical.

3.2.7.3 Ferric Chloride

A new bulk storage and feed system will be installed for ferric chloride. The primary use of this chemical is for coagulation ahead of the new DAF. This reagent may also be used for removal of selenium and some metals. The feed system consists of a 5,400 gallon double-walled plastic storage tank with fill connection and ladder, a duplex metering pump skid (one duty, one standby) with enclosure and associated tank level and metering pump controls. The ferric chloride tank is suitable for typical solutions ranging from 38% to 42% strength solution in full truck load quantities. The tank does not require insulation or heat tracing due to the low freezing point of this chemical.

3.2.7.4 Sodium Hydroxide

A new feed system will be installed for sodium hydroxide. The primary use of this chemical is for pH adjustment before entering the Aeration/Biotreatment Tank. The feed system will consist of a storage tote with secondary containment, a duplex metering pump skid (one duty, one standby) with enclosure and associated metering pump controls. The sodium hydroxide will be supplied as a 25% solution in tote quantities and replaced by the vendor when empty. The tank will likely require a small tank heating pad and/or immersion heater in the winter to prevent freezing at below zero conditions.

3.2.7.5 Polymer Flocculant

A polymer make-down and feed system will be installed adjacent to the DAF unit. The primary use of this system is to provide flocculation ahead of the DAF unit to improve DAF performance. The polymer make-down system includes a package unit with all instrumentation and controls include that will automatically dilute the liquid polymer feed chemical with water and provide the necessary activation energy to make the dilute polymer solution ready for use. The automated feed system will require a drum of liquid polymer and potable water connection. A small heated enclosure will be required for this system.

Section 4
Implementation

4.1 Demolition

In order to implement the WWTP expansion and upgrades, some existing equipment will need to be demolished and removed. In addition, the implementation of the process upgrades will need to be carried out in a way that allows for the continuous operation of the wastewater treatment plant. Equipment that must be demolished includes the following:

- Portions of the existing 8-inch piping between the feed pumps and the equalization tanks (Tanks 143 and 145) will be replaced with 12-inch piping to allow flows up to 4,000 gpm during high storm events.
- The existing Slop Oil Tank (Tank 144) will be relocated. The equipment pad where this tank currently sits will be demolished.
- The existing Blue and Yellow DAF whitewater systems will be modified to allow for installation of upgraded whitewater system equipment.
- Effluent discharge pumps will be replaced with larger capacity pumps
- The existing Aeration Tank will be re-purposed as the Stormwater Overflow Tank. This tank will be relocated.
- Miscellaneous small scale demolition will likely be necessary during the construction.

4.2 Equipment Installation

Although the overall facility improvements and their functions were discussed in detail above, this section will elaborate on the physical construction activities of the new equipment and their locations. Perhaps the biggest challenge will be to maintain a fully functional treatment plant throughout the construction process. The proposed installation schedule is as follows:

- Install Equalization Tank 143, skimmer, and associated equipment.
- Install piping and actuated valves on Tank 143. Divert flow to Tank 143 and install piping and actuated valves on Tank 145.
- Install the Stormwater Overflow Tank and piping. This tank will be the re-purposed Aeration Tank. Currently this aeration tank serves as a contingency oxidation step for sulfide. Because this is a contingency measure, removing this tank from service is not problematic. The increased equalization and storage capacity added will also mitigate any high sulfide discharges.
- Install new Stormwater Pump and appurtenances.
- Install new transfer pump and appurtenances. . This will allow the UCB to be isolated and the WWTP to process wastewater through the new Stormwater Overflow Tank as needed.

- Install the new Slop Oil Tank and Decant Tank.
- Relocate existing Slop Oil Tank (Tank 144) and divert slop oil to the new Slop Oil Tank as needed.
- Install new bulk chemical systems
- Install new Mix Tank, DAF unit, and supporting equipment
- Install new Aeration Blower.
- Install Aeration Grid in Tank 146 and new feed line from DAF to center of Tank 146. This will require taking Tank 146 out of service. During this time, the DAF effluent will be routed around Tank 146 to the Blue and Yellow DAFs.
- Install upgraded whitewater systems in the B&Y DAF units.

The Stormwater Overflow Tank and Stormwater Pump will be installed first. A portion of the existing 8-inch piping between the UCB and the Tank 143 will be replaced with larger 12-inch piping to allow for the increased stormwater flows. New 12-inch piping will be installed on the existing pipe rack prior to abandoning the existing piping. The WWTP may be shut down temporarily to facilitate the final piping tie-ins, or temporary hoses may be used to maintain plant operation.

Once complete, wastewater will be routed to the stormwater overflow tank and bypass the UCB. This will allow the UCB inlet piping to be modified with installation of the new piping, valving and addition of a new transfer pump on the Stormwater Overflow Tank. When this work is finished, flow will be routed back to the UCB, as per normal operation.

The new Slop Oil Tank (Tank 144B) and Decant Tank will be constructed to receive slop oil from the EQ Tanks and DAF Float Collection Sump (eventually). Once the new Slop Oil Tank is in operation, the existing Slop Oil Tank (Tank 144) will be taken out of service, relocated, and placed back into service.

The bulk chemicals systems will be constructed prior to the DAF system, and are not contingent on other plant construction.

The Mix Tank, DAF unit, and associated equipment will then be installed. However, before this equipment can be brought online, additional equipment must be installed on the EQ Tanks (Tank 143 and 145), including the Equalization Tank Effluent Pumps, actuated valves and associated piping. The new Oil Skimmer Pump will also be installed on Tank 143. Once complete, Tank 143 will be brought online, and flow will bypass Tank 145. This will allow for piping modifications and actuated valve installation on Tank 145. With these modifications complete, the DAF system will be commissioned. Once the DAF system is operating satisfactorily, DAF effluent will temporarily bypass the Aeration/Biotreatment Tank (Tank 146) and will flow directly to the POTW to facilitate modifications to Tank 146.

Tank 146 will be removed from service and drained. The new aeration grids will be installed in the tank. A new influent line will be installed from the DAF unit to the center of the tank. Concurrently, the new Aeration Blower will also be installed on Tank 146. When complete, Tank 146 will be placed back into service.

The final step will be to implement the full scale control scheme, tying the existing controls and the new controls into the DCS at the facility.

4.3 Maintenance/Contingency Operation

At some point during the future operations, it may be necessary to perform unscheduled maintenance on primary treatment equipment. Some primary equipment must be removed from service, and does not have duplex or standby equipment installed due to practical limitations. Such equipment includes:

- Equalization tanks, TK-143 and TK-145
- New primary DAF system
- Existing Aeration/Biotreatment Tank (TK-146)
- Existing Blue and Yellow DAF units.

This section details how the WWTP system operation will be maintained during periods when primary equipment is removed from service without having to declare the need for a bypass due to sufficient design of the systems as described below.

Equalization Tanks

Equalization tanks will be scheduled for maintenance during expected low water demand season, avoiding spring rains, if possible. Either tank can provide sufficient inventory and skimming capabilities to meet permit requirements. Tanks will be required to have mechanical integrity inspections, sludge cleanout and possible other maintenance on the tank's floating roofs. Advantage of having two tanks includes:

- Flexibility to take one out of service and continue to operate.
- Equalization capacity for storm surges and spill containment
- Improved maintenance.

Primary DAF System

If the primary DAF system must be removed from service, the Multi-Chamber Mix Tank, DAF Unit, and the DAF Effluent Mix Tank will be isolated, as these units function as a single operation.

Isolation is accomplished through isolation and bypass valves located at the Multi-Chamber Mix Tank inlet and Effluent Mix Tank effluent. Bypass lines are installed to route water from the Equalization Tanks (TK-143 & 145) to the Aeration/Biotreatment Tank (TK-146).

The primary DAF system (chemical mix tank and DAF) functions to remove emulsified oil and grease, oxidize sulfide, and correct pH excursions if needed. By removing the DAF system from service, the plant will revert to the treatment process historically operated for years. To compensate for the DAF system, the large equalization tanks (49,800 BBLs combined total) upstream of the DAF will allow for storage and mitigation of large fluctuations in flow, pH and NaHS spikes. In fact, at normal conditions, all flow could be stored in the EQ tanks for up to 5 days with not plant discharge.

The existing Aeration/Biotreatment tank will remain in operation to oxidize sulfide. The Aeration/Biotreatment tank will be upgraded with additional aeration grids and a significant increase in aeration blower capacity. This will improve the oxidation performance of the Aeration/Biotreatment Tank.

Overflow from the Aeration/Biotreatment tank will flow to the existing Blue and Yellow DAF units. These units will also have been upgraded with new whitewater system to improve floatation in the units. These units will serve to remove any remaining oil and grease and biosolids in the wastewater, as well as providing additional oxygen for sulfide oxidation.

The overall plant upgrades will allow the WWTP to operate effectively should the primary DAF system need to be removed from service.

Aeration/Biotreatment Tank

The Aeration/Biotreatment Tank serves to promote the biodegradation of BOD, mostly organic hydrocarbons that remain after the previous treatment steps.

The tank may require infrequent maintenance to service the submerged aeration grids or the tank itself. These activities will require draining the tank completely.

With tank offline, Primary DAF effluent will flow directly to the City discharge via installed bypass piping and valving. Given the performance of the new DAF system, wastewater will be in compliance with all permit discharge requirements.

Chemical addition in the mix tank will allow for complete oxidation of sulfide through peroxide addition, as well as pH control. Oil and grease removal in the DAF system will be more than sufficient to achieve permit compliance, and will exceed the treatment performance of the current system.

In addition, the large equalization capacity of the EQ tanks will allow for either complete storage with no discharge, or for very low discharge rates through the DAF system to further improve treatment performance.

Blue & Yellow DAFs

The B&Y DAF units operate in parallel, each with a rated capacity of around 250 gpm. If the units require service, it is most likely that one unit can be removed from service with the other remaining in operation. Any excess flow can be mitigated with the Equalization Tanks.

However, if both the B&Y DAFs systems must be taken offline, treated effluent from the Aeration/Biotreatment Tank will flow directly to discharge, bypassing the B&Y DAFs. This will be accomplished by utilizing the TK-146 discharge line on the bottom of TK-146. This line includes a flow control valve that will regulate the discharge rate from the Aeration/Biotreatment Tank.

In the new configuration of the WWTP, the B&Y DAFs mainly serve to remove biologic, non-hazardous sludge generated by biologic activity in the Aeration/Biotreatment Tank. Oil and grease as well as sulfide will have been fully removed with the upstream processes, prior to wastewater entering the B&Y DAFs. With these B&Y DAF units offline, it is likely that some additional solids loading will be discharged to the City POTW, but no other significant impacts to the discharged effluent will result.

In the event that this must be performed, the City will be provided with advance notice. A surcharge from the city may apply for water discharged under this scenario.

Section 5
Schedule

Implementation of the wastewater system improvement elements described in this BED Report may be phased using the brief approach described in this section. A summary schedule for anticipated project implementation is presented in **Figure 5-1**.

5.1 Phase 1 – Immediate Implementation

Immediate implementation of the WWTP improvements described herein encompasses the following:

- Preliminary engineering and design packages for WWTP upgrades
- Equipment procurement of long-lead WWTP items
- Utility service expansion, if needed

5.2 Phase 2 – Near-term Implementation

For the near-term implementation phase of the WWTP improvements described herein, the following tasks may be conducted:

- Final engineering and design activities
- Permitting (as required)
- Retain construction contractor (if separate from engineering firm)

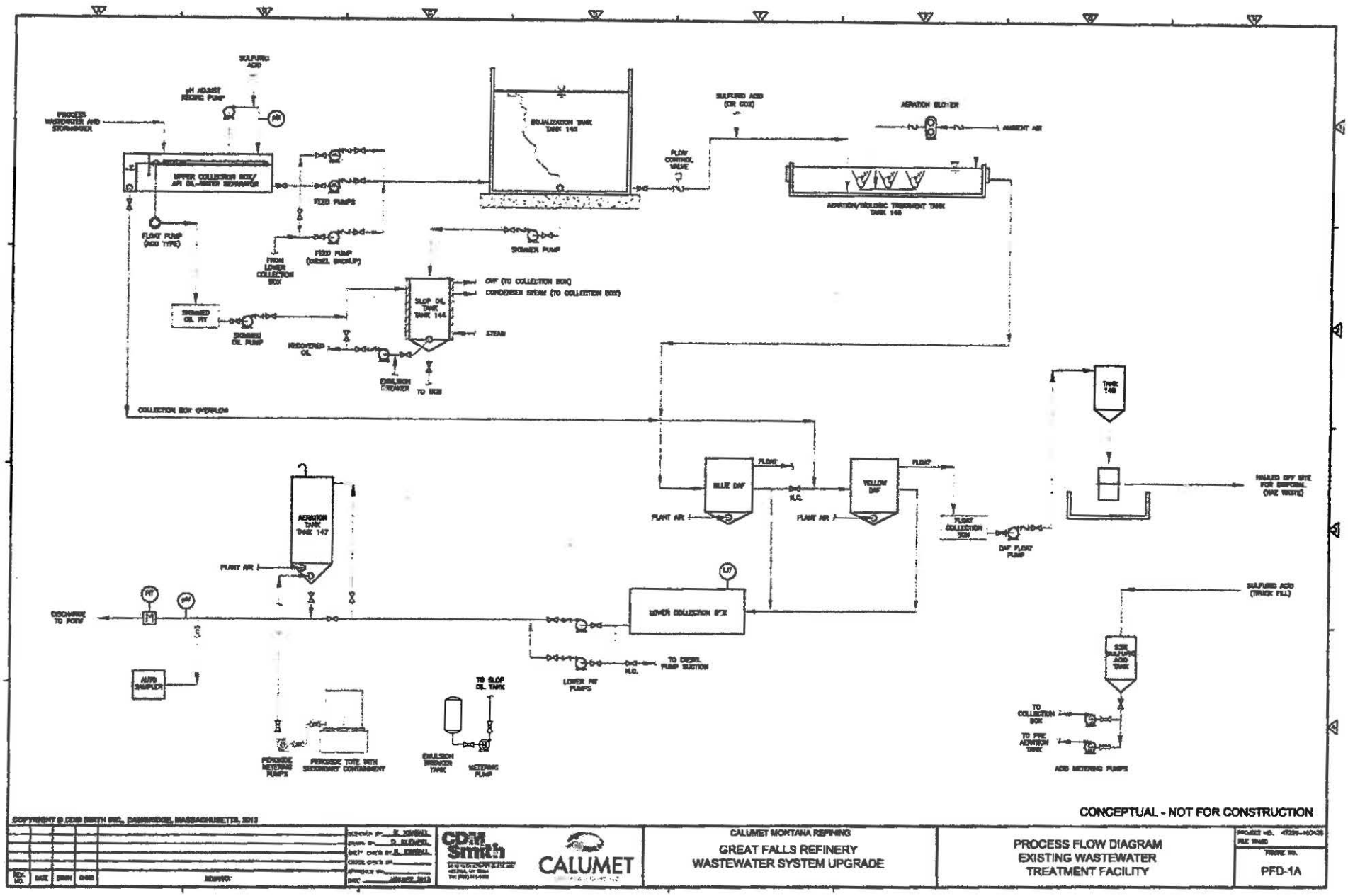
5.3 Phase 3 – Final Completion

To achieve final completion of the WWTP upgrade project, the following scope is necessary:

- WWTP construction and installation
- Existing WWTP demolition activities
- New/existing operator training
- WWTP project upgrade commissioning

Appendix A

Drawings



CONCEPTUAL - NOT FOR CONSTRUCTION

REV. NO.	DATE	DRAWN	CHKD	REMARKS

DESIGNED BY: K. KNIGHT
DRAWN BY: D. BLOCKER
CHECKED BY: K. KNIGHT
CHECKED BY:
APPROVED BY:
DATE: AUGUST 2013

CDM Smith

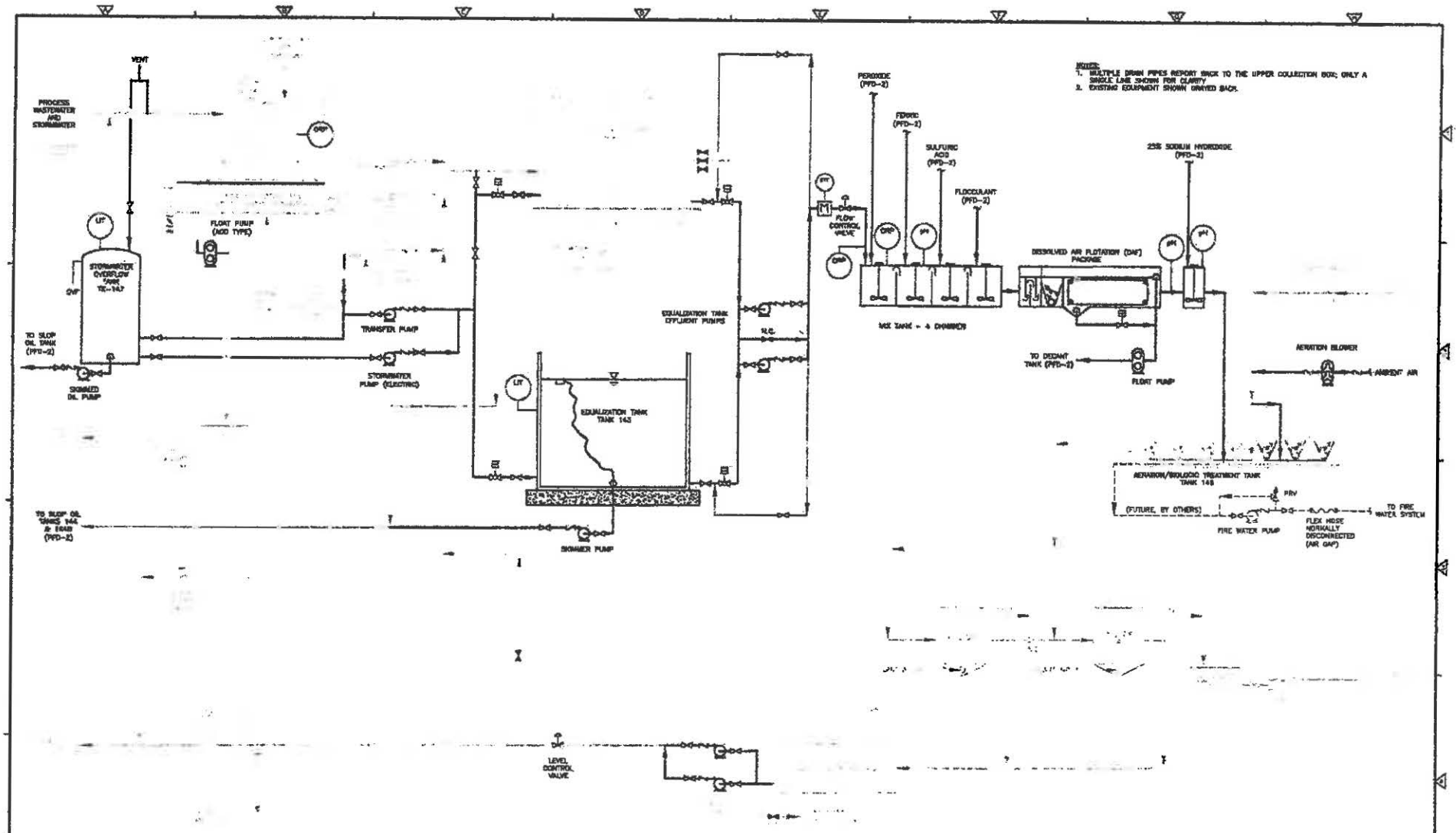
CALUMET

CALUMET MONTANA REFINING
GREAT FALLS REFINERY
WASTEWATER SYSTEM UPGRADE

PROCESS FLOW DIAGRAM
EXISTING WASTEWATER
TREATMENT FACILITY

PROJECT NO. 47209-162426
FILE NAME
FIGURE NO.
PFD-1A

CMR Ex 4:32



CONCEPTUAL - NOT FOR CONSTRUCTION

REV NO.	DATE	DRWN	CHKD	REMARKS

DRAWN BY: K. KIMBALL
CHKD BY: D. KLEVEN
SUBMITTED CHKD BY: K. KIMBALL
APPROVED BY:
DATE: JANUARY 2015

CDM Smith

CALUMET

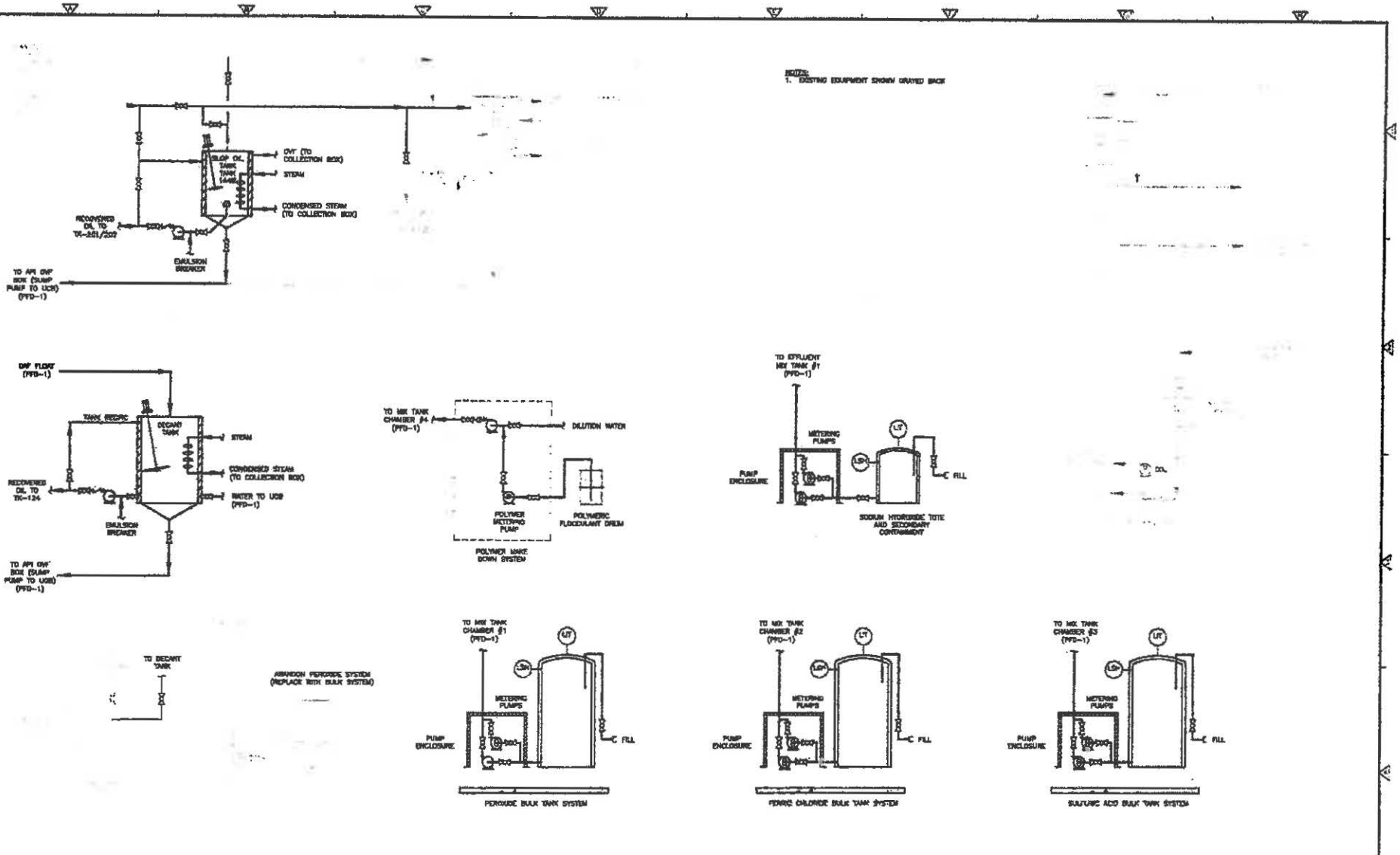
CALUMET MONTANA REFINING
GREAT FALLS REFINERY
WASTEWATER SYSTEM UPGRADE

PROCESS FLOW DIAGRAM
FUTURE WTP
PRIMARY TREATMENT SYSTEM

PROJECT NO. 47384-163436

FIGURE NO.
PFD-1

CMR Ex 4:33



CONCEPTUAL - NOT FOR CONSTRUCTION

REV NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: R. KIMBALL
DRAWN BY: D. KIEMPEL
CHECKED BY: R. KIMBALL
QA/QC CHK'D BY:
APPROVED BY:
DATE: JANUARY 2015

CDM Smith

CALUMET MONTANA REFINING

GREAT FALLS REFINERY
WASTEWATER SYSTEM UPGRADE

PROCESS FLOW DIAGRAM
FUTURE WTP
ANCILLARY SYSTEMS

PROJECT NO. 67239-153-328
FILE NAME:
FIGURE NO.
PFD-2

CMR Ex 4:34

Project #: 103438
Title: Calumet Wastewater Treatment System
Prel. Eng.: B. Kimball

EQUIPMENT LIST

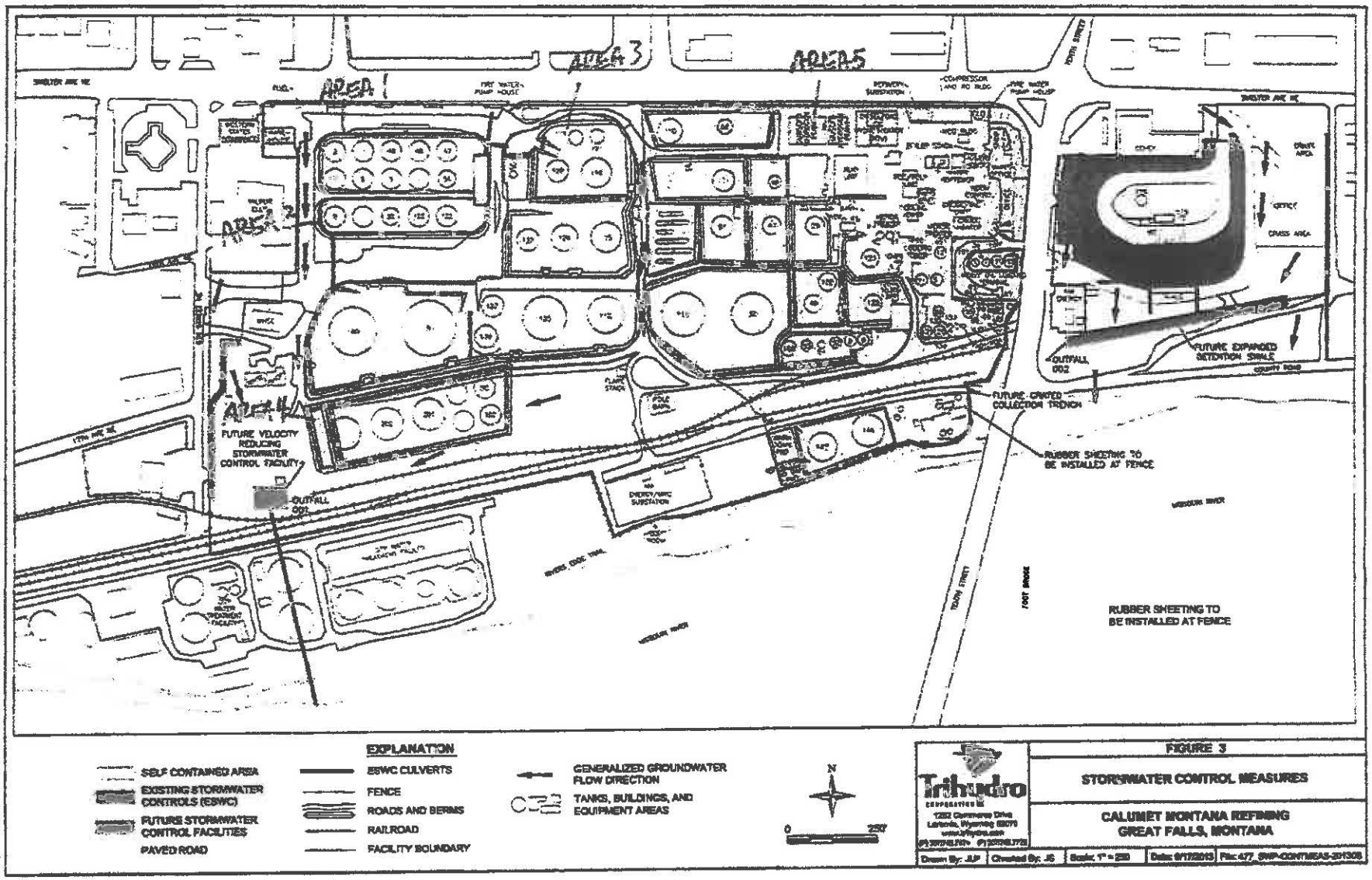
Great Falls Refinery

C	04.09.15	DTK	
B	11.13.14	DTK	
A	04.09.14	JDC	
Rev #:	Date:	Chk By	Appr By

TAG	DESCRIPTION	SHEET NO.	MATERIALS OF CONSTRUCTION	MFR/MODEL #	CAPACITY	ELECTRICAL VAC/PH	ELECTRICAL HP	ELECTRICAL RPM	DESIGNED FLOW	DESIGNED PRESS/HEAD	TEMP.	WEIGHT	PAINT	TRANS. TITLE	REMARKS	MFR.
P-091921	PVF Tank Skimmer Pump	PFD-1	316 SS	1.5-3X8	75 GPM	460/3/60	3	1750	75 GPM	22.6 PSI						Goulds
TK-147	Stormwater Overflow Tank	PFD-1	Carbon Steel	N/A	1,000 BBL	N/A	N/A	N/A	N/A	50 PSI					Existing Aeration Tank relocated/re-purposed	N/A
P-091920	Stormwater Pump (Electric)	PFD-1	Cast Iron + SS Imp	Goulds 3410 10X12-12	4,000 GPM	460/3/60	125	1750	4,000 GPM	38 PSI		5,000 LBS				Goulds
P-091920	Transfer Pump	PFD-1	Ductile Iron + SS Imp	Goulds 3196	500 GPM	460/3/60	15	1750	500 GPM	26.5 PSI						Goulds
TK-143	Equalization Tank	PFD-1	A36 (Welded)	48' dia x 55' H	16,700 BBL	N/A	N/A	N/A	N/A	ATM						BMT
P-091821	Skimmer Pump No. 2	PFD-1	316 SS	Goulds 1X1 5-8	100 GPM	460/3/60	10	3500	100 GPM	66.5 PSI						Goulds
P-091822	Equalization Tank Effluent Pump (No. 1)	PFD-1	Ductile Iron + SS Imp	Goulds 4X6-10H	500 GPM	460/3/60	7.5	1200	500 GPM	15 PSI						Goulds
P-091823	Equalization Tank Effluent Pump (No 2)	PFD-1	Ductile Iron + SS Imp	Goulds 4X6-10H	500 GPM	460/3/60	7.5	1200	500 GPM	15 PSI						Goulds
TK-180	Multi Chamber Mix Tank	PFD-1	304 Stainless steel	N/A	500 GPM	N/A	N/A	N/A	500 GPM	N/A						Environmental Treatment Systems, Inc.
MX-091824	Mix Tank #1 Mixer	PFD-1	Stainless Steel	Sharpe G100	N/A	460/3/60	1		N/A	N/A						Sharpe
MX-091825	Mix Tank #2 Mixer	PFD-1	Stainless Steel	Sharpe G100	N/A	460/3/60	1		N/A	N/A						Sharpe
MX-091826	Mix Tank #3 Mixer	PFD-1	Stainless Steel	Sharpe G050	N/A	460/3/60	0.5		N/A	N/A						Sharpe
MX-091827	Mix Tank #4 Mixer	PFD-1	Stainless Steel	Sharpe G050	N/A	460/3/60	0.5		N/A	N/A					Inverter Duty Rated	Sharpe
	Effluent Mix Tank	PFD-1	304 Stainless steel	N/A	500 GPM	N/A	N/A	N/A	500 GPM	N/A						Environmental Treatment Systems, Inc.
MX-091A28	Tank Mixer	PFD-1	Stainless Steel	Sharpe G050	N/A	460/3/60	0.5		N/A	N/A						Sharpe
T-091	Dissolved Air Flotation (DAF) Unit	PFD-1	304 Stainless steel	[illegible] RT-125A	500 GPM	N/A	N/A	N/A	500 GPM	ATM	110F	8,400 lbs empty, 46,000 lbs op.				Environmental Treatment Systems, Inc.
T-091B6	Pressure Chamber	PFD-1	304 Stainless steel	N/A	N/A										Piping chamber	Environmental Treatment Systems, Inc.
P-091B32	DAF Recirculation Pump	PFD-1	304 Stainless steel	Hellbender HB-90	90 GPM	460/3/60	15		90 GPM	100 PSI	110F	Included *	Factory Std		Part of DAF Package	Environmental Treatment Systems, Inc.
	DAF Float Skimmer	PFD-1	304 Stainless steel			460/3/60	0.5				110F	Included *			Part of DAF Package	Environmental Treatment Systems, Inc.
	DAF Solids Auger	PFD-1	304 Stainless steel			460/3/60	0.5				110F	Included *			Part of DAF Package	Environmental Treatment Systems, Inc.
P-091B33	Float Pump	PFD-1	Carbon Steel	Vogelsang IO		N/A	N/A	N/A							Rotary Lobe Pump	Vogelsang
BL-091B05	Aeration Blower	PFD-1			1,600 SCFM	460/3/60	100		1,600 SCFM							Kaeser
	Aeration Diffuser Grids Coarse Bubble	PFD-1	304 Stainless steel	N/A		N/A									Two row premium grade suspended grating	SSI
D-0902	Blue Saturation Drum	PFD-1	304 Stainless steel													Environmental Treatment Systems, Inc
D-0901	Yellow Saturation Drum	PFD-1	304 Stainless steel													Environmental Treatment Systems, Inc
P-091B02	Blue Recycle Pump	PFD-1	Stainless Steel													Environmental Treatment Systems, Inc.
P-091407	Yellow Recycle Pump	PFD-1	Stainless Steel													Environmental Treatment Systems, Inc.
P-091405	West Pump	PFD-1	Ductile Iron + SS Imp	Goulds 3196 4X6-10G	500 GPM	460/3/60	15	1770	500 GPM							Goulds
P-091406	East Pump	PFD-1	Ductile Iron + SS Imp	Goulds 3196 4X6-10G	500 GPM	460/3/60	15	1770	500 GPM							Goulds
Tank 144B	Slop Oil Tank	PFD-2	Carbon Steel	13'-9 5" D X 25'-0" H	584 BBL	N/A	N/A	N/A	N/A						14' D, match existing T-144 height	Sunland Steel
MX-091840	Slop Oil Tank Mixer	PFD-2	Stainless Steel	Sharpe N3	N/A	460/3/60	1.5	N/A	N/A							Sharpe
P-091840	Slop Oil Tank Effluent Pump No 1	PFD-2	Stainless Steel	Viking RL40257	125 GPM	460/3/60	15	N/A	125 GPM	233' TDH					Rotary Lobe Pump	Viking
P-091840	Slop Oil Tank Effluent Pump No. 2	PFD-2	Stainless Steel	Viking RL40257	125 GPM	460/3/60	15	N/A	125 GPM	233' TDH					Rotary Lobe Pump	Viking
TK-181	Decant Tank	PFD-2	Carbon Steel	13'-9 5" D X 25'-0" H	584 BBL	N/A	N/A	N/A	N/A							Sunland Steel
MX-091841	Decant Tank Mixer	PFD-2	Stainless Steel	Sharpe N3	N/A	460/3/60	1.5	N/A	N/A							Sharpe
P-091904	Decant Tank Discharge Pump	PFD-2	Stainless Steel	Viking RL40257	125 GPM	460/3/60	15	N/A	125 GPM	233' TDH					Rotary Lobe Pump	Viking
P-09190103	Sodium Hydroxide metering Pump No. 1	PFD-2	Non-metallic	1/4" Sandpiper AOD Pump		N/A	N/A	N/A							Air Operated Diaphragm Pump	Sandpiper
P-09190104	Sodium Hydroxide metering Pump No. 2	PFD-2	Non-metallic	1/4" Sandpiper AOD Pump		N/A	N/A	N/A							Air Operated Diaphragm Pump	Sandpiper
P-09190201	Hydrogen Peroxide metering Pump No. 1	PFD-2	Non-metallic	1/4" Sandpiper AOD Pump		N/A	N/A	N/A							Air Operated Diaphragm Pump	Sandpiper
P-09190202	Hydrogen Peroxide metering Pump No. 2	PFD-2	Non-metallic	1/4" Sandpiper AOD Pump		N/A	N/A	N/A							Air Operated Diaphragm Pump	Sandpiper
P-09190201	Sulfuric Acid metering Pump No. 1	PFD-2	Non-metallic	1/4" Sandpiper AOD Pump		N/A	N/A	N/A							Air Operated Diaphragm Pump	Sandpiper
P-09190202	Sulfuric Acid metering Pump No. 2	PFD-2	Non-metallic	1/4" Sandpiper AOD Pump		N/A	N/A	N/A							Air Operated Diaphragm Pump	Sandpiper
P-09190201	Coagulant metering Pump No. 1	PFD-2	Non-metallic	1/4" Sandpiper AOD Pump		N/A	N/A	N/A							Air Operated Diaphragm Pump	Sandpiper
P-09190202	Coagulant metering Pump No. 2	PFD-2	Non-metallic	1/4" Sandpiper AOD Pump		N/A	N/A	N/A							Air Operated Diaphragm Pump	Sandpiper
	Polymer Feed System	PFD-2	0446 Nut / PVC / NEMA 4X	VM-2 SP-1200	1GPH (neat poly	120	2.5 HP		7.5 GPH	58 PSI	110F	38 lbs	Factory Std		Polymer Feed System	Velodyne Velocity Dynamics, INC
P-091939	Polymer Pump	PFD-2	316 SS			120										
P-09190105	Polymer Metering Pump	PFD-2	316 SS			120										

Appendix B

Stormwater Modeling


AREA 1
AREA 2
AREA 3
AREA 4
AREA 5
FUTURE VELOCITY REDUCING STORMWATER CONTROL FACILITY
OUTFALL 001
OUTFALL 002
FUTURE EXPANDED RETENTION SWALE
FUTURE CRATED COLLECTION TRENCH
RUBBER SHEETING TO BE INSTALLED AT FENCE
RUBBER SHEETING TO BE INSTALLED AT FENCE
MISSOURI RIVER
FOOT BRIDGE
TOOLE STREET
EXPLANATION
SELF CONTAINED AREA
EXISTING STORMWATER CONTROLS (ESWC)
FUTURE STORMWATER CONTROL FACILITIES
PAVED ROAD
ESWC CULVERTS
FENCE
ROADS AND BERMS
RAILROAD
FACILITY BOUNDARY
GENERALIZED GROUNDWATER FLOW DIRECTION
TANKS, BUILDINGS, AND EQUIPMENT AREAS
N
0
250'
Trihydro
1252 Commerce Drive
Laramie, Wyoming 82070
FIGURE 3
STORMWATER CONTROL MEASURES
CALUMET MONTANA REFINING
GREAT FALLS, MONTANA
Drawn By: JLP
Checked By: JS
Scale: 1" = 250'
Date: 9/17/2013
File: 477_SWP-CONTMEAS-20130

CMR Ex 4:39

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Area 1 Runoff Area=64,860 sf 100.00% Impervious Runoff Depth>2.52"
Flow Length=150' Slope=0.0010 '/' Tc=10.4 min CN=98 Runoff=4.94 cfs 0.312 af

Subcatchment2S: Area 2 Runoff Area=40,727 sf 100.00% Impervious Runoff Depth>2.52"
Flow Length=100' Slope=0.0010 '/' Tc=7.5 min CN=98 Runoff=3.40 cfs 0.196 af

Subcatchment3S: Area 3 Runoff Area=387,552 sf 100.00% Impervious Runoff Depth>2.51"
Flow Length=600' Slope=0.0010 '/' Tc=31.6 min CN=98 Runoff=17.29 cfs 1.857 af

Subcatchment4S: Area 4 Runoff Area=110,482 sf 100.00% Impervious Runoff Depth>2.52"
Flow Length=100' Slope=0.0010 '/' Tc=7.5 min CN=98 Runoff=9.22 cfs 0.532 af

Subcatchment5S: Area 5 Runoff Area=891,728 sf 100.00% Impervious Runoff Depth>2.50"
Flow Length=1,000' Slope=0.0010 '/' Tc=47.6 min CN=98 Runoff=30.33 cfs 4.261 af

Total Runoff Area = 34.328 ac Runoff Volume = 7.158 af Average Runoff Depth = 2.50"
0.00% Pervious = 0.000 ac 100.00% Impervious = 34.328 ac

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Area 1 Runoff Area=64,860 sf 100.00% Impervious Runoff Depth>3.26"
Flow Length=150' Slope=0.0010 '/' Tc=10.4 min CN=98 Runoff=6.33 cfs 0.405 af

Subcatchment2S: Area 2 Runoff Area=40,727 sf 100.00% Impervious Runoff Depth>3.26"
Flow Length=100' Slope=0.0010 '/' Tc=7.5 min CN=98 Runoff=4.35 cfs 0.254 af

Subcatchment3S: Area 3 Runoff Area=387,552 sf 100.00% Impervious Runoff Depth>3.25"
Flow Length=600' Slope=0.0010 '/' Tc=31.6 min CN=98 Runoff=22.17 cfs 2.408 af

Subcatchment4S: Area 4 Runoff Area=110,482 sf 100.00% Impervious Runoff Depth>3.26"
Flow Length=100' Slope=0.0010 '/' Tc=7.5 min CN=98 Runoff=11.81 cfs 0.690 af

Subcatchment5S: Area 5 Runoff Area=891,728 sf 100.00% Impervious Runoff Depth>3.24"
Flow Length=1,000' Slope=0.0010 '/' Tc=47.6 min CN=98 Runoff=38.91 cfs 5.525 af

Total Runoff Area = 34.328 ac Runoff Volume = 9.282 af Average Runoff Depth = 3.24"
0.00% Pervious = 0.000 ac 100.00% Impervious = 34.328 ac

Summary for Subcatchment 5S: Area 5

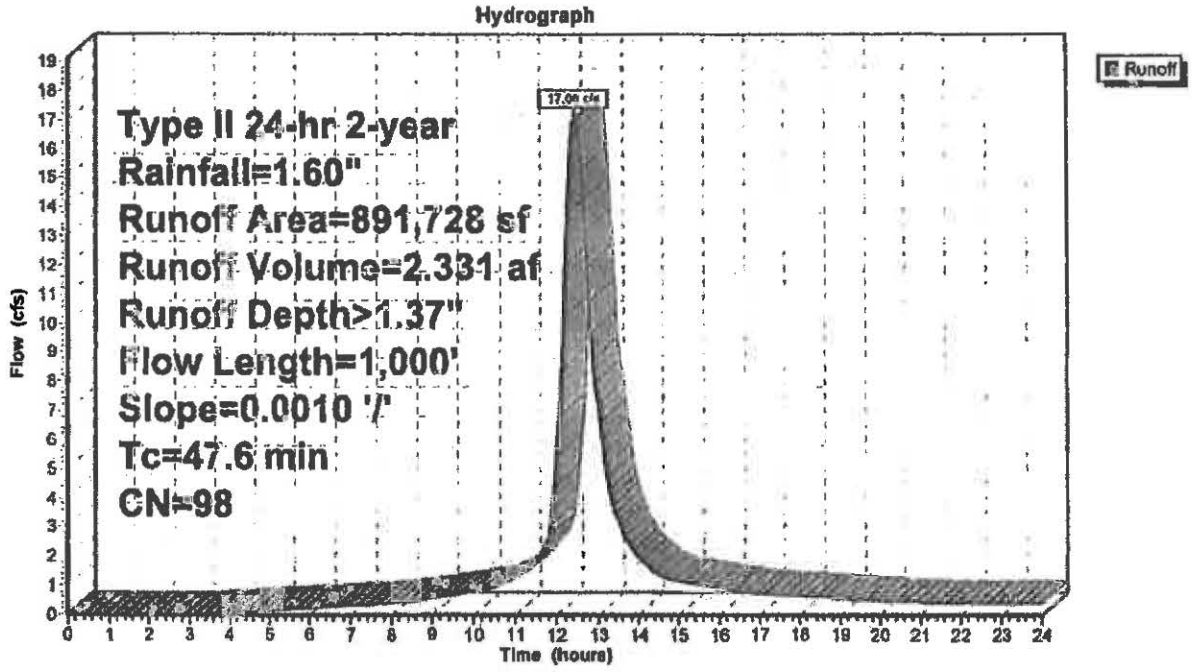
Runoff = 17.06 cfs @ 12.44 hrs, Volume= 2.331 af, Depth> 1.37"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-year Rainfall=1.60"

	Area (sf)	CN	Description
*	891,728	98	
	891,728		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
47.6	1,000	0.0010	0.35		**Lag/CN Method,**

Subcatchment 5S: Area 5



Summary for Subcatchment 5S: Area 5

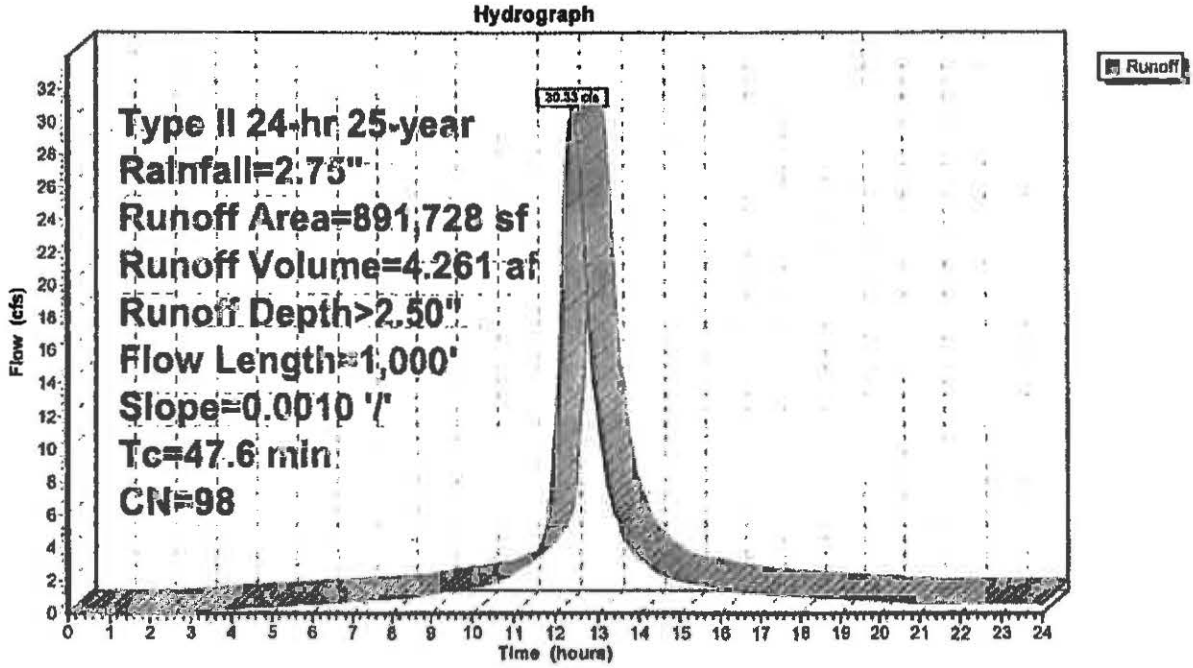
Runoff = 30.33 cfs @ 12.44 hrs, Volume= 4.261 af, Depth> 2.50"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-year Rainfall=2.75"

	Area (sf)	CN	Description
*	891,728	98	
	891,728		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
47.6	1,000	0.0010	0.35		**Lag/CN Method,**

Subcatchment 5S: Area 5



Summary for Subcatchment 5S: Area 5

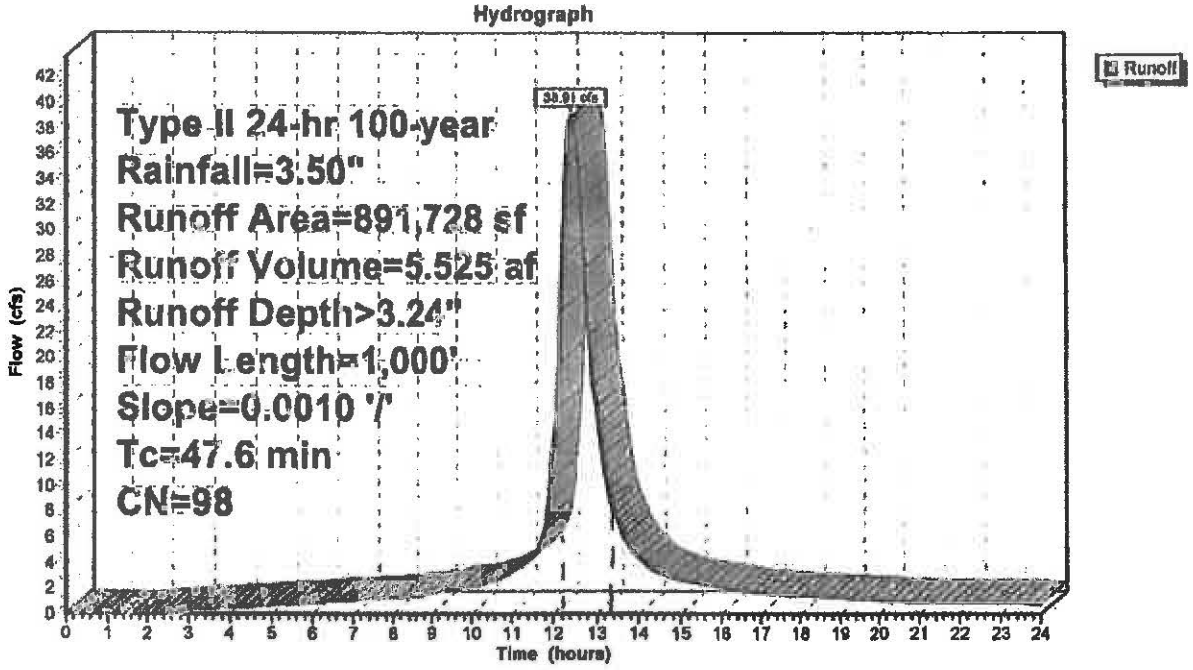
Runoff = 38.91 cfs @ 12.44 hrs, Volume= 5.525 af, Depth> 3.24"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-year Rainfall=3.50"

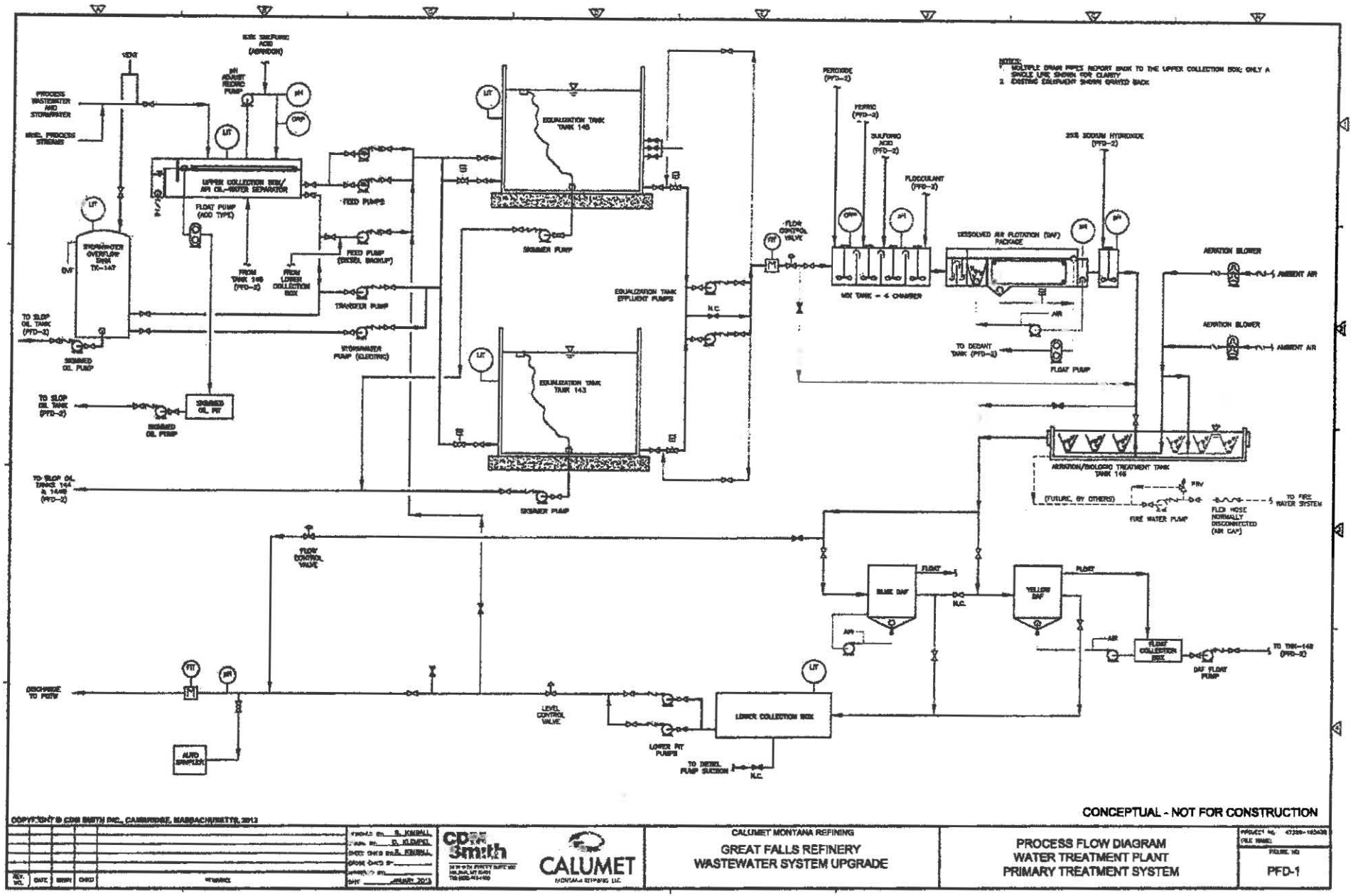
	Area (sf)	CN	Description
*	891,728	98	
	891,728		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
47.6	1,000	0.0010	0.35		Lag/CN Method,

Subcatchment 5S: Area 5



Appendix C
Process Flow Figures
During Equipment Maintenance


PROCESS WASTEWATER AND STORMWATER
MISC. PROCESS STREAMS
VENT
PH ADJUST CAUSTIC PUMP
UPPER COLLECTION BOX/ API OIL-WATER SEPARATOR
FLOAT PUMP (ACID TYPE)
STORMWATER OVERFLOW BOX TK-147
TO SLOP OIL TANK (PFD-2)
SKIMMED OIL PUMP
SKIMMED OIL PIT
FEED PUMPS
FEED PUMP (DIESEL BACKUP)
FROM TANK 146 (PFD-2)
FROM LOWER COLLECTION BOX
TRANSFER PUMP
STORMWATER PUMP (ELECTRIC)
EQUALIZATION TANK TANK 145
EQUALIZATION TANK TANK 143
SKIMMER PUMP
EQUALIZATION TANK EFFLUENT PUMPS
FLOW CONTROL VALVE
PEROXIDE (PFD-2)
FERRIC (PFD-2)
SULFURIC ACID (PFD-2)
FLOCCULANT (PFD-2)
25% SODIUM HYDROXIDE (PFD-2)
MIX TANK - 4 CHAMBER
DISSOLVED AIR FLOTATION (DAF) PACKAGE
TO DECANT TANK (PFD-2)
FLOAT PUMP
AERATION BLOWER
AMBIENT AIR
AERATION/BIOLOGIC TREATMENT TANK TANK 146
(FUTURE, BY OTHERS)
PRV
FIRE WATER PUMP
FLEX HOSE NORMALLY DISCONNECTED (AIR GAP)
TO FIRE WATER SYSTEM
TO SLOP OIL TANKS 144 & 145 (PFD-2)
BLUE DAF
YELLOW DAF
FLOAT
AIR
FLOAT COLLECTION BOX
DAF FLOAT PUMP
TO TNK-148 (PFD-2)
DISCHARGE TO PSTW
AUTO SAMPLER
LEVEL CONTROL VALVE
LOWER COLLECTION BOX
LOWER PIT PUMPS
TO DIESEL FUEL SUCTION
N.C.
NOTES:
1. MULTIPLE DRAIN PIPES REPORT BACK TO THE UPPER COLLECTION BOX; ONLY A SINGLE LINE SHOWN FOR CLARITY
2. EXISTING EQUIPMENT SHOWN GRAYED BACK
CONCEPTUAL - NOT FOR CONSTRUCTION
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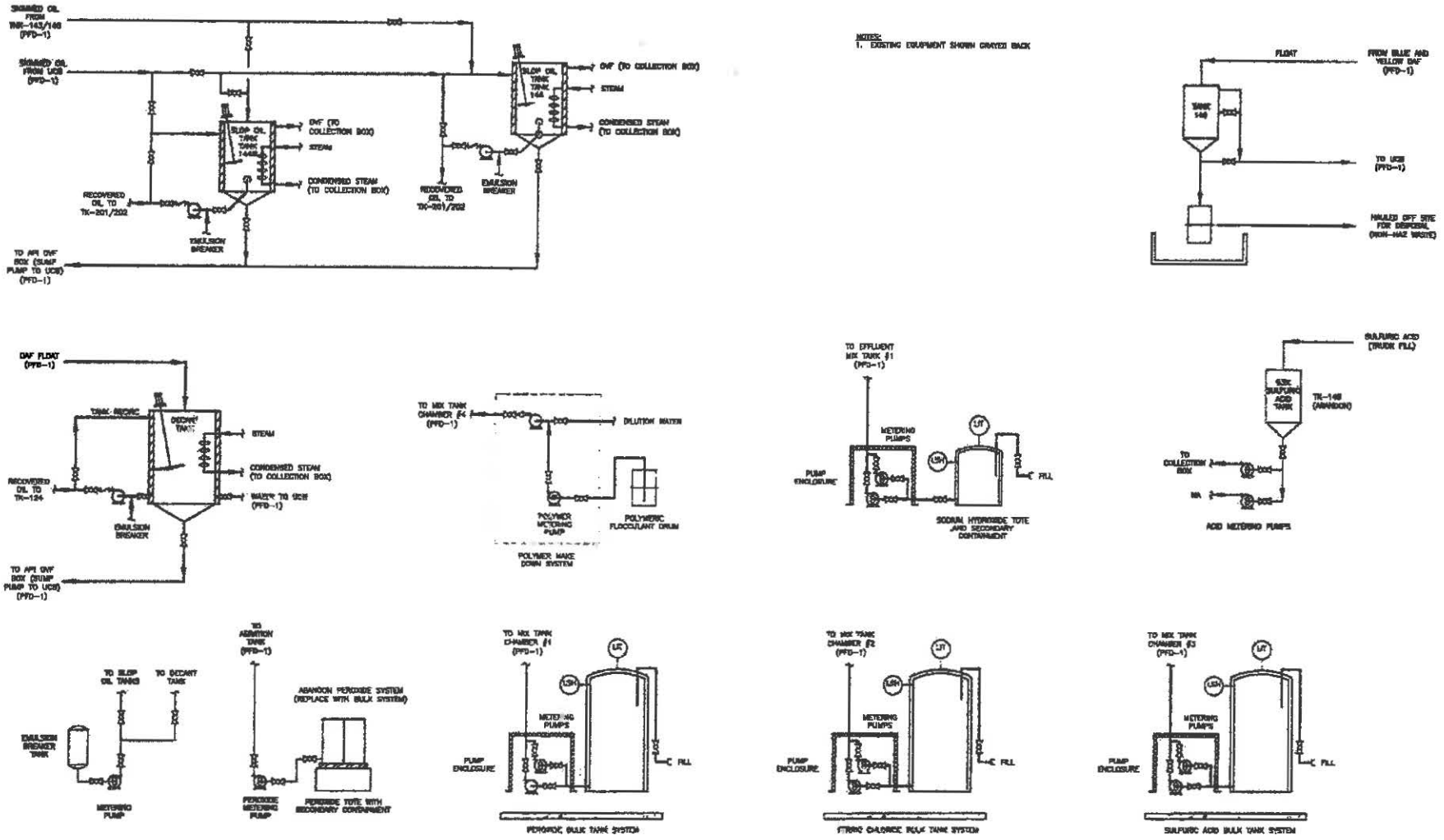
CDM Smith
CALUMET
CALUMET MONTANA REFINING
GREAT FALLS REFINERY
WASTEWATER SYSTEM UPGRADE
PROCESS FLOW DIAGRAM
WATER TREATMENT PLANT
PRIMARY TREATMENT SYSTEM
PFD-1

CMR Ex 4:46



CONCEPTUAL - NOT FOR CONSTRUCTION

REV. NO.	DATE	BY	CHK	REMARKS

PROJECT MGR. B. KNOLL
DRAWN BY D. KLEMPE
PROJECT CHK'D BY E. STROLL
CHK'D CHK'D BY
APPROVED BY
DATE JANUARY 2013

CDM Smith

CALUMET MONTANA REFINING

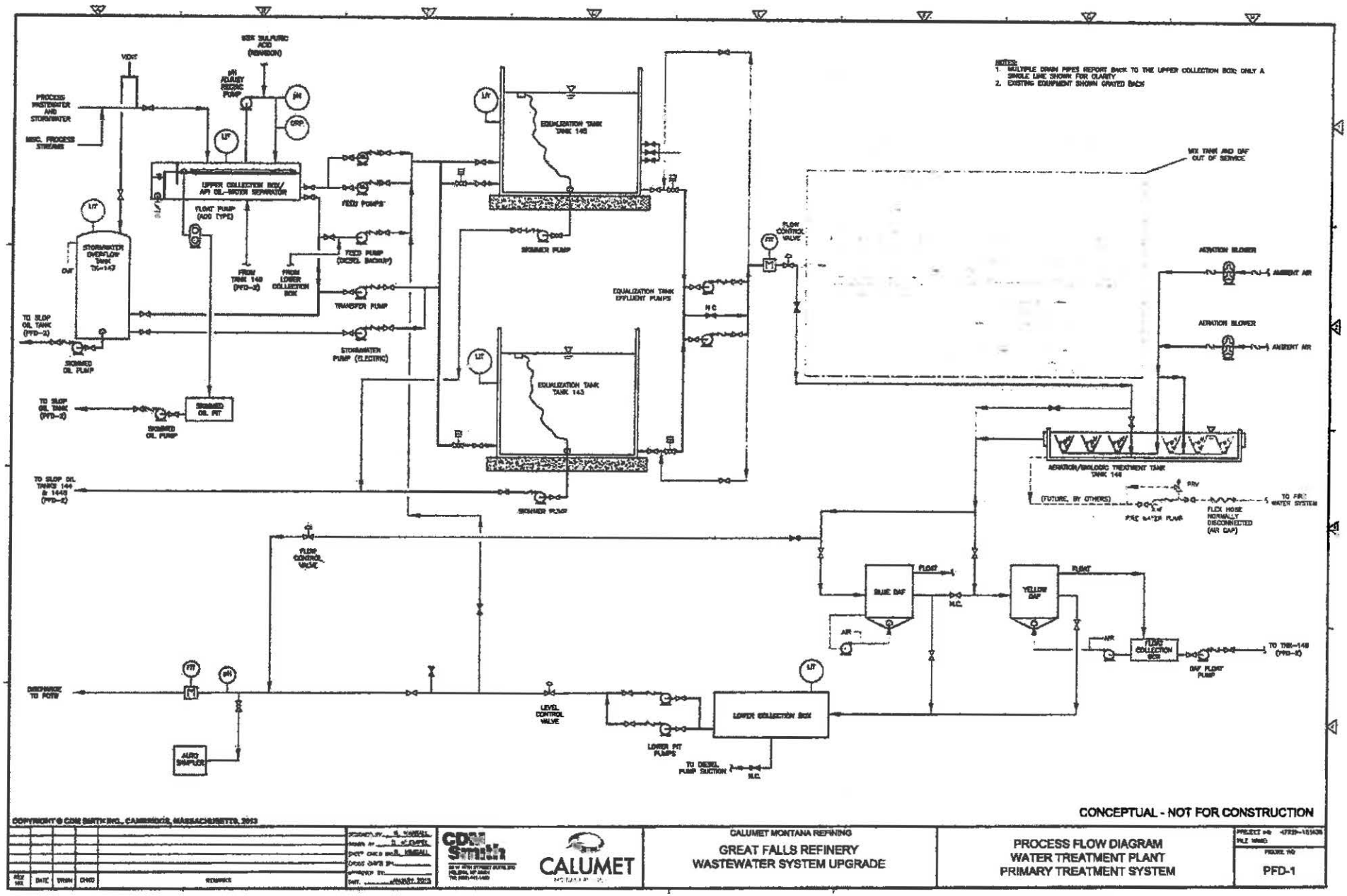
GREAT FALLS REFINERY
WASTEWATER SYSTEM UPGRADE

PROCESS FLOW DIAGRAM
FUTURE WTP
ANCILLARY SYSTEMS

PROJECT NO. 47559-116438
FILE NAME:

FIGURE NO.
PFD-2

CMR Ex 4:47



CONCEPTUAL - NOT FOR CONSTRUCTION

REV NO.	DATE	TRAIN	CHKD	REMARKS

DESIGNED BY: S. KIMBALL
DRAWN BY: S. CARTER
CHECKED BY: S. KIMBALL
CROSS CHKD BY:
APPROVED BY:
DATE: JANUARY 2013

CDM Smith

CALUMET

CALUMET MONTANA REFINING
GREAT FALLS REFINERY
WASTEWATER SYSTEM UPGRADE

PROCESS FLOW DIAGRAM
WATER TREATMENT PLANT
PRIMARY TREATMENT SYSTEM

PROJECT NO. 47329-151439
FILE NAME:
FIGURE NO.
PFD-1

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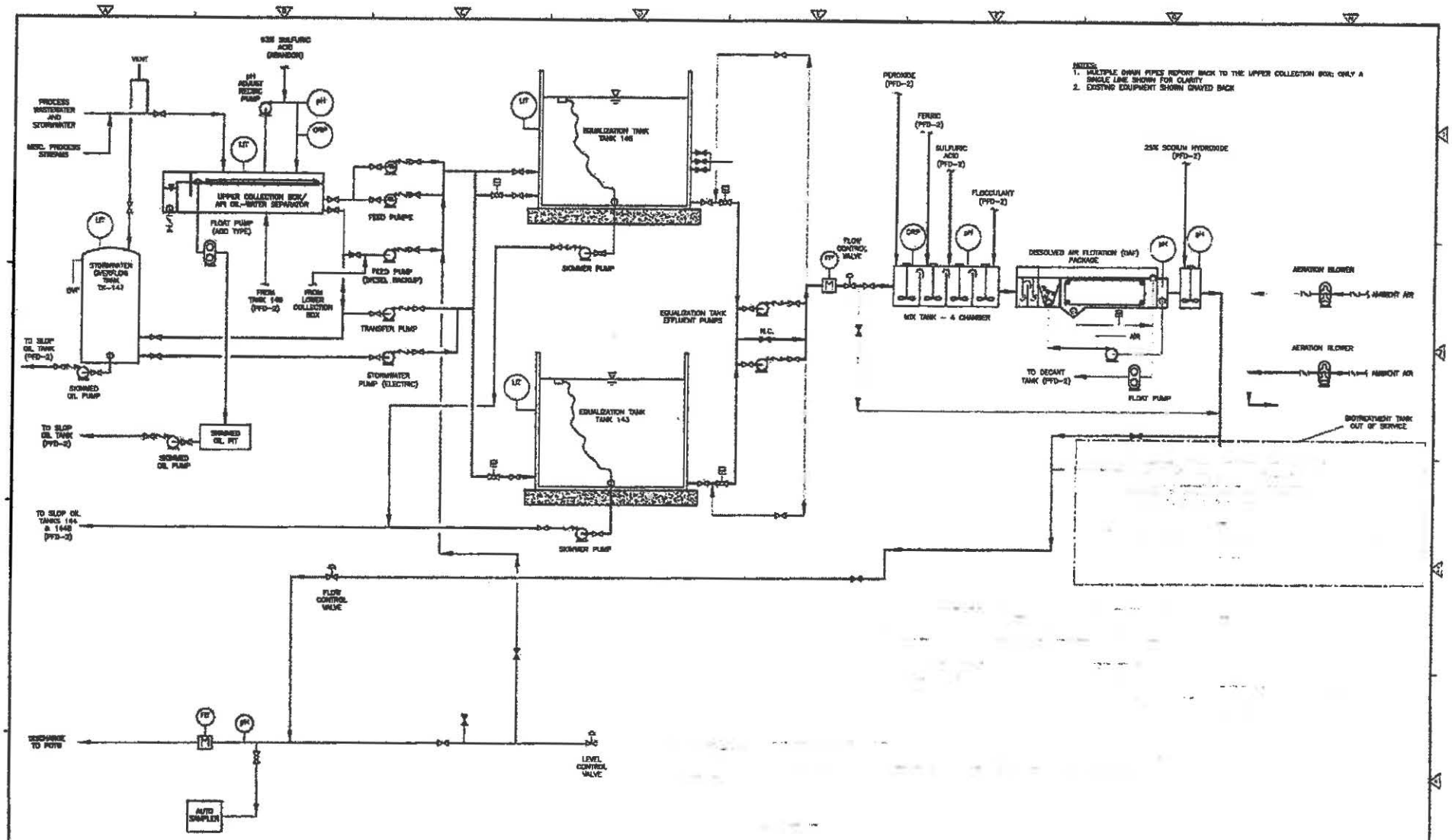

CONCEPTUAL - NOT FOR CONSTRUCTION

REV. NO.	DATE	DRWN	CHKD	REMARKS

DRAWN BY: B. KIMBALL
CHKD BY: D. WUNDER
QA/QC CHKD BY: B. KIMBALL
APPROVED BY:
DATE: JANUARY 2015

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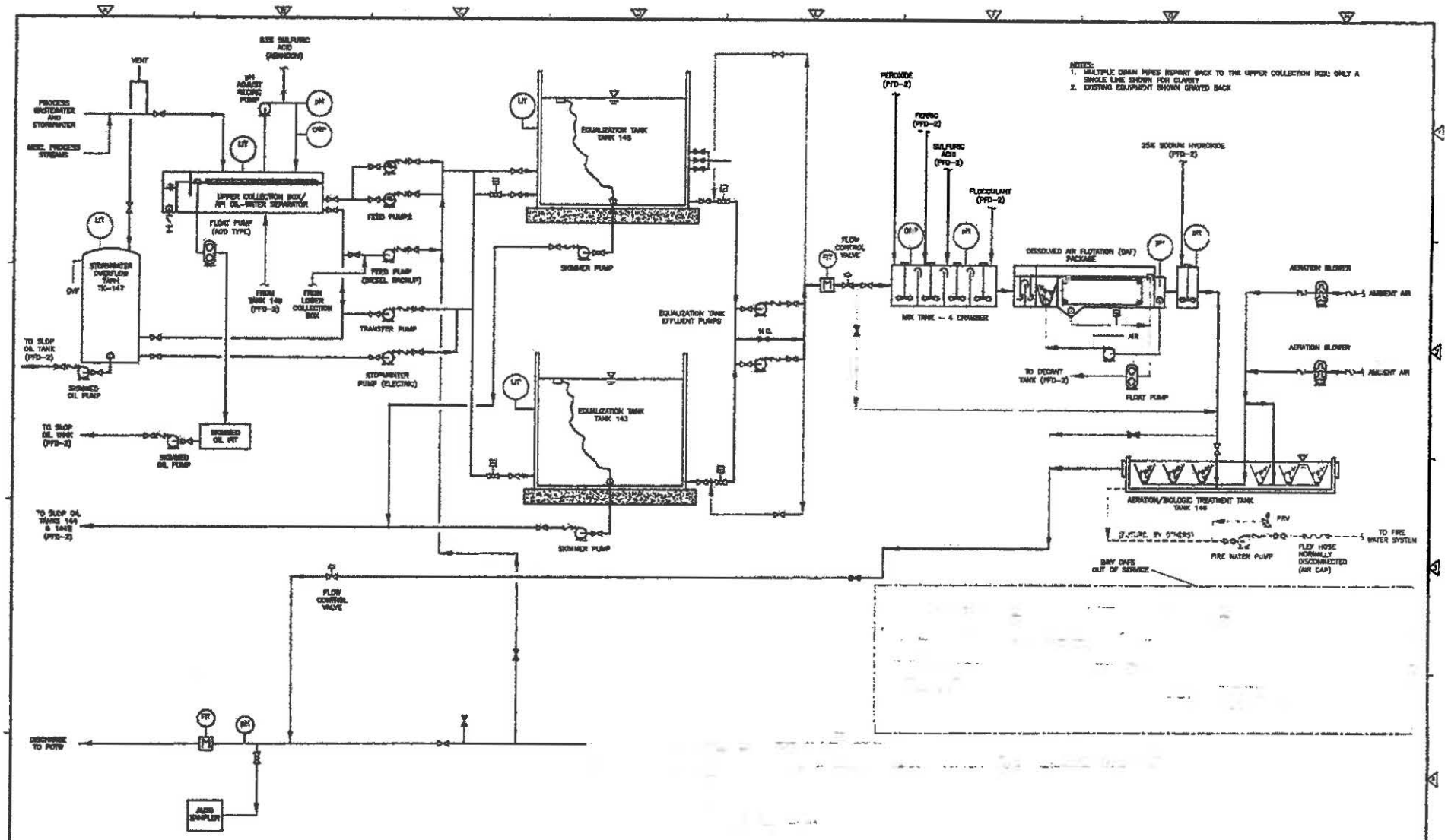
CALUMET

CALUMET MONTANA REFINING
GREAT FALLS REFINERY
WASTEWATER SYSTEM UPGRADE

PROCESS FLOW DIAGRAM
WATER TREATMENT PLANT
PRIMARY TREATMENT SYSTEM

PROJECT NO. 47XXXX-XXXXX
FILE NAME:
DRAWING NO.
PFD-1

CMR Ex 4:49



CONCEPTUAL - NOT FOR CONSTRUCTION

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. KIMBALL
DRAWN BY: D. KLEMPEL
CHECKED BY: R. KIMBALL
QA/QC BY:
APPROVED BY:
DATE: JANUARY 2015

CDM Smith

CALUMET

CALUMET MONTANA REFINING
GREAT FALLS REFINERY
WASTEWATER SYSTEM UPGRADE

PROCESS FLOW DIAGRAM
WATER TREATMENT PLANT
PRIMARY TREATMENT SYSTEM

PROJECT NO. 47251-143439
FILE NAME:
FIGURE NO.
PFD-1

CMR Ex 4:50