



# Refinery Water 102

Melissa Manke Fimbres – December 10th, 2024

# Agenda

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1	Refinery Water Sources & Volume - October
2	Refinery Water Use 101 – October
3	Refinery Water 102 - City Wastewater
3	Treatment Plant (WWTP) - December

Future Issues - December

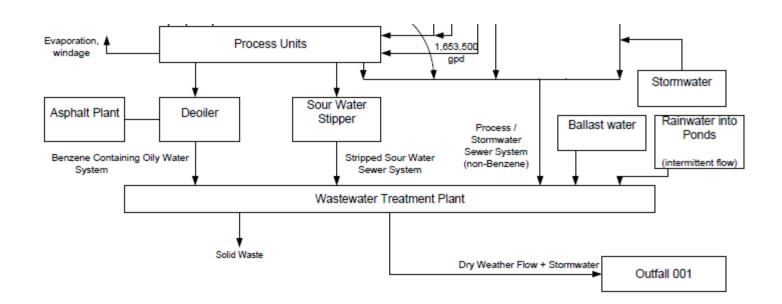
#### Water Use 101 Summary - October

- Water sources and distribution
  - Treatment of Raw Water
- Raw Water uses
  - Cooling Water
  - Boiler Feed Water / Steam production
- Water recovery includes
  - Cooling tower reuse
  - More air cooler / fin fan exchangers
  - Condensate recovery
- Tour
  - Raw water receipt infrastructure



#### Valero Process Water to WWTP

 Used process water that has been removed of oil in the Deoiler and stripped of H<sub>2</sub>S in the sour water stripper towers (and rainwater collected in ponds) is routed via process/stormwater sewer system to diversion tanks and then sent to the Valero Wastewater treatment plant





#### Valero WWTP effluent specifications

- Strict State and EPA Specifications
  - Ammonia: NH3
  - Phenols
  - Neutral pH
  - Selenium
  - Mercury
  - Effluent Toxicity
  - Chemical Oxygen Demand (COD)
  - Total Suspended Solids (TSS)
  - Biochemical Oxygen Demand (BOD)

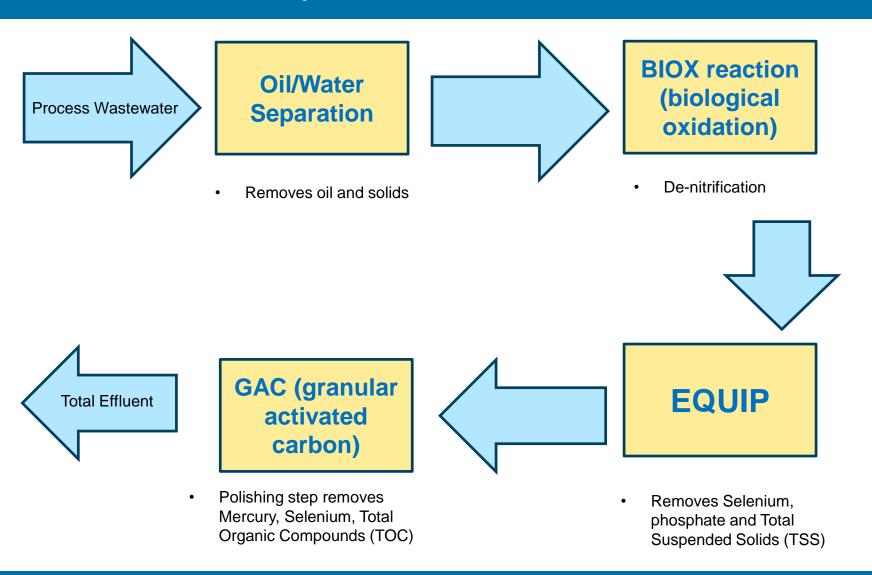


#### City and Benicia WWTP Effluent comparison

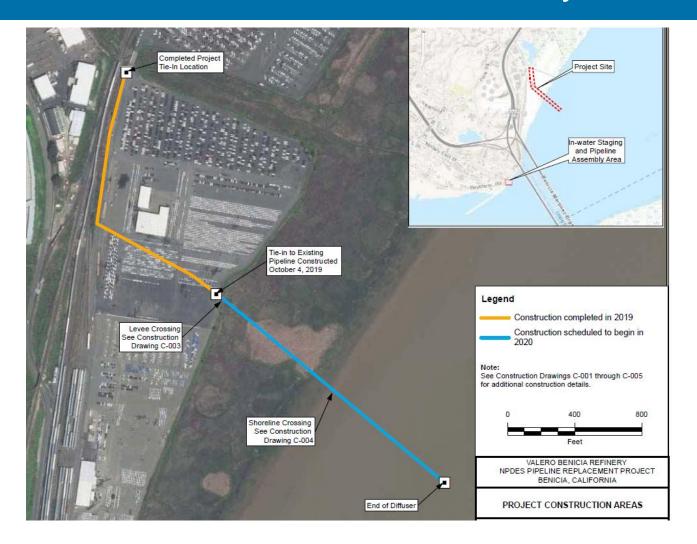
- Refinery specification requirements can differ between sites
- Even in the same location, Valero standards are different than the City's
  - Valero does daily fish testing (bioassay and effluent toxicity)
  - City does quarterly testing
- City and Valero WWTP effluent are considered high quality
  - High levels of Total Suspended Solids (TSS) prevent immediate reuse
- WWTP effluent volumes at City & Valero are comparable



#### Valero WWTP process



## Valero WWTP Effluent line to the Bay - New





#### Future Issues: Nutrient discharge limits

- Per Water Code section 13383, Regional Water Control Board (RWCB) is requiring discharges is requiring monitoring for total inorganic nitrogen and phosphorus
  - To prevent algae blooms
- As of 2024, Bay Area Cities and refineries are monitoring for nutrients monthly and providing data
  - Nitrate-nitrite: Total is TIN
  - Inorganic Nitrogen
  - Phosphorus (very low for VLO BN)
- Have to provide study to RWCB in 2026-2027 to manage potential new limits
  - Expect Cities to be most affected due to volume and could affect processing rates
  - Bay Area refineries wastewater help with dilution (2012 data survey indicated insignificant nitrogen)



## City of Benicia WWTP Effluent Reuse Project

- In 2015-2016 City retained Brown and Caldwell (BC) to complete a Feasibility Study of WWTP effluent reuse in Refinery's cooling tower
- Purpose was to define project in sufficient detail to support state/federal funding requests
  - Final BC report issued June 2017
  - City unable to obtain state funding & project on hold
- Use of reclaimed water in Refinery cooling tower is technically feasible
- City's plan to supply reclaimed water to Valero cooling tower is the most economically viable water conservation option identified to date <u>if</u> state/federal grants & loans can be obtained
  - Refinery will continue to support City's efforts until it is clear that state/federal funding is unrealistic



# Map for tour



## **Questions?**





#### Valero Detailed WWTP PFD

Valero Benicia Refinery Valero Refining Company-California Order R2-2020-0033 NPDES CA0005550

#### Benicia Refinery Wastewater Treatment Scheme Final Effluent Available for Fire Fighting and Landscape Watering During Stormwater Retention Ponds Water Conservation Periods When 20 Year Sour Water Storm Capacity is Diversion to Sulfur Sourwater Pre-BIOX Exceeded or Springs Creek If Effluent Pump Flow Storm Water Requirements Capacity is Exceeded Alternate Flow When One Oll/ are met Water Separator is Out of Pond Storm Water Overflow When Surge and Equalization Tanks are Full Surge Control Sand Filters Equalization Clarifler Oll/Water Tank Tank ISF Separato GAC PO4 Caustic Surge Tank Final Effluent Pumps Oll/Water Process/ Surge Tank Equalization ISF Strainer Aeration Clarifier Stormwater On-Specification Wastewater and Storm Off-Specification I Wastewater Wet Crude Field Solids to Offsite Retention Ponds Primary Sludge Thickener (PST) BIOX Sludge Thickener (BST) Legend To Process/Storm Water Sewer If Additional Treatment is Normal Water Streams Needed Slop Oil to Intermittant Water Streams CPS Solids/sludge Streams Oil Streams Dewatering Asphalt Plant Cone Roof Tank and ental NPDESIWA-12-02 Permits-is\_WW2014 Renewal Figuresi. WWTP 2014.pdf Alternative Flow When Additional Oil or To Offsite Disposal or To Offsite Disposal VAO Removal is not Needed Benzene Containing Oily Water