# Refinery Application Note
## Waste Water Treatment

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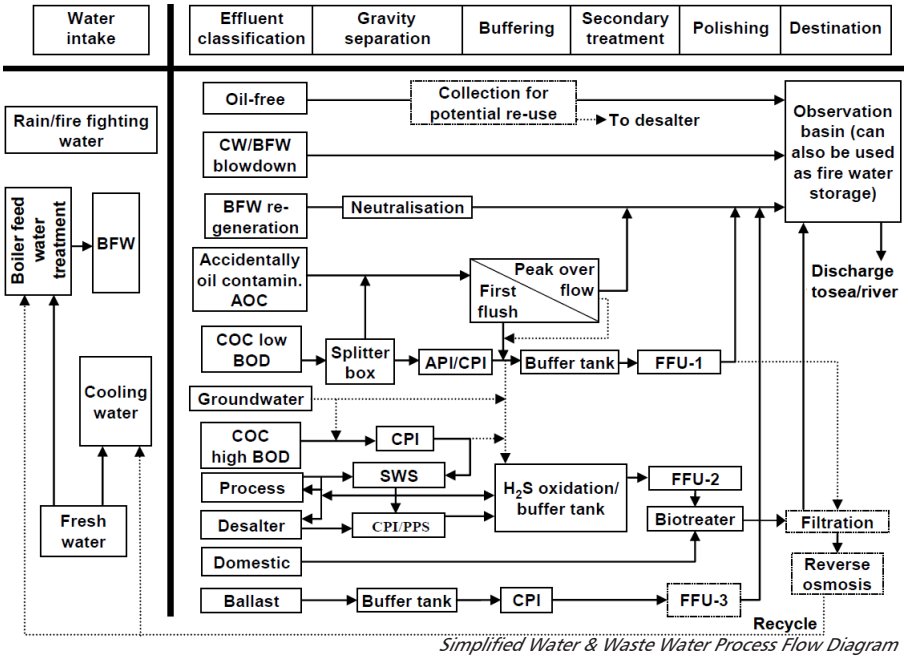
## Application Overview

Refinery waste water is generated from water used throughout a refinery. This includes assisting hydrocarbon distillation, steam stripping, and desalting crude oil. After being collected and receiving pretreatment (eg. SWS), it is collected and treated on-site. Treatment techniques vary based on the waste water sources before effluent discharge.

**Oil Recovery**
- API Separation
- Equalization Tanks

**Diserpsed Oil & TSS Recovery**
- Dissolved Air Flotation (DAF)
- Sand Filtration

**Soluble Substance Removal**
- Biological Treatment
- Clarification



*Simplified Water & Waste Water Process Flow Diagram*

## Operational Challenges

API's should have < 100 ppm oil in the outlet. However, systems without internal mechanical solids extraction risk solids accumulation issues.

Flocculation techniques inject coagulant to achieve < 20 ppm oil. However, without continuous alkalinity fine-tuning, pH swings prevent effective precipitation.

Aeration pumps run inefficiently if ammonia levels vary. Nitrification is negatively impacted if alkalinity < 50 ppm, sulfide > 500 ppb, > 400 ppm phenol, or if nitrite accumulates. High nitrate reduces disinfection effectiveness.

Phosphorus cannot be precipitated out successfully without enough lime to form alkaline calcium carbonate.

Hypochlorite must be strong enough for deodorization ($H_2S$, mercaptans) but low concentration in effluent.

Regulatory guidelines specify limits on compounds (eg. heavy metals, cyanide) discharged from treatment systems. Without proper effluent monitoring, there is a risk of being out of environmental compliance.

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## Liquid Monitoring

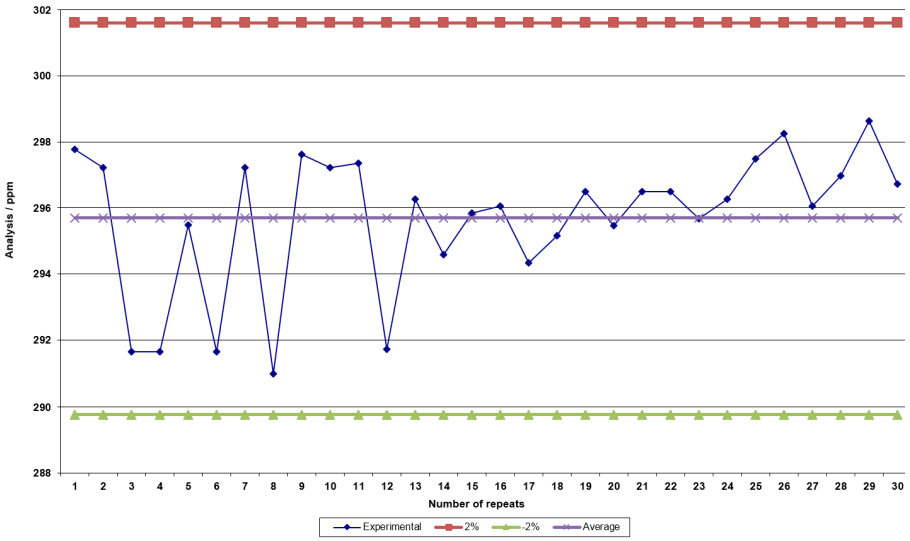
### Alkalinity
- Optimize Coagulation & Flucculation
- Phosphorus Precipitation
- Ensure Effective Nitrification

### Ammonia, Nitrite, Nitrate
- Avoid Running Pumps When Not Needed
- Prevent Stunted Biological Treatment

### Hypochlorite
- Ensure Successful Deodorization Control

### Metals, Cyanide, $H_2S$, Mercaptans
- Effluent Environmental Compliance

## Performance Guaranteed




*Alkalinity Analysis With < ± 2% f.s. Repeatability by Acid-Base Titration (EPA 310.1; ASTM D1067)*

## Online Benefits
- Identify & Avoid Expensive Process Upsets
- Fewer Personnel for Grab Sampling
- Minimize Human Error (Sampling / Testing)
- Precise Aeration Pump Control Saves Costs
- Optimize Environmental Compliance

## AccuSeries-LPA Advantage
- Certified ATEX / IECEx Zone 2 *Without* a Purge
- Compatible Components Minimize Maintenance
- g/l Calibration Ranges for Thorough Reporting
- Multi-Parameter & Multi-Stream for Fast ROI
- ± 2% f.s. Accuracy with ppb Sensitivity

## Galvanic Difference
- 35+ Years of Experience in Difficult Applications
- Global Sales, Consumables, & Service Support
- Custom Engineering to Customer Requirements
- Methods of Analysis to Match Laboratory SOP
- One-Stop-Shop for Gas & Liquid Online Analyzers




*AccuSeries-LPA Wet-Chemistry Online Analyzer*

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