



OWEA Biosolids Workshop Grease Unloading Station

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Summary

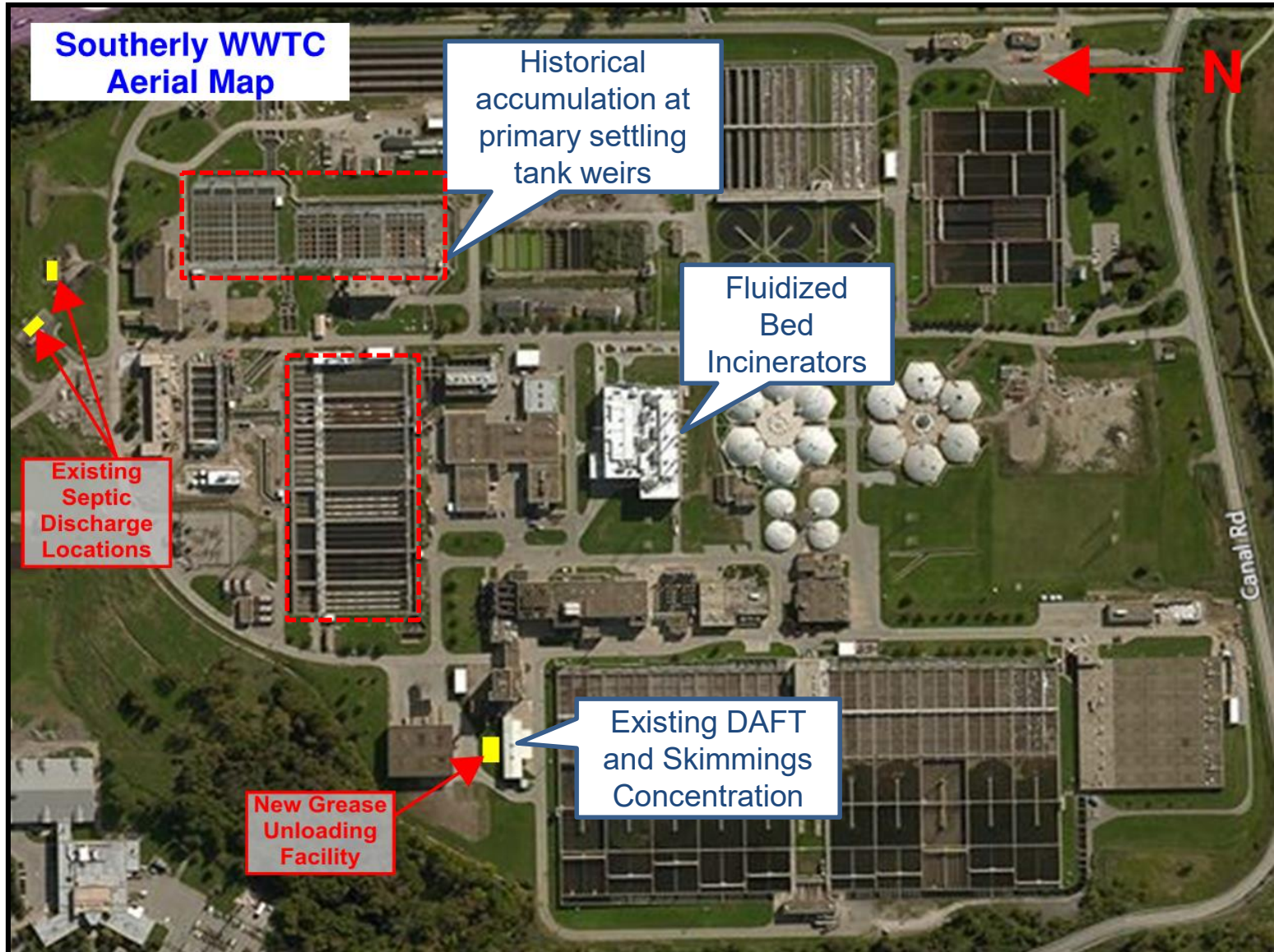
- Project Overview and Objectives
- Background
- Design
- Operations and Maintenance provisions
- Performance and Feedback from Plant

Overview and Project Objectives

- Grease delivered by privately owned trucking companies
- Grease was unloaded from the trucks into the septage receiving location upstream of the headworks
- Grease and septage were handled in the same manner
- **Project Objectives:** Do not dilute concentrated grease, preserve for reuse, reduce the downstream O&M issues of weir clogging

Note: The existing Septage Receiving Station will remain as a backup discharge location

Southerly WWTC Overview



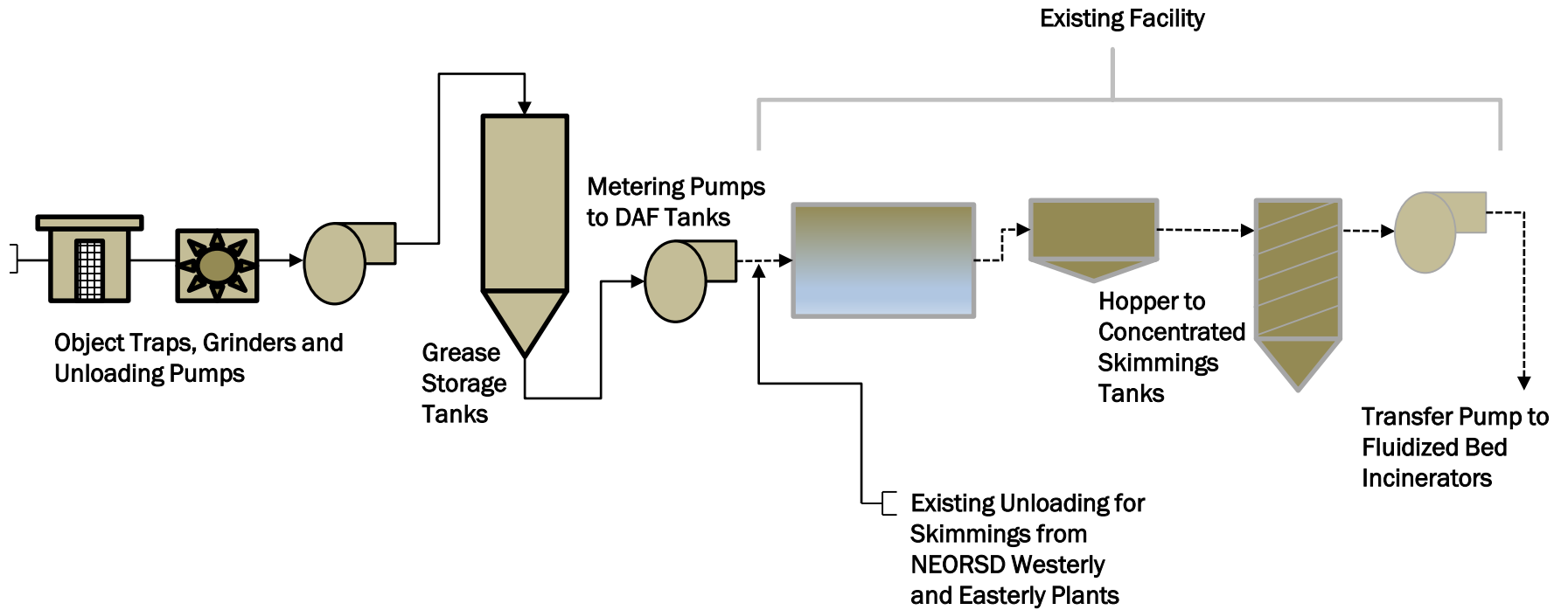
Background - Existing Septage/Grease Unloading



Design Conditions

Parameter	Value
Estimated Number of Trucks per Day • Average / Max Day	8 / 17
Volume per Truck, gallons	3,000 to 4,000
Grease Total Solids, %	2 to 5
Grease Specific Weight, lbs/gal	8.3
Estimated Flow per Day • Average / Max Day, gpd	25,200 / 38,800
Two Tanks Provided	13,000 gal each

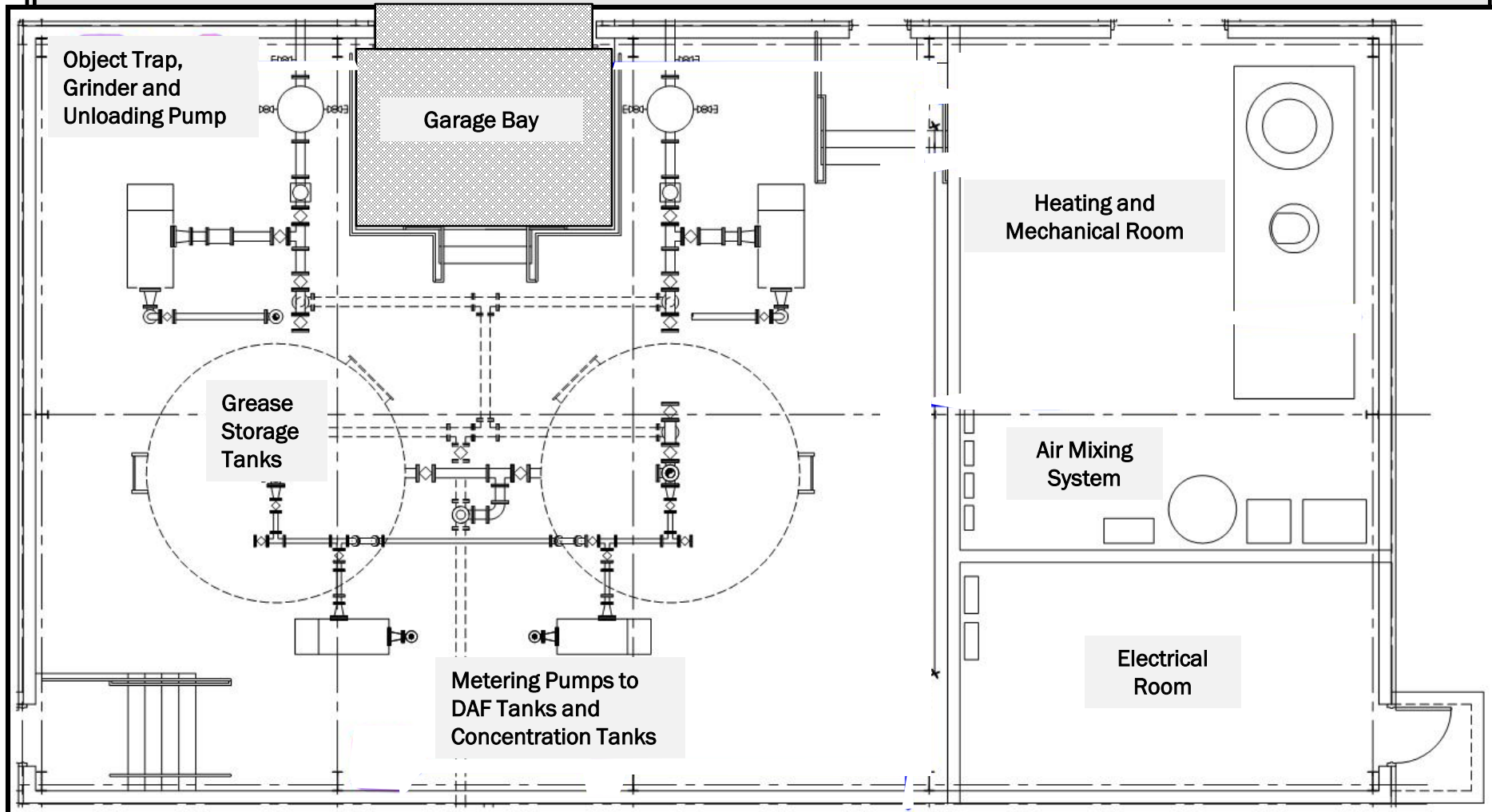
Design Process Schematic



General Layout

Challenge: Protect stormwater system during unloading process.

Spill containment berm and trench drain



New Grease Unloading Facility



Single Story 2800 SF Facility,
Prefab Metal Building
Started up Summer 2016
\$3.3M and 19 months to complete

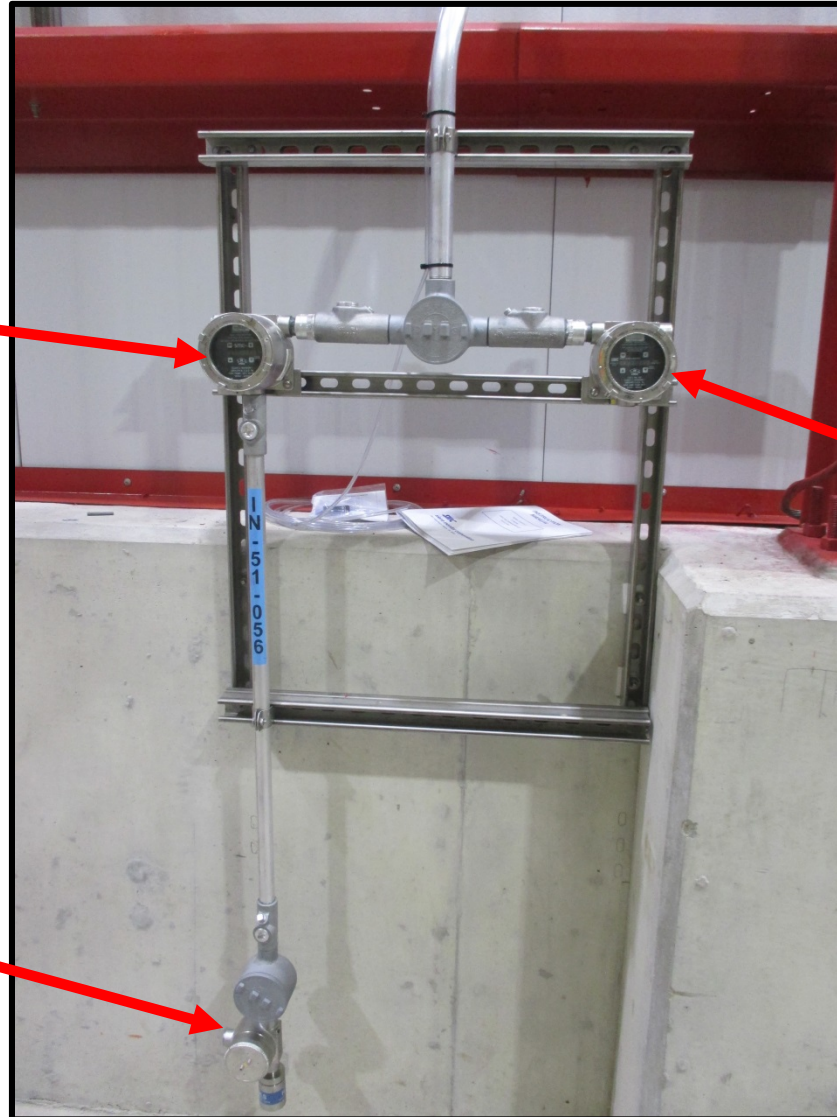
- Keeps concentrated waste product separate from the liquid treatment process and avoids downstream removal and pumping
- Preserves the grease, a waste product with relatively high BTU content for use as a fuel in the fluidized bed incinerators
- Improves hydraulic distribution at weirs and within conduits

Safety Features - Combustible and Methane Gas Detectors

Combustible Gas Indicator (H₂S)

Methane Gas Indicator (Sensor at Ceiling)

Floor Level Combustible Gas Sensing Head



Unloading Stations / Docks



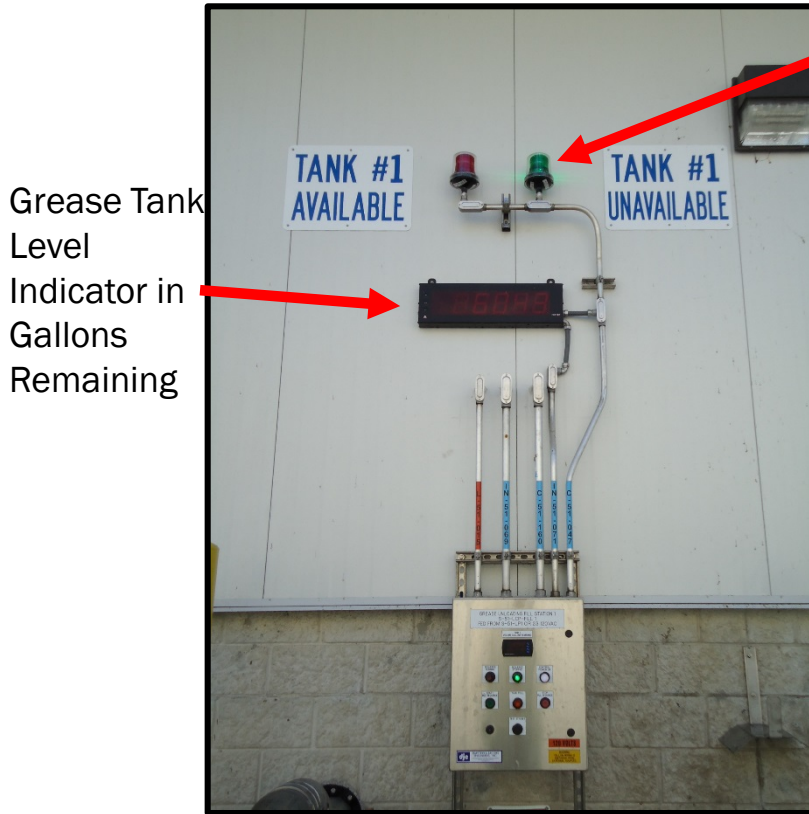
2 Grease
Unloading
Stations

A sample is
collected from
every truck



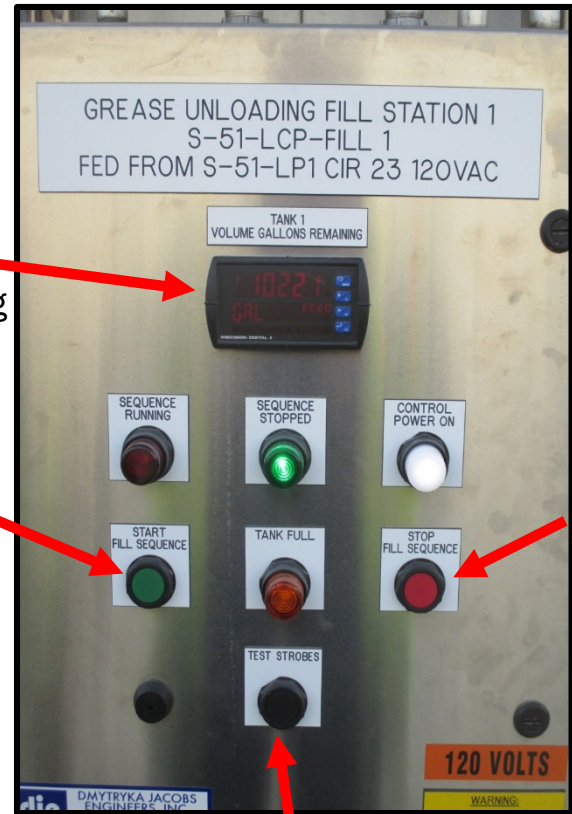
*Challenge: Assure contract haulers
are only unloading grease*

Unloading Station



Tank Level Light

Grease Tank Level Indicator in Gallons Remaining



Gallons Remaining

Start Fill Sequence Pushbutton

Stop Fill Sequence Pushbutton

Test Strobes Pushbuttons

Challenge: Make the unloading panels intuitive for non-NEORSD staff

Rock Traps and Grinders

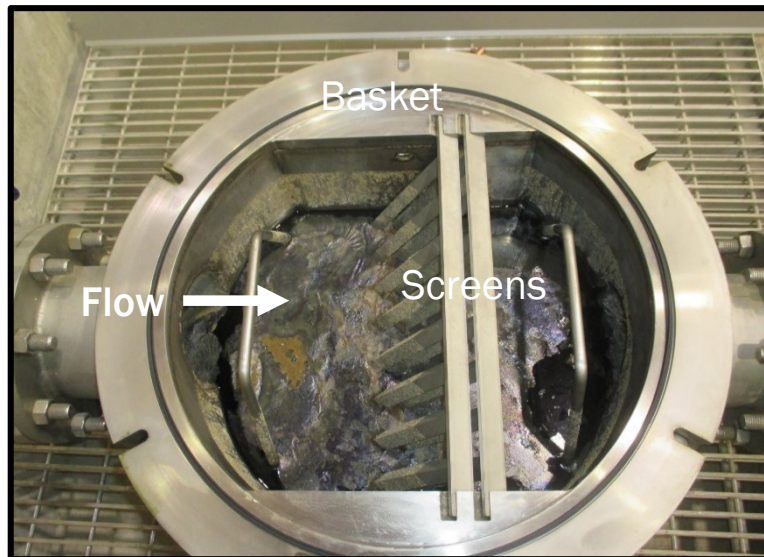
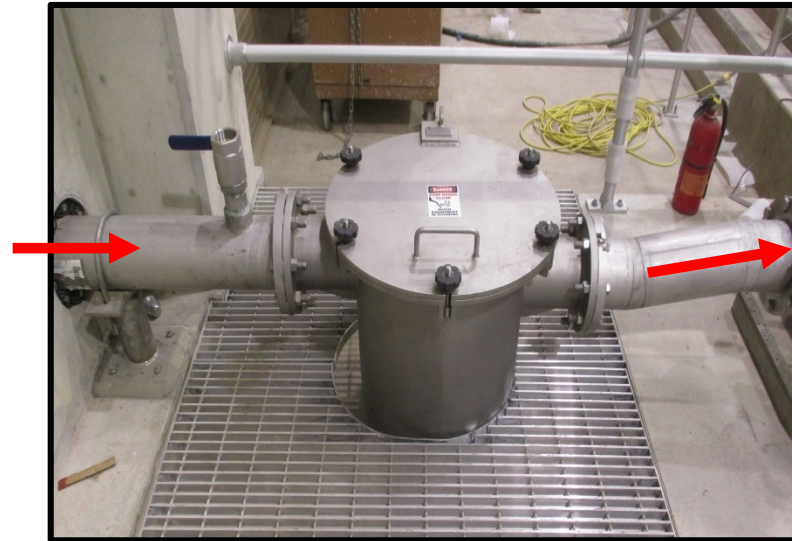
Manuf.: JWC Environmental

No. 2

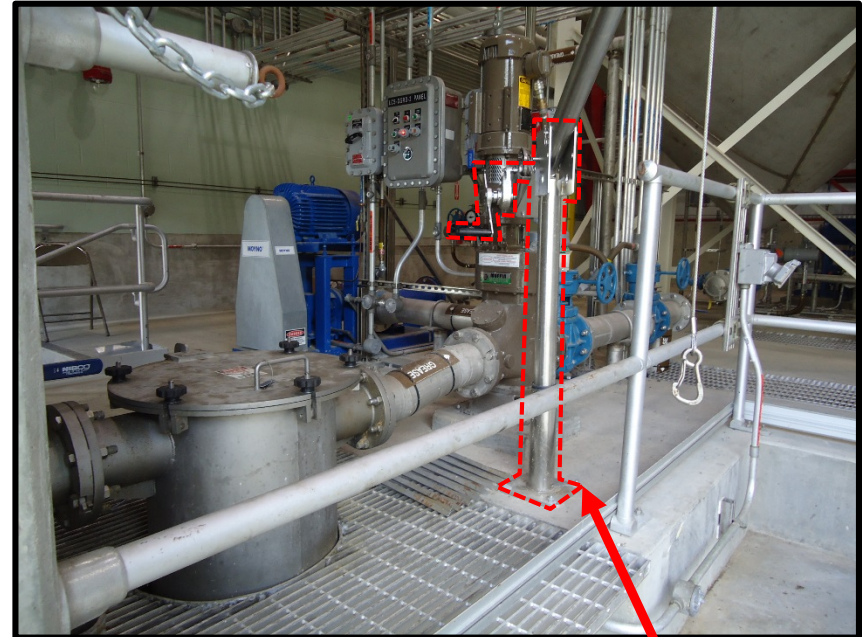
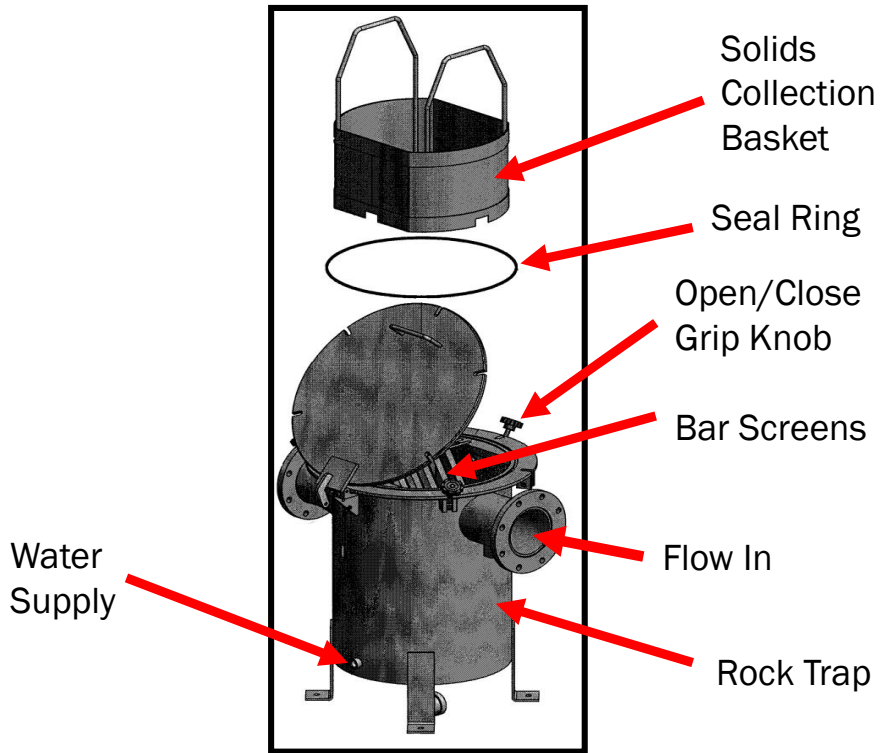
Capacity per Trap: 600
gpm, 5 HP

Purpose:

To collect heavy material before reaching the grinder, which then grinds remaining debris and protect the pumps



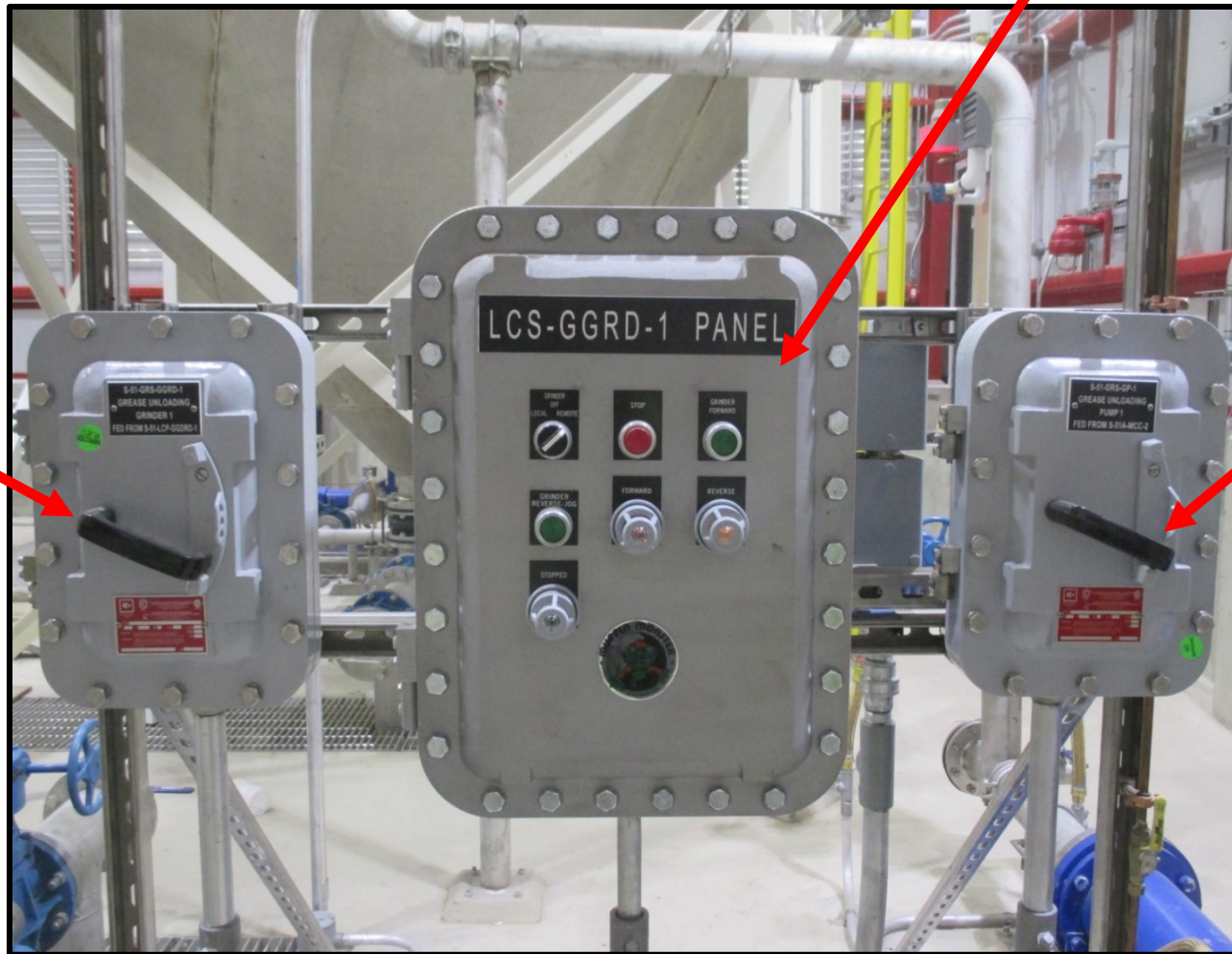
Rock Trap with Basket and Grinder



Davit for Basket

In-line Grinder Control Panel

In Auto, Grinder Control Panel, controlled by "Fill Start" sequence



Grinder Disconnect Switch

Pump Disconnect Switch

The Grease Storage Room is classified as an explosion proof area (Class 1, Div 1) and the Electrical Room is unclassified.

Grease Unloading Pumps

Qty: 1 per Tank

Manufacturer: Moyno (NOV)

Series: 2000

No. of Pumps: 2

Type: Positive displacement,
progressive cavity

Capacity per Pump: 350 gpm

Discharge Head: 100 ft

Motor Hp: 20



Liquid Grease Storage and Mixing Tanks

Manufacturer: International Production Specialists (IPS)

No. of Tanks: 2

Unheated

Dimensions

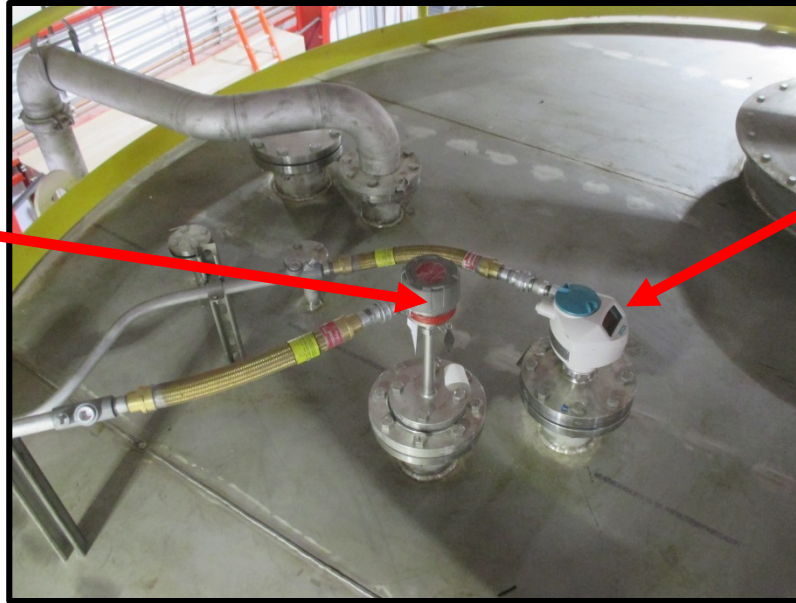
- Diameter – 13.5 ft.
- Side Height – 12 ft.
- Max. Liquid Depth – 10 ft.
- Cone Depth – 6.75 ft.

Capacity per Tank: 13,000 gallons

Challenge: Future thickening/subcanting may be desired



Liquid Grease Storage Tank Monitoring



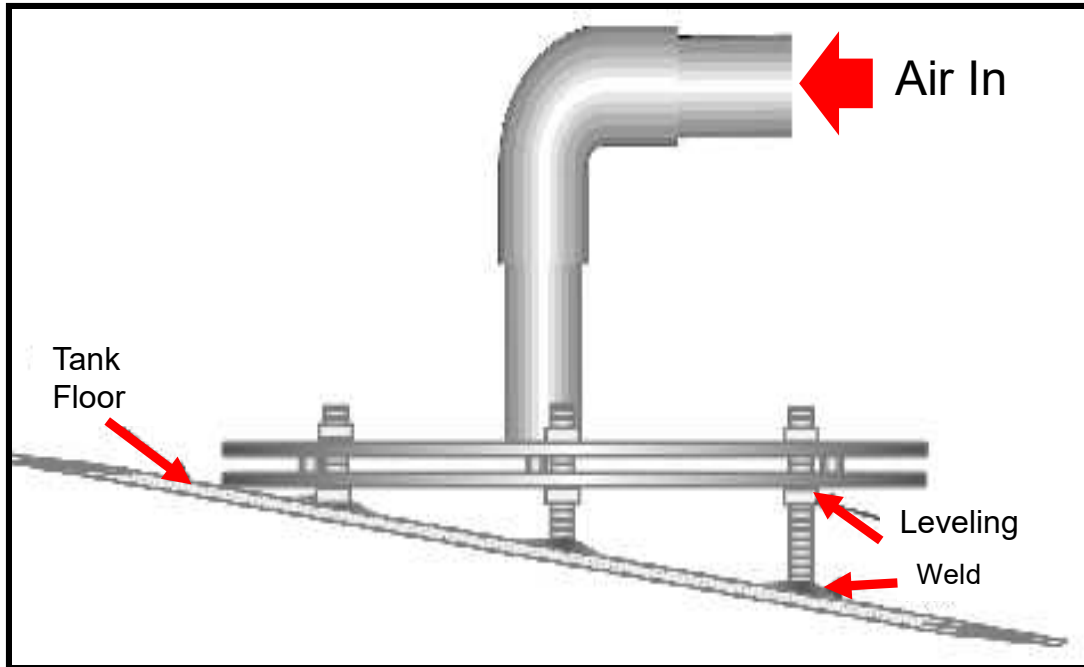
High
Level
Alarm
Sensor

Liquid Level
Sensor



Level
Indicator

Grease Storage Tank Air Mixing



Challenge: Prevent stratification

1. System parameters that control mixing efficiency:
 - Air Pressure
 - Pulse Duration
 - Pulse Frequency
2. Compressed air is injected to the diffuser plates at short pulses within the range of 40 to 80 psig.
3. The number of times the air valve opens (Pulse Rate) can be adjusted by the operator to optimize mixing from 1 to 6 times per minute.
4. Pulse duration can be adjusted by the operator between 0.2 to 0.8 seconds.

Grease Transfer Pumps

Manufacturer: Moyno (NOV)

Series: 2000

No. of Pumps: 2

Type: Positive displacement, progressive cavity

Capacity per Pump: 50 gpm

Discharge Head: 230 ft

Motor Hp: 10

No Flow Sensor
(There is a no flow
sensor on each of
the four grease
pumps)



Where can the grease that is removed from the Grease Storage Tanks be pumped?

Challenge: Integrate into existing skimmings handling facility which is not continuously staffed

Existing DAF Tanks and Concentrated Skimmings Tanks

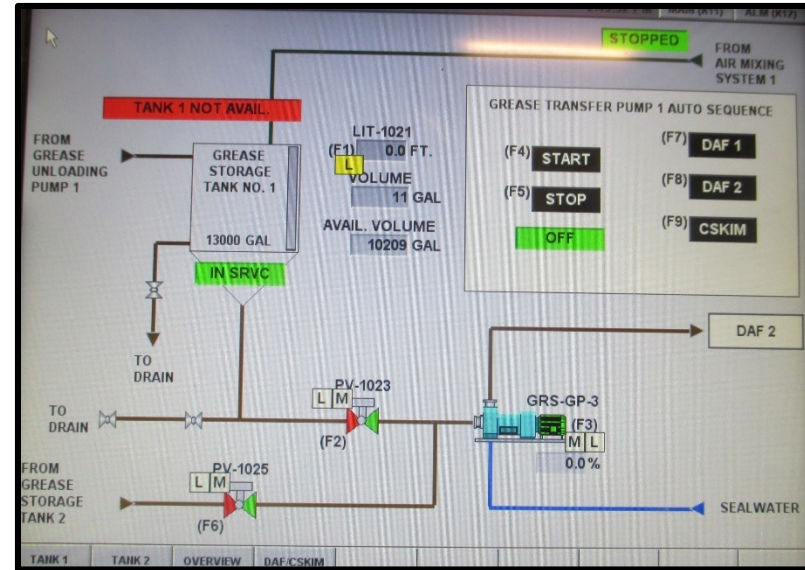
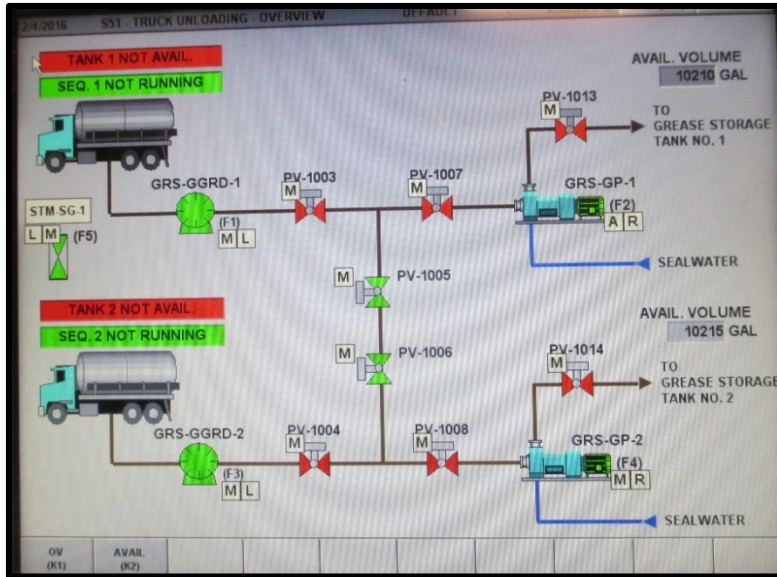


DAF Tank contents transferred to CSKIM Tanks



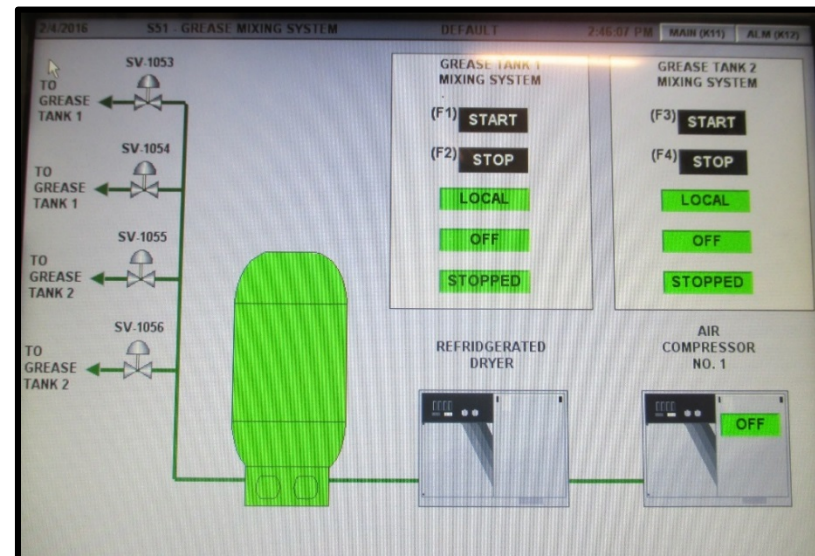
Heated CSKIM Tank

SCADA Operational Overview Provisions

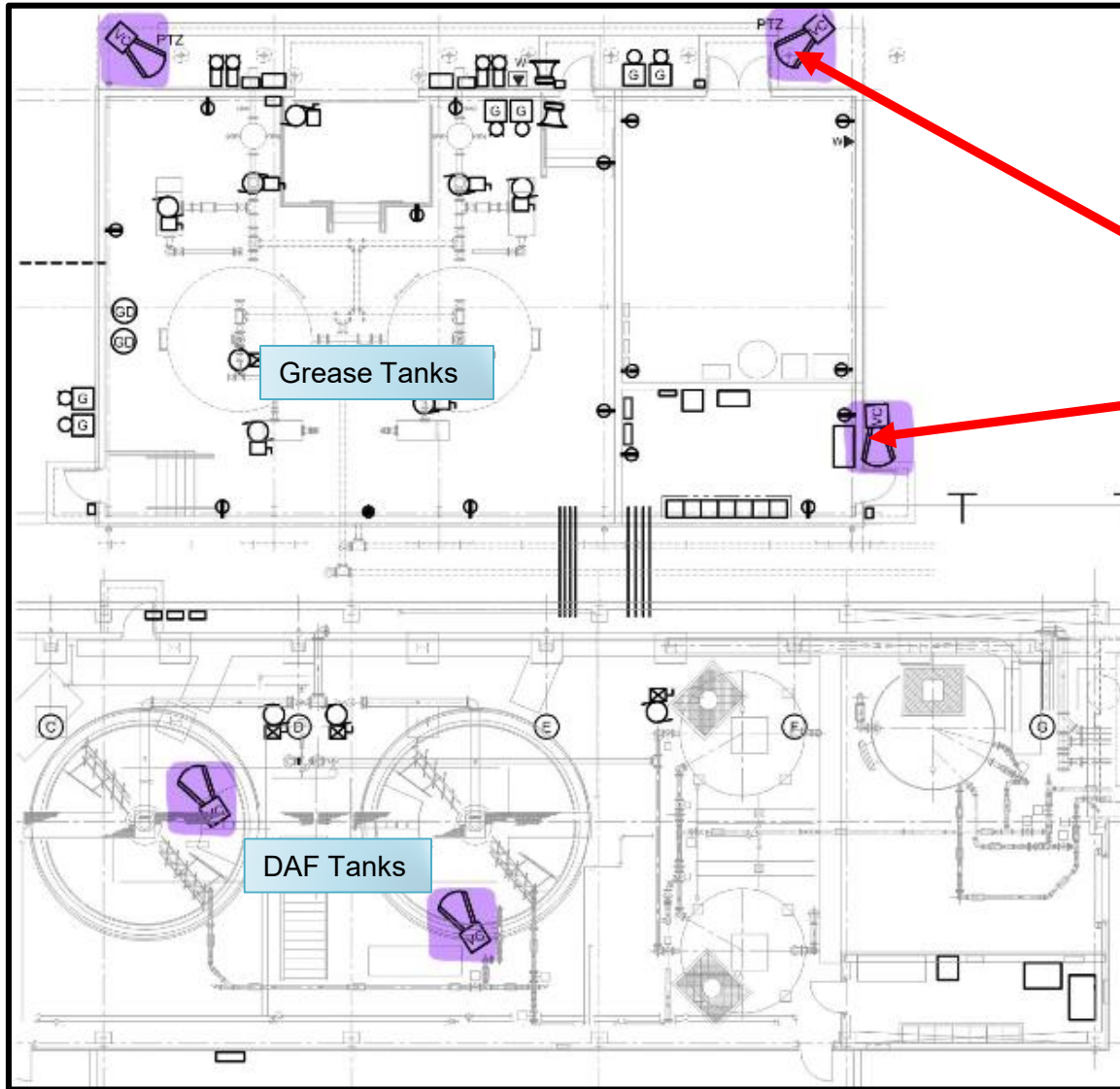


Three screens developed with Operations Staff

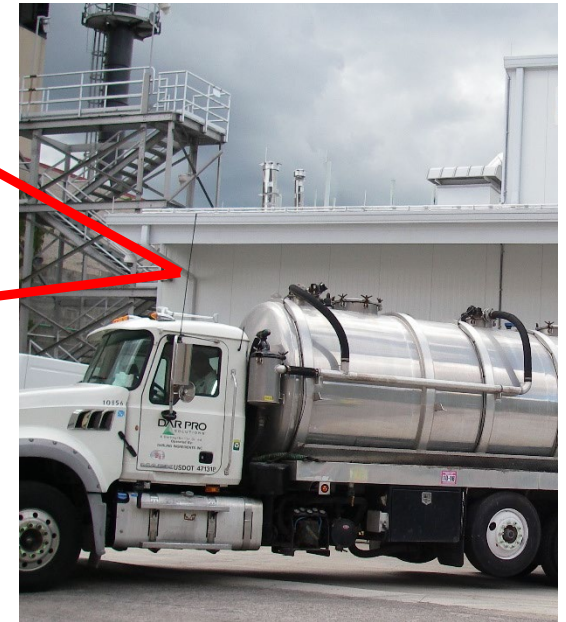
- Unloading
- Transferring
- Mixing



Operations Remote Monitoring Provisions



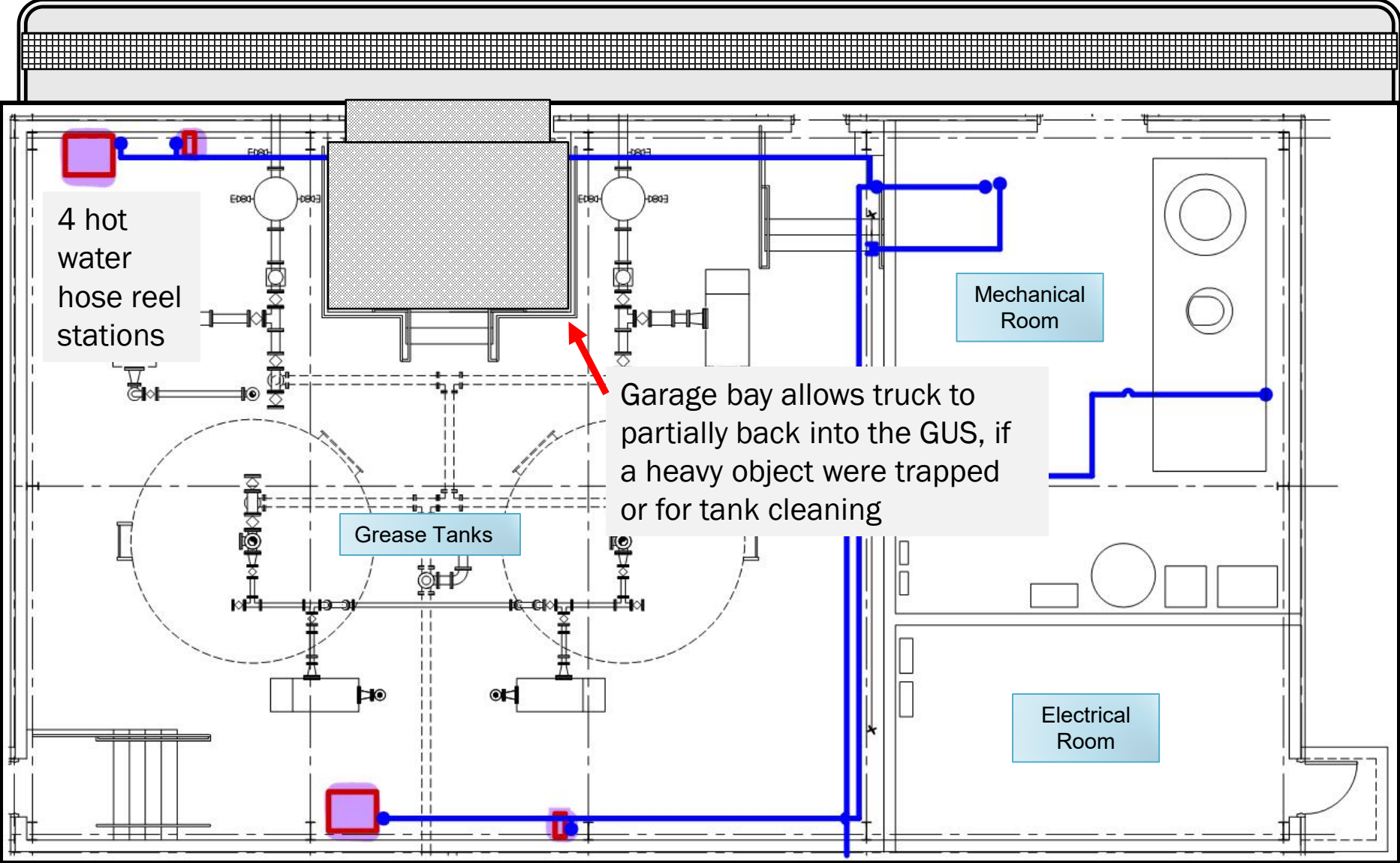
Five video cameras for security and to monitor the process



Challenge: remotely monitor DAF tanks to prevent overflowing from other skimmings pumps

Maintenance Provisions

Spill containment berm and trench drain



Garage bay allows truck to partially back into the GUS, if a heavy object were trapped or for tank cleaning

4 hot water hose reel stations

Grease Tanks

Mechanical Room

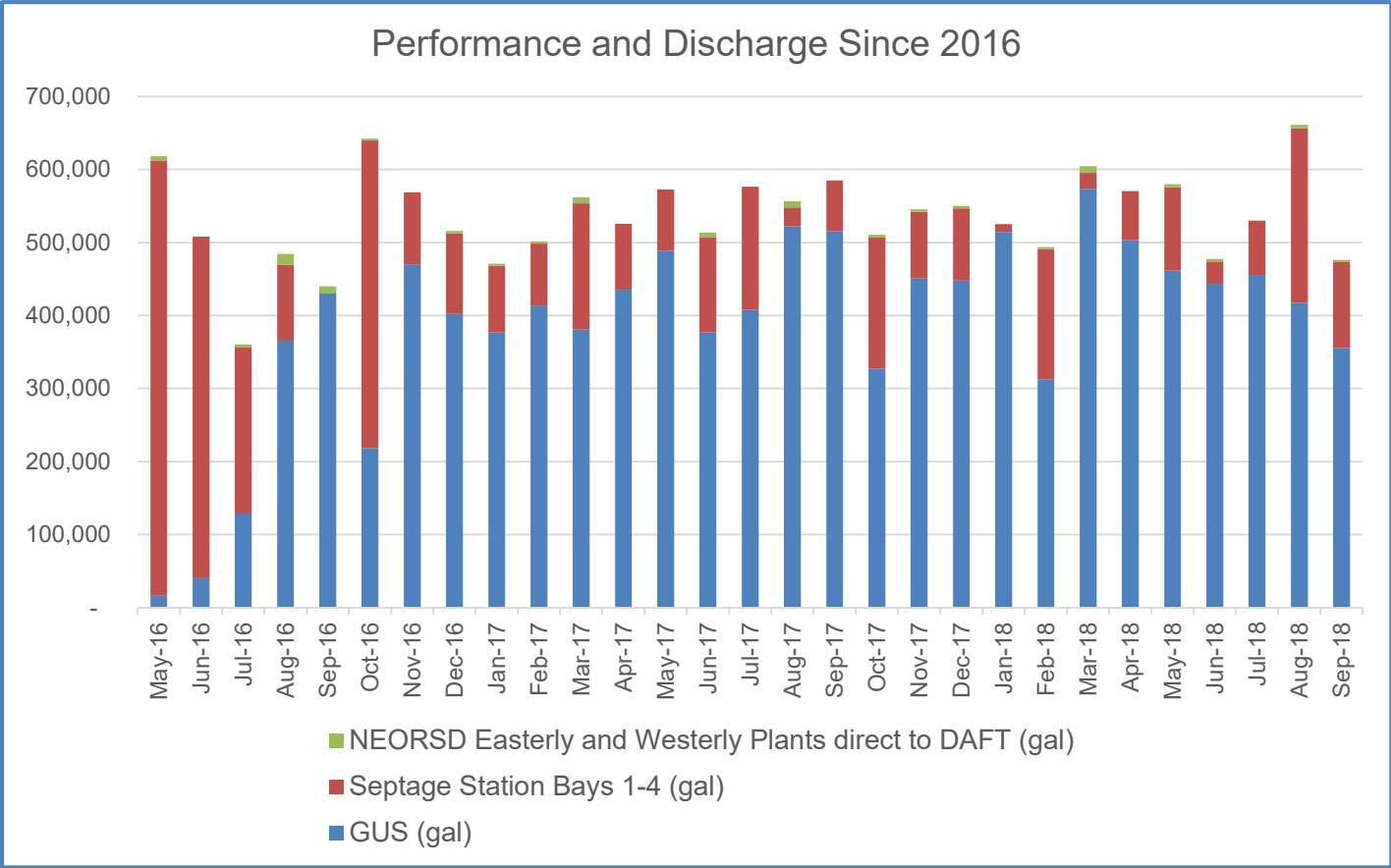
Electrical Room

Early Performance in Year 2016

	June	July	Aug	Sep	Oct	Nov	Dec
# Loads	10	34	103	126	62	138	108
Gallons	40,000	133,000	380,000	440,000	152,000	470,000	405,000
# of Vendors	2	3	5	11	14	14	10
Loads/ day	No data	2.3	4.7	6.0	6.2	6.0	4.1
Avg gal /load	4,000	3,900	3,700	3,500	2,500	3,400	3,800

Initial challenge: Building confidence that contract haulers are only unloading grease

Beneficial Plant Impact



*~15,000 BTU/lb volatile solids
 11 million gallons and 73% reduction in
 hauling discharge volume to headworks*

Lessons Learned / Operations Feedback



- Two shift operation, 24 hours a day, 28 staff trained
- 5 days a week, operating at 50% capacity
- Loads received during day shift
- Night shift cleans and flushes
- <15 minutes to unload, not every truck is full
- Storage tanks operated in tandem
- Rock trap is efficient but heavy, so davits added
- Tanker weighed, converted to gallons for billing
- SOPs incorporated for winter draining of traps
- Staffing resulted in addition of small operations office



NEORS currently charges a flat charge of \$40.00 per grease truck up to 1000 gallons. Over 1000 gallons, the fee charged is \$0.04/gallon.

Lessons Learned / Operations Feedback



Existing DAFT and Skimmings Facility

- Trucks with “heavy grease” are routed directly to DAFT; some haulers concentrate before delivery
- Grease transferred to DAFT, subcanted and mixed in two skimmings concentration tanks, then discharged to 3rd tank
- Fed to Fluidized Bed Incinerators 1-2 gpm
- Thickened ~54% total solids, 98.5% volatile, heated to 140°F

Questions

