# DCP Midstream Slug Catcher Data

## Designing for Zero-Failure:
## Bridging the Visibility Gap in High-Stakes Energy Infrastructure.

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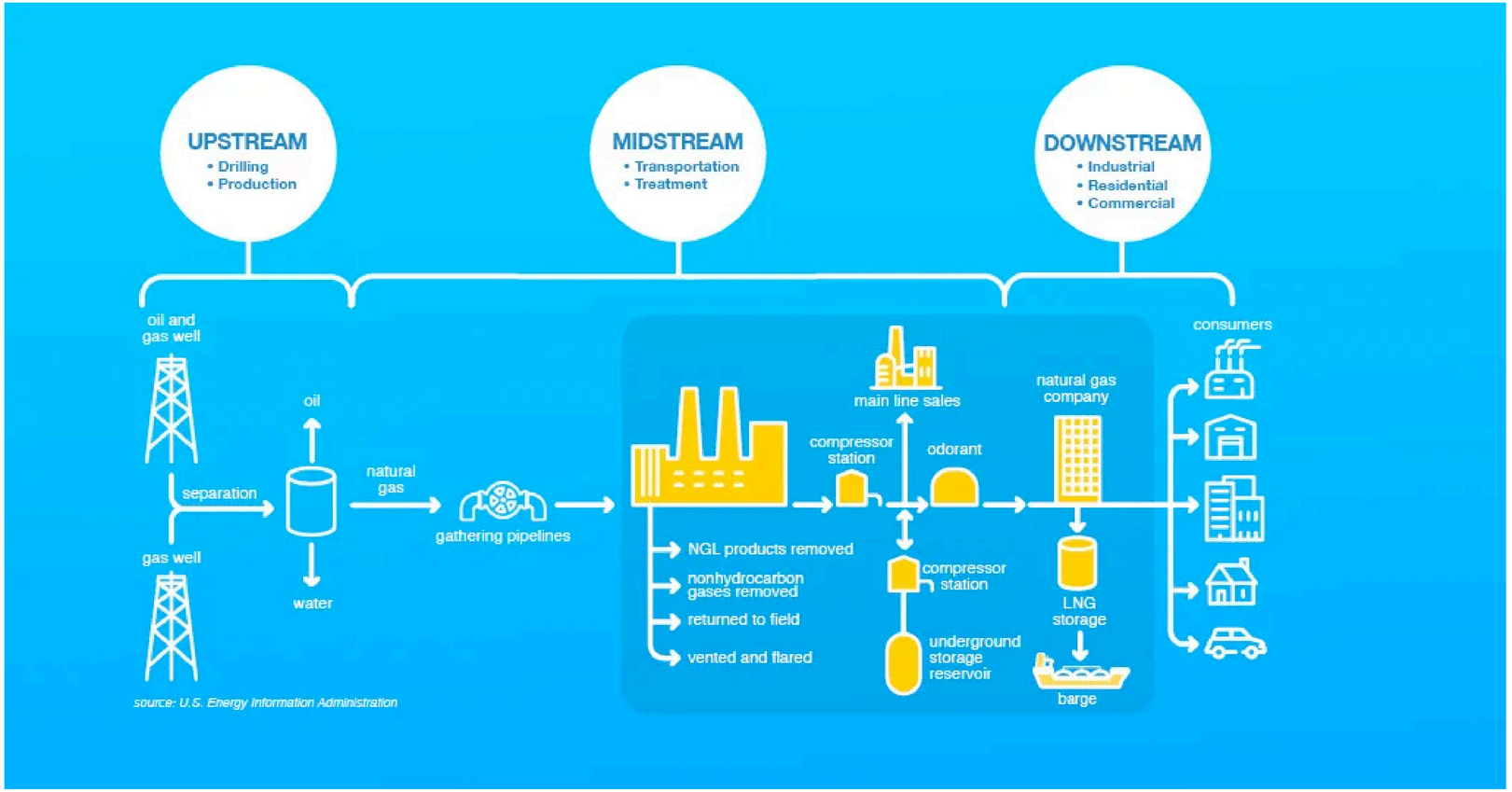
Lead UX Designer

# Terms: Midstream

Midstream is the ‘middleman’ of oil and gas—processing and moving product. The UX challenge here was a visibility gap between the pipelines and the plants.

- Pipelines
- Processing plants
- Storage facilities.



# The Stakes:

The ‘Slug Catcher’ is the first piece of equipment at the plant. If it overflows, it’s a catastrophic event: hundreds of thousands of gallons of oil spilling, causing fire hazards and soil contamination.

**798,000 Gallons**

of liquid surge of the plant is not prepared.
A single missed communication = catastrophic flood

# Research & Validation:

Mixed-Methods Approach:

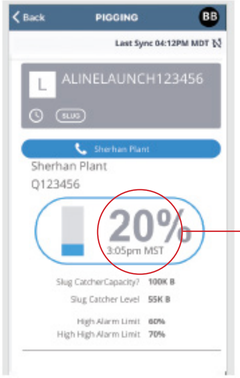
Interviewed 7 Operators
(including a 40-year veteran)
7 SCADA IT Experts

The mental model was correct,
but the tools were breaking.

100% Comprehension in Usability Testing

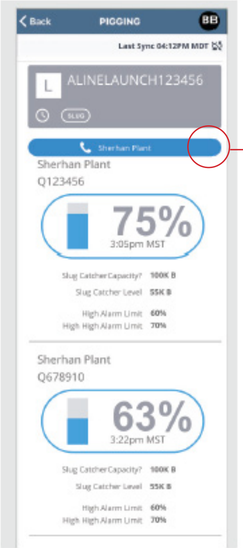
TASK 1

When to discuss levels with supervisors.



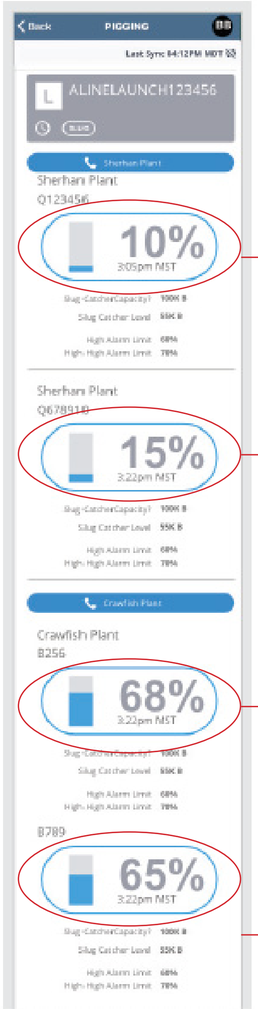

TASK 2

How to escalate high-risk levels.




TASK 3

How to identify available hardware (boosters/multiple catchers).



# The Friction:

## SCADA is a “failure”

It takes 15–30 minutes to get data, and connectivity in the field.

## 6 out of 7 Operators

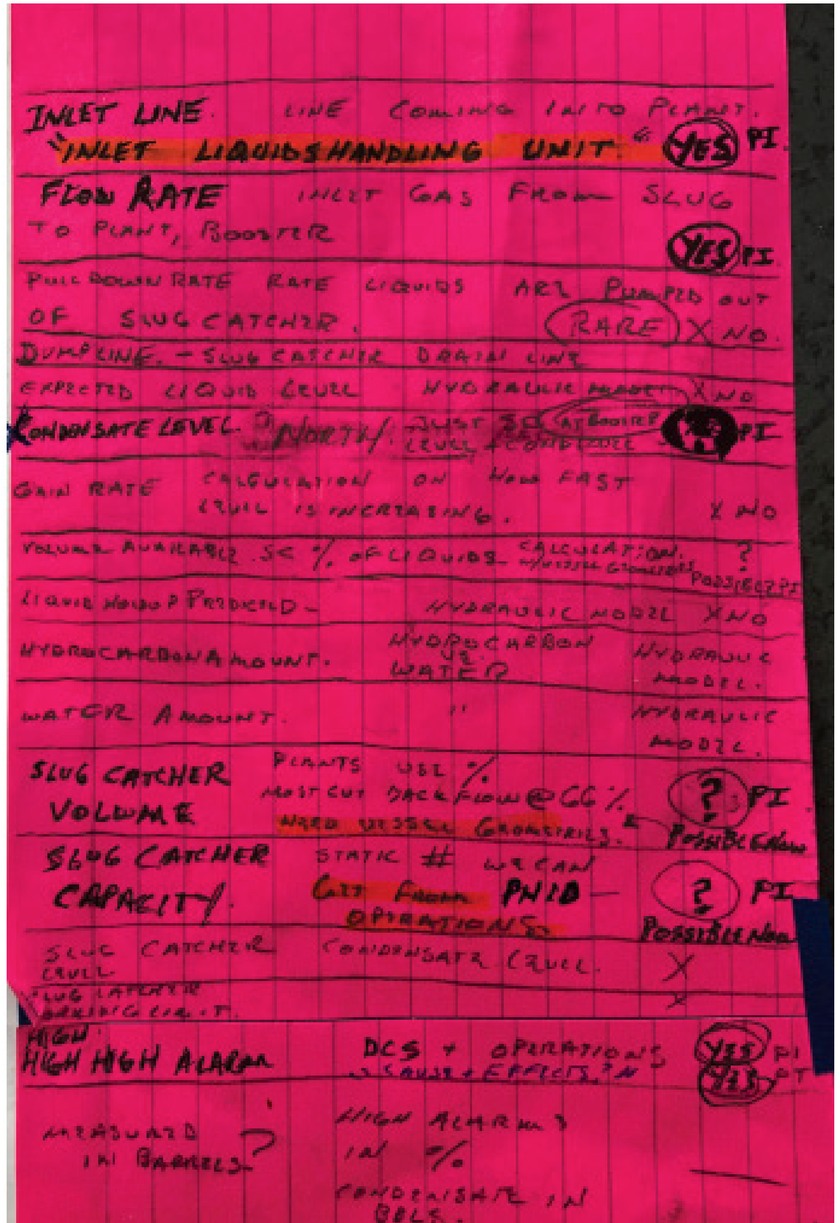
specifically requested SC data on iOS via OPSTools because SCADA was unusable.

## Fragmented

visibility across regions (North, Midcon, South, Permian) left plants “flying blind”

Operators didn’t need more data; they needed reachable data.

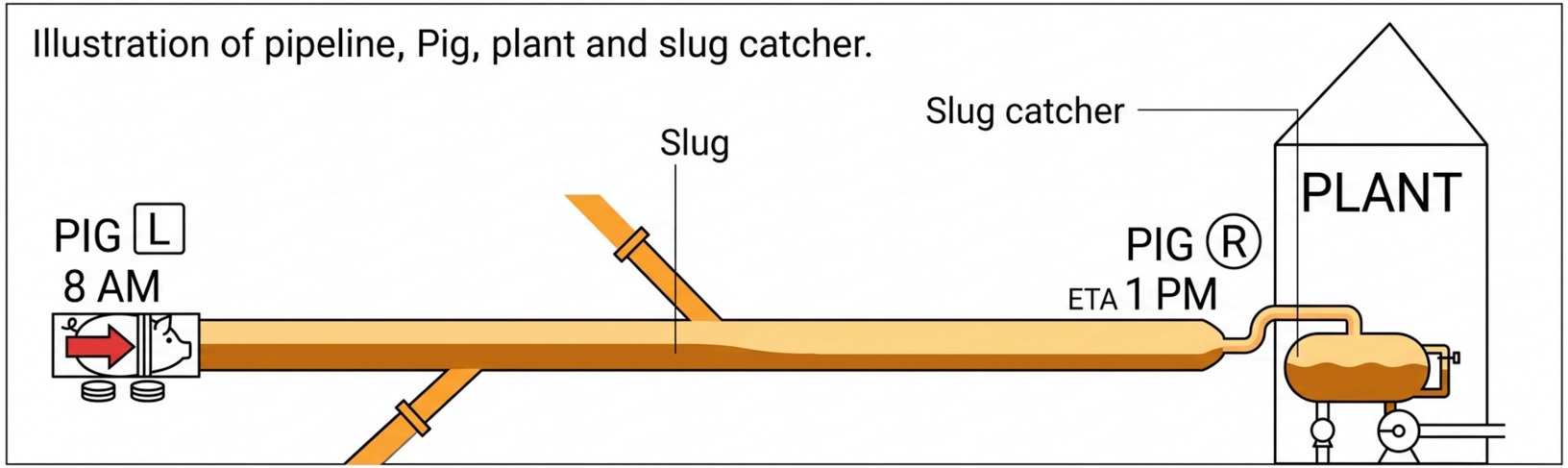
Possible data points that Field Ops and Plant Supervisors said would be helpful in OneSight & OPSTools



# The Process:

A ‘Pig’ pushes a ‘Slug’ (liquid/dirt) toward the plant. If the plant doesn’t know it’s coming, it floods.

Billy Ops, putting Pig in pipeline



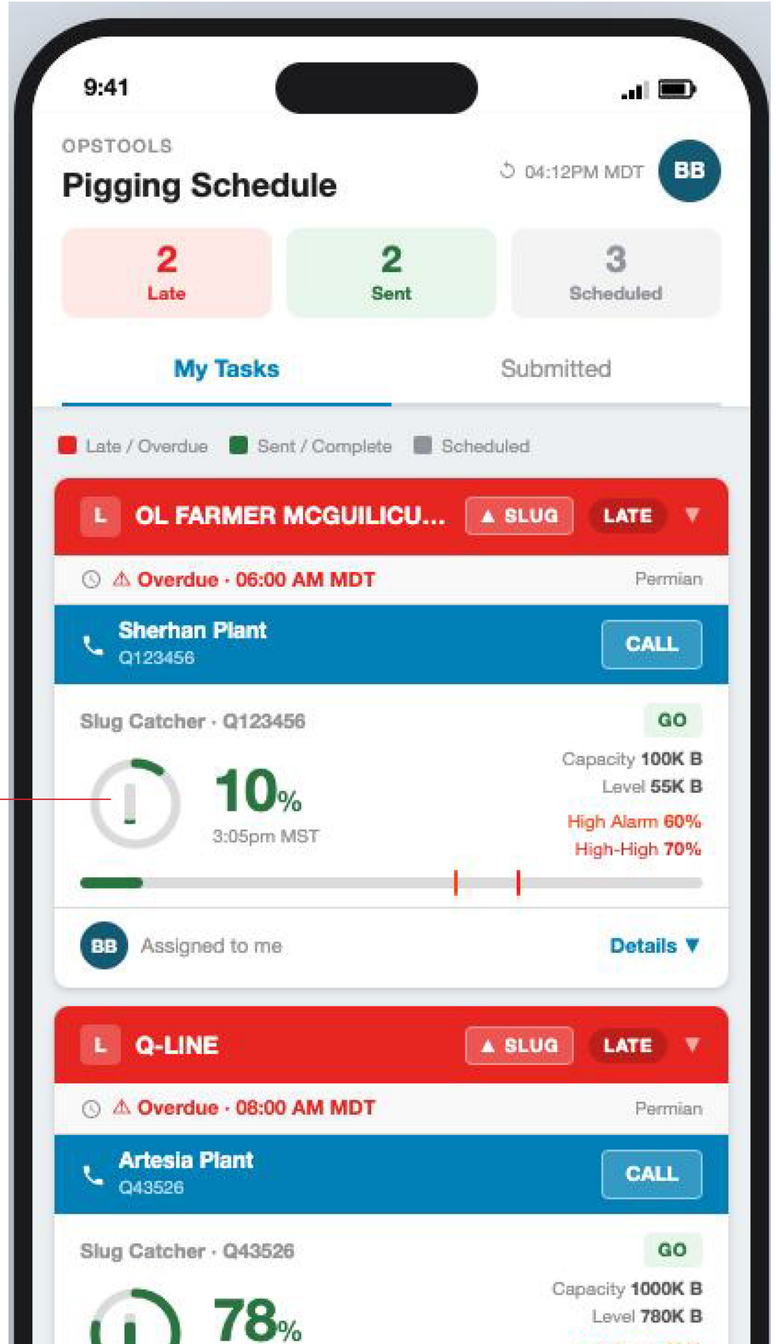
Bill, Pig and Joel

# The Solution:

For Field Operators

A real-time UI that visualized tank capacity as a percentage. This gave field ops the immediate ‘Go/No-Go’ clarity they needed before launching a pig.

Slug catcher capacity showing Go/No-Go



# OPSTools: Redesigned

A real-time UI that visualized tank capacity as a percentage. This gave field ops the immediate 'Go/No-go' clarity they needed before launching a pig.

Red = Late / Overdue

Green = Sent / Complete

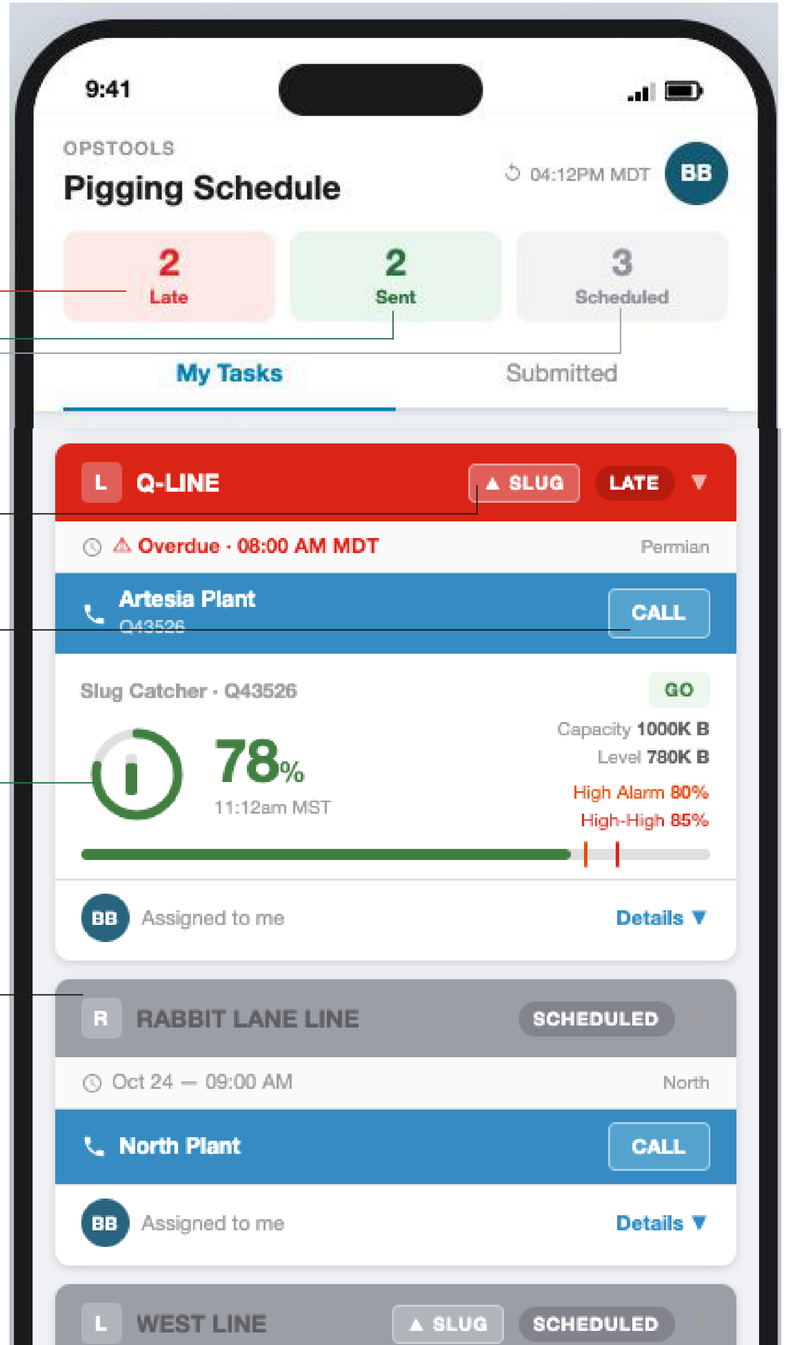
Grey = Scheduled

Slug Catcher connection iOT device

Call button for Plant

Green = Slug Catcher capacity from PI / SCADA

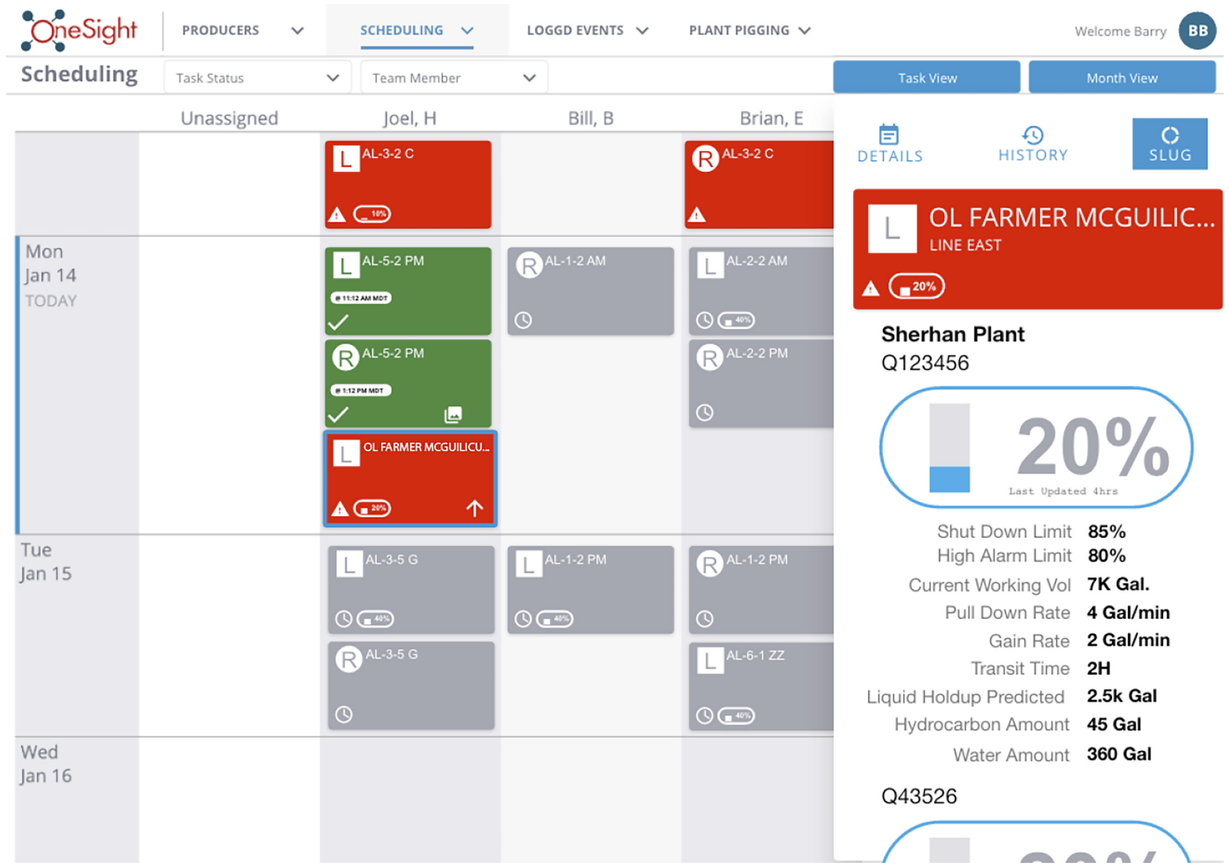
Grey = a scheduled task (may have data)



# Desktop Sync:

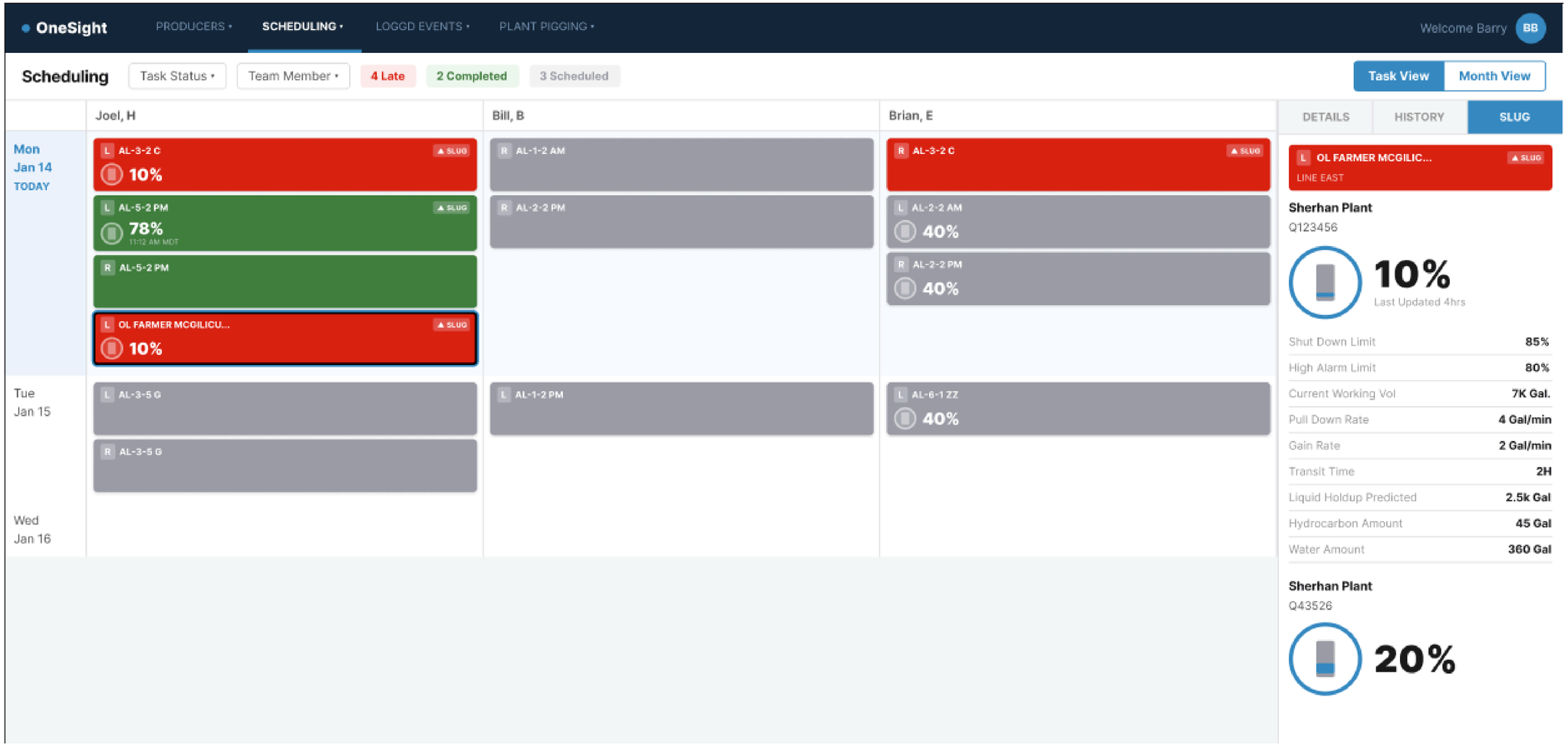
For Plant Managers

I mirrored this for plant managers. By synchronizing the feedback loop, we removed the ‘manual noise’ and gave everyone a single source of truth.



# Desktop Sync Redesigned

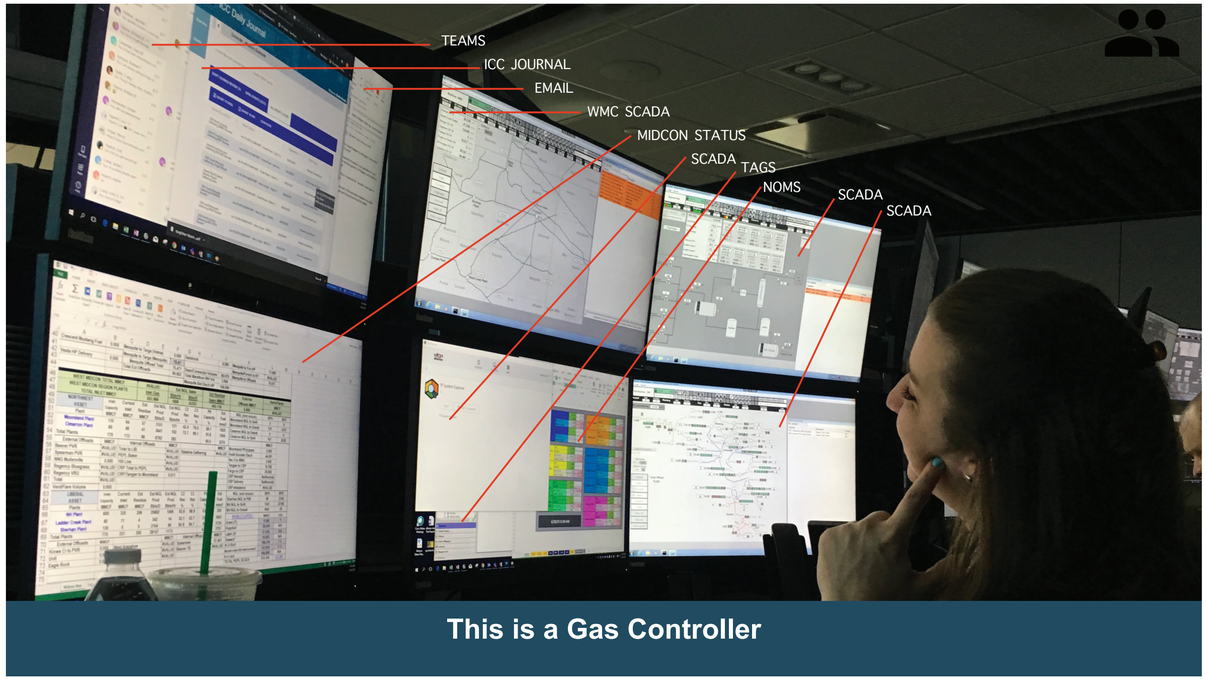
For Plant Managers



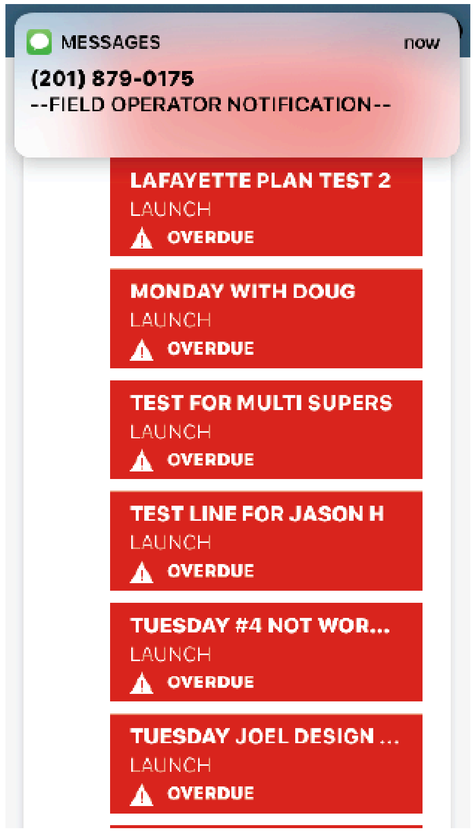
# Gas Controller App:

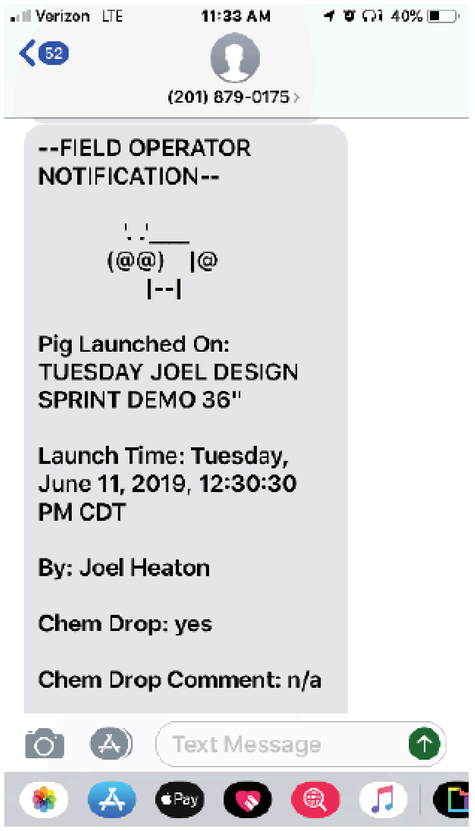
For Gas Controllers

Gas controllers juggle 10 apps on 6 screens. I designed automated text alerts so they could act on a message rather than staring at monitors all day.




Gas Controller with a sea of 10 applications on 6 screens.



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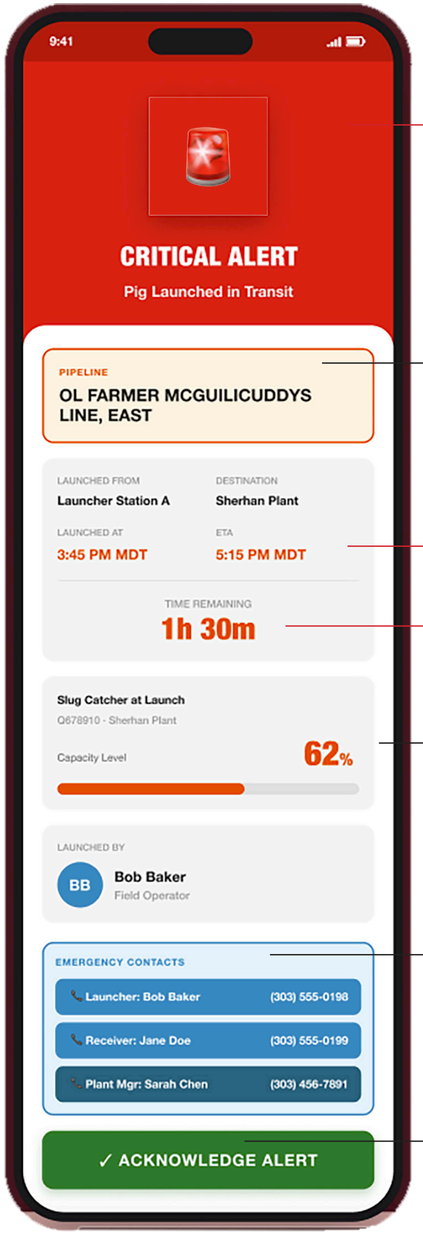



Haptic! Ding! Alert!
(Similar to amber alert)

Pipeline

Launch time specs

Time to receive liquids

Slug Catcher data, capacity

Call buttons for:
Launcher
Receiver
Plant

CTA acknowledgment

**Before:** 10 apps, 6 screens, ASCII text messages, no structure

**After:** 1 Screen, triage view, Live data, one-tap call

# The User

We identified our primary users: the Field Operator (safety) and the Plant Supervisor (capacity). Their core question was: ‘Is it safe to send it?

> *“The Field Operator or launch operator must communicate the launch. The Plant Ops and Supervisors “Must” know a pig is on the way.”*

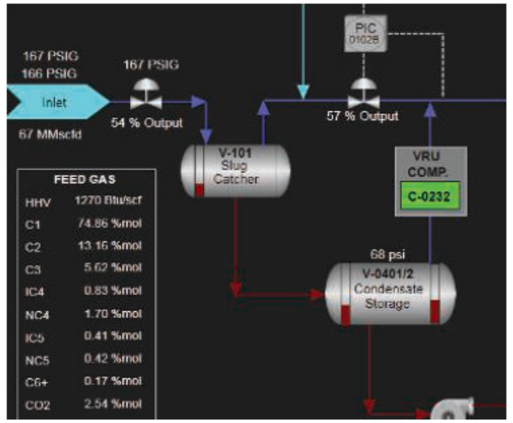
> *“Its go time, because if that tank is at 60% capacity 700k gallons will flood the plant! Period.”*

> *“The operator needs to know, Is it safe?, Can I send it?, Is there room in the tank?”*

> *“The plant needs to handle the condensate and everything coming down the pipe”*

# Distillation:

I distilled complex SCADA metrics into a single, actionable percentage. This translated raw sensor data into immediate situational awareness.




SCADA Raw Data

→

20%

Slug Catcher
Capacity

→

One number.
One decision.

Go / No-Go

High Alarm 60%
High-High 70%

# Before vs. After:

## Before:

**Pig Launch:** Operators initiate the pigging process, sending an unmonitored liquid slug toward plant.

**Fragmented Communication:** Coordination relies on manual, “noisy” workflows—including paper logs, clipboards, and verbal hand-offs—that fail to provide a single source of truth.

**Operational Visibility Gap:** Legacy regional technology and inconsistent scheduling leave the plant “flying blind,” creating a high-risk environment prone to flooding and shutdowns.

## After:

**Precision Launch:** Operators leverage real-time tank capacity data to confirm “Go/No-Go” status before initiating any pigging operation.

**Unified Communication:** Manual “noise” is replaced by a centralized UI component, synchronizing Field Ops, Plant Managers, and Gas Control through a single source of truth.

**Total Situational Awareness:** Integrated text alerts and desktop/mobile visibility eliminate the “flying blind” risk, ensuring the plant is prepared for every delivery and protected from flooding.

# The Ecosystem:

Three products. One source of truth. Zero missed communications.

**OPSTools**
Mobile - Field Operator

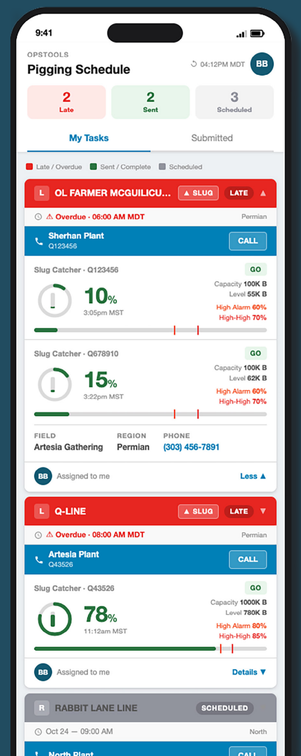
Launches the pig
Checks Slug catcher levels
Go/No-Go decision

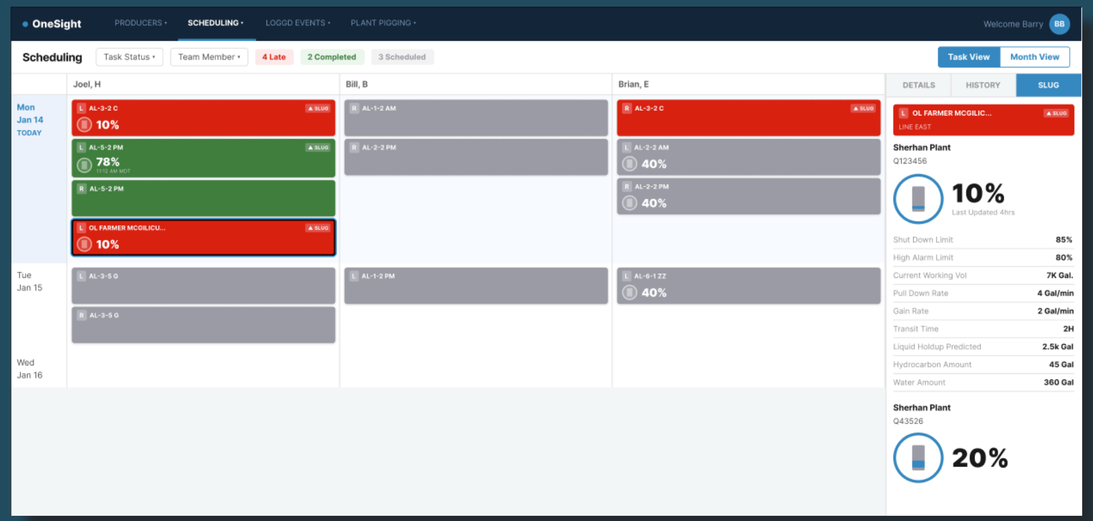
**OneSight**
Desktop - Plant Manager

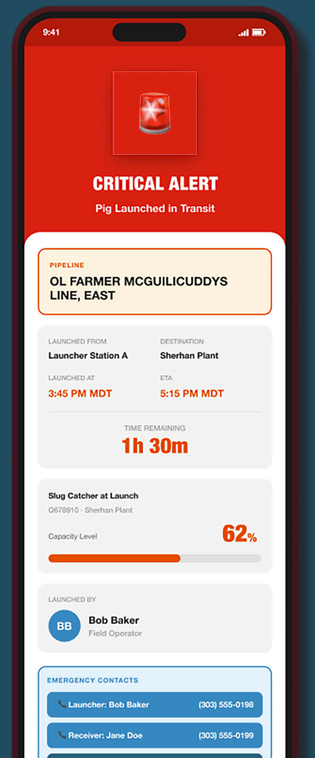
Manages the pigging schedule
Sees all team tasks
Monitors slug catcher levels

**GasController**
Mobile - Gas Controller

Receives inbound pig alerts
Monitors surge risk
Prepares slug catcher receiver




Shared design system • RED=Late • GREEN=Sent • GREY=Scheduled
SLUG=live slug catcher data
Go/NoGo gauge • Plant call bar

# Validation

We standardized metrics to provide ‘at-a-glance’ awareness

> “This is perfect! It lets the field know... They feel my pain.”

> “Same as PI a diagram that shows the tank capacity in %, showing how much was in there and how much space there was.”

## Technical Requirements

**IOT Integration:** Retrofit older tanks with IOT sensing units to bring legacy infrastructure into the real-time ecosystem.

**Critical Safety Logic:** Implement “High-High” alarm limits; note that currently only 50% of units support this, requiring a strategic investment in additional IOT hardware.

**Standardized Metrics:** Display Slug Catcher levels by percentage to provide universal “at-a-glance” capacity awareness.

**System Mapping:** Identify and integrate unique Equipment IDs for all slug catchers into SCADA for centralized tracking.

# The Bottom Line:

By unifying the data stream, we replaced chaotic guesswork with **absolute situational awareness.** We ensured that safety is never compromised by a missed phone call.

**Bridge the Hardware Gap:** Retrofit legacy assets with IOT devices to bring 100% of slug catchers into the digital ecosystem.

**Establish a Single Source of Truth:** Replace fragmented texts and word-of-mouth with a real-time dashboard that connects every user—from the field to the NOC—in one accountable system.

**Integrate the Data Loop:** Map unique Equipment IDs and pipe segments directly into PI and SCADA to ensure metrics are accurate and synchronized.

**Prioritize Accountability:** Build a centralized scheduling and notification framework where every pig launch is visible, tracked, and confirmed by all stakeholders.