



EMERSON EXCHANGE 2025

ACCELERATING INNOVATION



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INNOVATION

1-1665 - Building a Strong Tank Farm Wireless Radar Network to Save Time and Inventory Costs

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Inquiries should be directed to:
EmersonExchange@Emerson.com



Karman Dadiala

Process Engineer, Nachurs Alpine Solutions



Cheryl Menzies

Account Manager, Lakeside Process Controls



Agenda

KARMAN DADIALA

Nachurs Alpine Solutions - Overview

KARMAN DADIALA

Tank Farm Overview

KARMAN DADIALA

Inventory Requirements

CHERYL MENZIES

Wireless Trial

CHERYL MENZIES

Wireless Solution

KARMAN DADIALA

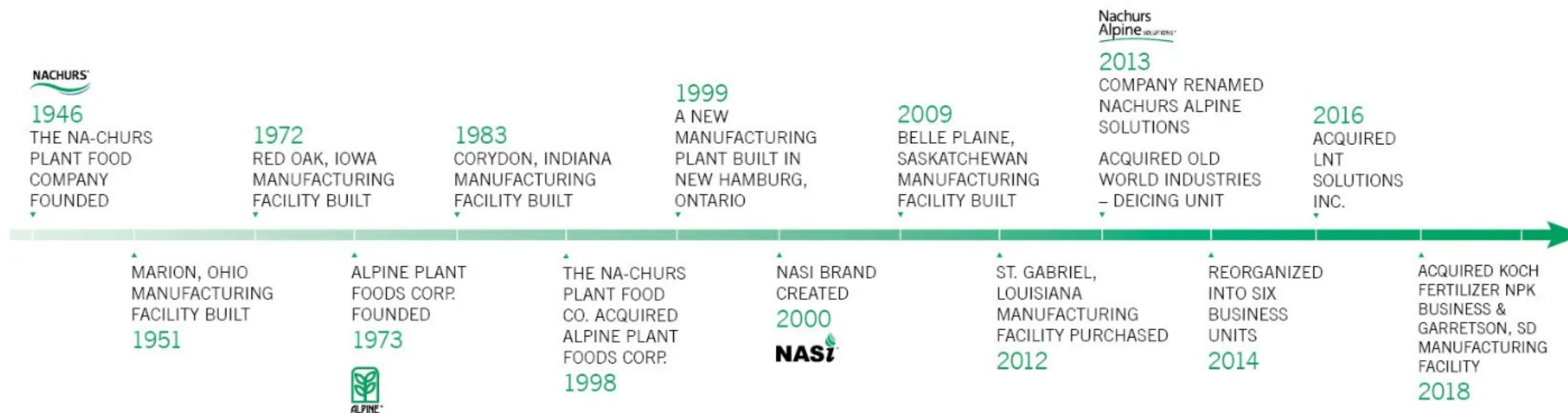
Summary

Nachurs Alpine Solutions

- **ALPINE Liquid Fertilizers** is the Canadian division of Nachurs Alpine Solutions® (NAS), who is a leading manufacturer of liquid fertilizers in North America - providing quality products since 1946. NAS has manufacturing plants in New Hamburg, Ontario; Belle Plaine, Saskatchewan; Marion, Ohio; Corydon, Indiana, Red Oak, Iowa and St. Gabriel, Louisiana. NAS markets specialty precision liquid in-furrow starters, foliar fertilizers, and micronutrients for field and specialty crops under the ALPINE brand in Canada. Nachurs Alpine Solutions is owned by Wilbur Ellis.

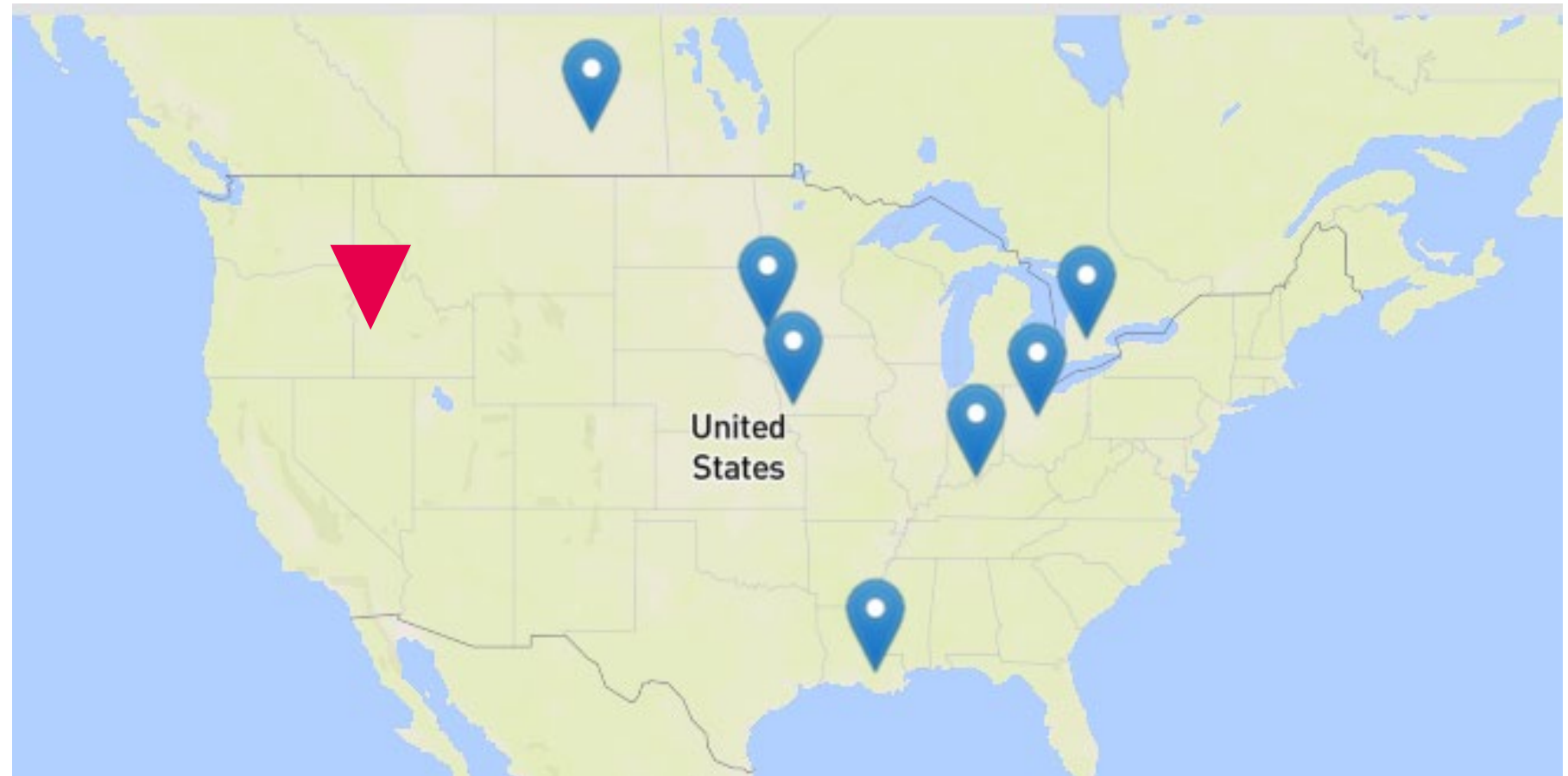


Nachurs Alpine Solutions - History



Nachurs Alpine Solutions - Locations

- Marion, OH, US – Corporate Office
- New Hamburg, ON, Canada
- Corydon, IN, US
- St Gabriel, LA, US
- Belle Plaine, SK, Canada
- Garretson, SD, US
- Red Oak, IA, US
- **Future Location - Boise, ID, USA**



Tank Farm Overview

- 104 Outdoor Tanks
 - Concrete silos
 - HDPE
 - Stainless steel
- 28 Indoor Tanks
 - HDPE
 - Stainless steel
- Storing raw materials and finished goods
 - Acids
 - Bases
 - Neutral, non-corrosive



Nachurs Alpine Inventory Issues

- Recurring "slippages" on certain products
 - Mismatch in theoretical inventory vs actual "on-hand"
- Lack in confidence with manual checks
 - Temperature, equipment, operator
- Over-filling storage tanks
- Inventory cost \$5-10 CAD/liter
- Labour intensive
 - Operator manually check levels daily or weekly consumes several hours that could be better spent on other tasks
- Unreliable level measurements lead to inaccurate inventory reporting, potentially resulting in missed customer orders due to insufficient stock.

Nachurs Alpine Inventory Management Challenges

- High density tank farm (104 tanks total)
- Ammonia and other residual process vapours + steam
- Relocating current tank farm 100 m to the west in a new containment pad
- Some tanks have aluminum domes



Transition to wireless radars



User interface

EMERSON | **Wireless Gateway** | Version: 6.7.7 | oper (oper) | About | Help | Logout

OutdoorGW1 | 10.6.223.209 | Home | **Devices** | System Settings

All Devices 36 | **Live 35** | Unreachable 1 | Power Module Low 0

WirelessHART Devices | 50 | Live | Name (A-Z) |

+ Name	PV	SV	TV	QV	Last Update
+ <input checked="" type="checkbox"/> AN1-AMN	<input checked="" type="checkbox"/> 13.888 ft	<input checked="" type="checkbox"/> 20.362 ft	<input checked="" type="checkbox"/> 73.85 DegF	<input checked="" type="checkbox"/> 7.201 V	03/19/25 12:23:24
+ <input checked="" type="checkbox"/> CA3-Calcium 70%	<input checked="" type="checkbox"/> 21.305 ft	<input checked="" type="checkbox"/> 9.945 ft	<input checked="" type="checkbox"/> 76.55 DegF	<input checked="" type="checkbox"/> 7.223 V	03/19/25 12:23:22
+ <input checked="" type="checkbox"/> CA4-Calcium 70%	<input checked="" type="checkbox"/> 21.721 ft	<input checked="" type="checkbox"/> 9.529 ft	<input checked="" type="checkbox"/> 74.75 DegF	<input checked="" type="checkbox"/> 7.217 V	03/19/25 12:23:10
+ <input checked="" type="checkbox"/> H10-G241S	<input checked="" type="checkbox"/> 24.683 ft	<input checked="" type="checkbox"/> 9.567 ft	<input checked="" type="checkbox"/> 69.8 DegF	<input checked="" type="checkbox"/> 7.207 V	03/19/25 12:23:12
+ <input checked="" type="checkbox"/> H11-G241S	<input checked="" type="checkbox"/> 24.826 ft	<input checked="" type="checkbox"/> 9.424 ft	<input checked="" type="checkbox"/> 71.15 DegF	<input checked="" type="checkbox"/> 7.21 V	03/19/25 12:23:19
+ <input checked="" type="checkbox"/> H12-AMS 38%	<input checked="" type="checkbox"/> 29.744 ft	<input checked="" type="checkbox"/> 4.506 ft	<input checked="" type="checkbox"/> 73.85 DegF	<input checked="" type="checkbox"/> 7.211 V	03/19/25 12:23:13
+ <input checked="" type="checkbox"/> H13-G241S	<input checked="" type="checkbox"/> 18.67 ft	<input checked="" type="checkbox"/> 15.58 ft	<input checked="" type="checkbox"/> 70.7 DegF	<input checked="" type="checkbox"/> 7.192 V	03/19/25 12:23:12
+ <input checked="" type="checkbox"/> H14-G241S	<input checked="" type="checkbox"/> 27.511 ft	<input checked="" type="checkbox"/> 6.989 ft	<input checked="" type="checkbox"/> 70.25 DegF	<input checked="" type="checkbox"/> 7.122 V	03/19/25 12:23:35
+ <input checked="" type="checkbox"/> H15-G241S	<input checked="" type="checkbox"/> 27.473 ft	<input checked="" type="checkbox"/> 7.027 ft	<input checked="" type="checkbox"/> 71.15 DegF	<input checked="" type="checkbox"/> 7.102 V	03/19/25 12:23:01
+ <input checked="" type="checkbox"/> H5-Impulse	<input checked="" type="checkbox"/> 10.421 ft	<input checked="" type="checkbox"/> 23.829 ft	<input checked="" type="checkbox"/> 72.5 DegF	<input checked="" type="checkbox"/> 7.202 V	03/19/25 12:23:25
+ <input checked="" type="checkbox"/> H6-Impulse	<input checked="" type="checkbox"/> 9.634 ft	<input checked="" type="checkbox"/> 24.616 ft	<input checked="" type="checkbox"/> 71.6 DegF	<input checked="" type="checkbox"/> 7.198 V	03/19/25 12:23:28
+ <input checked="" type="checkbox"/> H7-Impulse	<input checked="" type="checkbox"/> 28.418 ft	<input checked="" type="checkbox"/> 5.832 ft	<input checked="" type="checkbox"/> 70.7 DegF	<input checked="" type="checkbox"/> 7.206 V	03/19/25 12:23:41
+ <input checked="" type="checkbox"/> H8-3-18,5-17,5	<input checked="" type="checkbox"/> 7.117 ft	<input checked="" type="checkbox"/> 27.133 ft	<input checked="" type="checkbox"/> 71.15 DegF	<input checked="" type="checkbox"/> 7.21 V	03/19/25 12:23:15
+ <input checked="" type="checkbox"/> H9-3-18,5-17,5	<input checked="" type="checkbox"/> 26.883 ft	<input checked="" type="checkbox"/> 7.367 ft	<input checked="" type="checkbox"/> 69.8 DegF	<input checked="" type="checkbox"/> 7.205 V	03/19/25 12:23:34

Field Trial

- In 2019 - Field trial with wireless radars inside six (6) concrete silos with aluminum domes on highest volume and highest margin product



The Solution

- Purchased 5 x 3308 and one gateway in late 2019 with remote antenna
- Purchased 1/month under maintenance budget
- In 2020 added wired radar with THUM for lime tank
- Oct 2021 added additional 11
- Added 1410S/781 for Inside Tanks
- Upgraded to new 1410S/781 for Outdoor Tanks
- Currently have ~50 wireless level transmitters



Issues with Gateway and Connections

+	✘ S2-S0018126	✘ 17.203 ft	✘ 9.297 ft	✘ 93.2 DegF	✘ 7.23 V	05/20/24 16:46:22
+	✘ S3-S0018125	✘ 3.491 ft	✘ 23.009 ft	✘ 90.05 DegF	✘ 7.185 V	05/20/24 16:53:00
+	✘ S4-S0018127			✘ 94.55 DegF	✘ 7.212 V	

Device Information												
Node	MAC	Device Type	TagName	Desc	Long Tag	Overall Reliability	Joins	Links	mxQ	Uptime	State	Update Rates (sec)
1	00-17-0D-00-00-4C-C3-00						1	57	0	7-01:12:05	Oper	
2	00-1B-1E-26-6E-0F-A3-6E	3308	S0018126		S2-S0018126	28.1428571428571	2	10	3	01:06:16	Oper	ID 0: 60 ID 1: 300
3	00-1B-1E-26-6E-0F-A2-E2	3308	S0018125		S3-S0018125		0	0	0	00:00:00	Idle	
4	00-1B-1E-26-6E-0F-A3-09	3308	S0018127	S4	S4-S0018127		0	0	0	00:00:00	Idle	
6	00-1B-1E-26-6E-0F-A2-FA	3308	S0018128		S6-S0018128	99.679223556506	4	14	4	4-22:43:12	Oper	ID 0: 60 ID 1: 300
7	00-1B-1E-26-6E-0F-A4-AA	3308	S0019225		S5-S0019225	99.5888834073343	5	10	3	4-22:41:12	Oper	ID 0: 60 ID 1: 300
8	00-1B-1E-26-6E-0F-AD-75	3308	S0000256		S7-S0000256	100	1	10	3	7-00:58:05	Oper	ID 0: 60 ID 1: 300
9	00-1B-1E-26-6E-0F-A8-67	3308	S0000050		S8-S0000050	100	1	15	5	7-00:58:31	Oper	ID 0: 60 ID 1: 300
10	00-1B-1E-26-6E-0F-AC-57	3308	S0000524		K15-S0000524	100	1	13	3	7-01:04:59	Oper	ID 0: 60 ID 1: 300
11	00-1B-1E-26-6E-0F-AA-71	3308	S0000581		K12-S0000581	100	1	12	3	7-01:05:40	Oper	ID 0: 60 ID 1: 300
12	00-1B-1E-26-4F-3F-1E-D5	775	LIME BIN		Short Lime Silo	100	1	10	4	7-00:54:06	Oper	ID 0: 60 ID 1: 60 ID 2: 60
13	00-1B-1E-26-6E-0F-B4-B3	3308	S302172		SO4-S302172	100	1	11	3	7-01:07:14	Oper	ID 0: 60 ID 1: 300
14	00-1B-1E-26-6E-0F-B9-6A	3308	S0003184		K14-S0003184	100	1	25	4	7-01:07:55	Oper	ID 0: 60 ID 1: 300
15	00-1B-1E-26-6E-0F-B8-D3	3308	S0003286		K13-S0003286	100	1	34	7	7-01:07:37	Oper	ID 0: 60 ID 1: 300
16	00-1B-1E-26-6E-0F-B9-34	3308	S0003173		N2-S0003173	100	1	12	4	7-01:01:14	Oper	ID 0: 60 ID 1: 300
17	00-1B-1E-26-6E-0F-B9-4B	3308	S0003169		N3-S0003169	100	1	10	3	7-01:01:42	Oper	ID 0: 60 ID 1: 300



Original Gateway Location



New Gateway Location

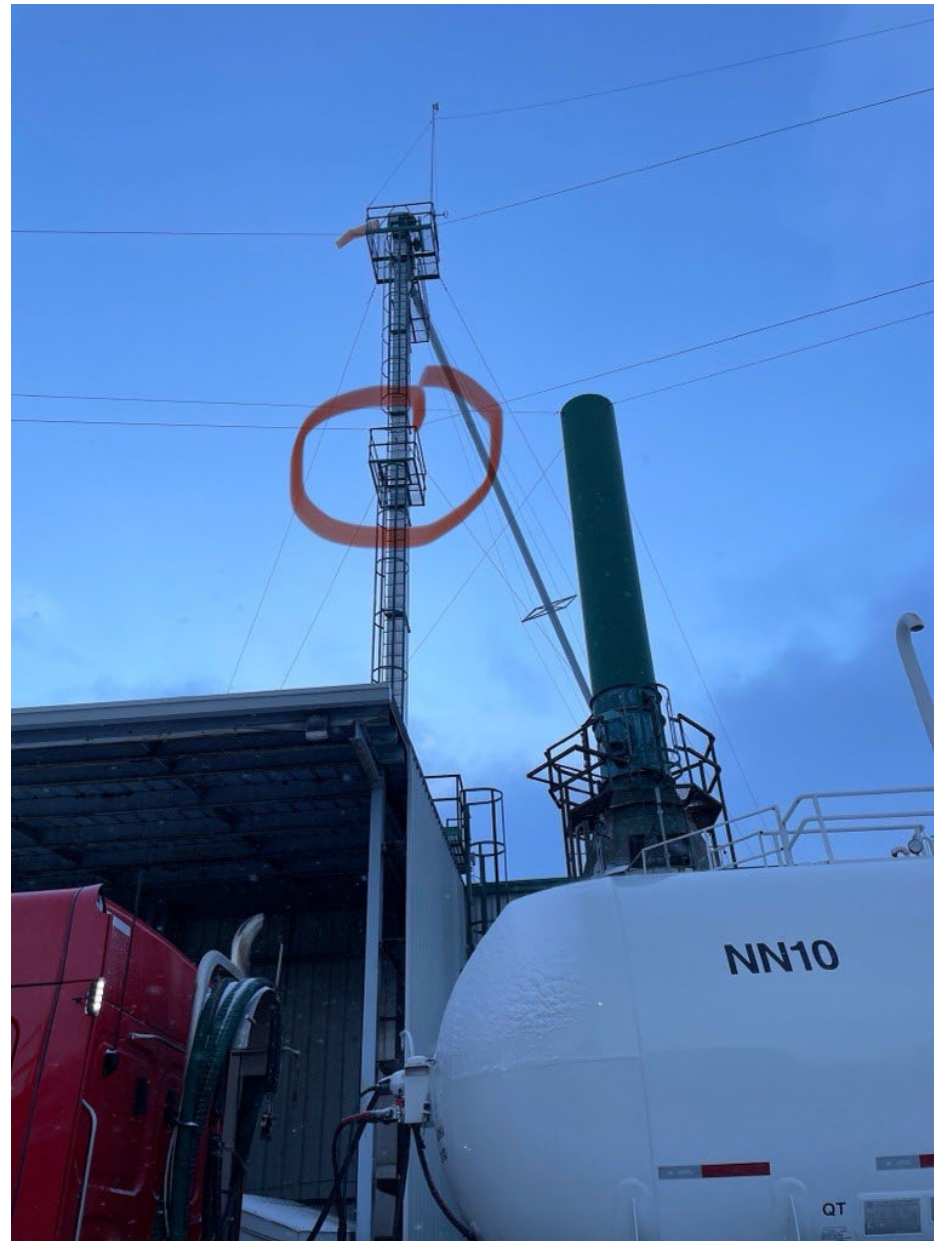


Diagram Tools

File Home Network Settings

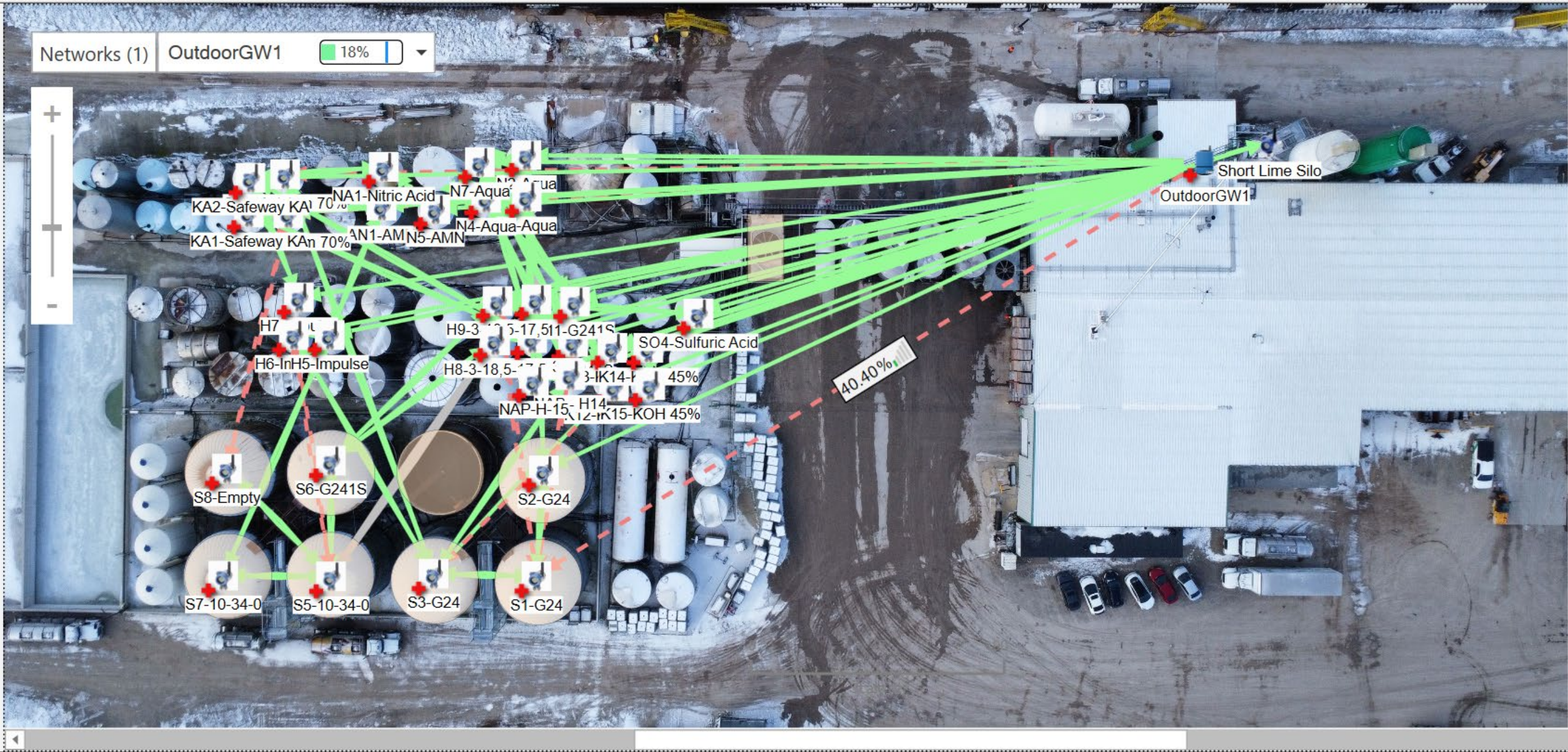
Import Delete Rename Editing

Transition Network Show Network Coverage Start Diagnostics Analyze and Split Networks Check Network Layout Enable Stress Testing

Stress Test 100%

Analysis

Networks (1) OutdoorGW1 18%



Report Diagram

Results

- Accurate inventory
- Saving up to two hours per day avoiding manual checks
- All inventory is displayed on a clean interface and can be accessed anywhere on site within network range
- Tanks being relocated starts this year and will take two years. No re-wiring!
- Amazing battery life on units as well as consistent and reliable servicing as needed (calibration, etc)

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SESSIONS

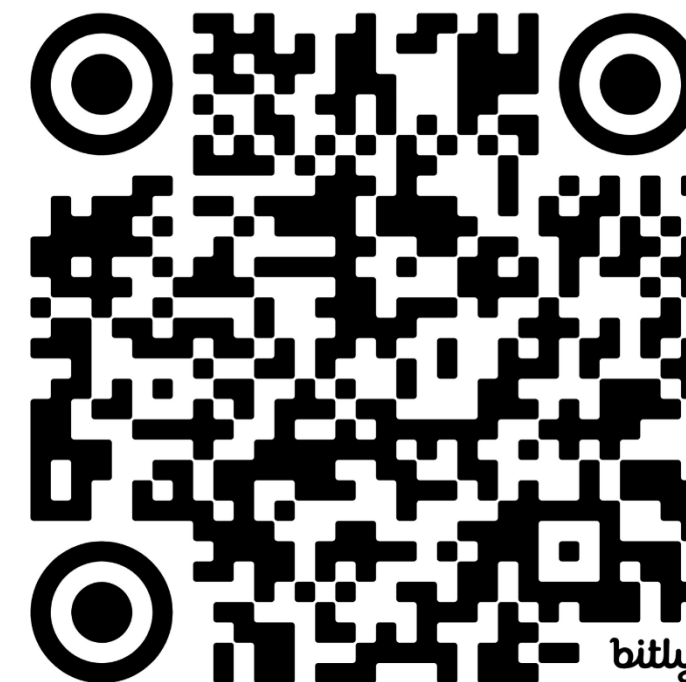
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