CORRTECH

CORROSION UNDERSTOOD

In-Service Above Ground Storage Tank Internal and External Condition Assessment

TALEN ENERGY

ERPI Buried Pipe Reference Guide

"It is probable that tanks fall under Federal, State, or Local regulatory jurisdiction and currently compliance may be managed by another department at your generation station, but responsibility for compliance and reporting will be required as part of your buried pipe program and may be included in the scope of INPO audits."

Comprehensive Inspection

Check for condition assessment integrity and condition of coating systems:

- Exterior Coating condition
- Concrete foundations and visible footings
- Structural components (stiffeners and wind rods)
- Ladders, vents, safety devices
- Interior Coating condition
- Wall and Floor Plates
- Cathodic protection system functionality
- Overflow Pipe, weir boxes and bug screens

ROV Inspection

- **No Downtime**
- **Full Inspection**
- **No Confined Space Entry**
- **Better Documentation**
- **Not for Hydro Tanks**

Cleaning Methods

- **Drain Tank**
- **Chemical Cleaning**
- **Robotic Method – On line**
- **Diver Method – On line**

Interior Corrosion Environment

- Above Water
- Submerged
- Galvanic
- Couples


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CAUTION
CONFINED
SPACE
11 07 2022


017052
ET-400S
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HORTON® TANK
YEAR
BUILT BY
Chicago Bridge & Iron Company
Oak Brook, Illinois
11 07 2022


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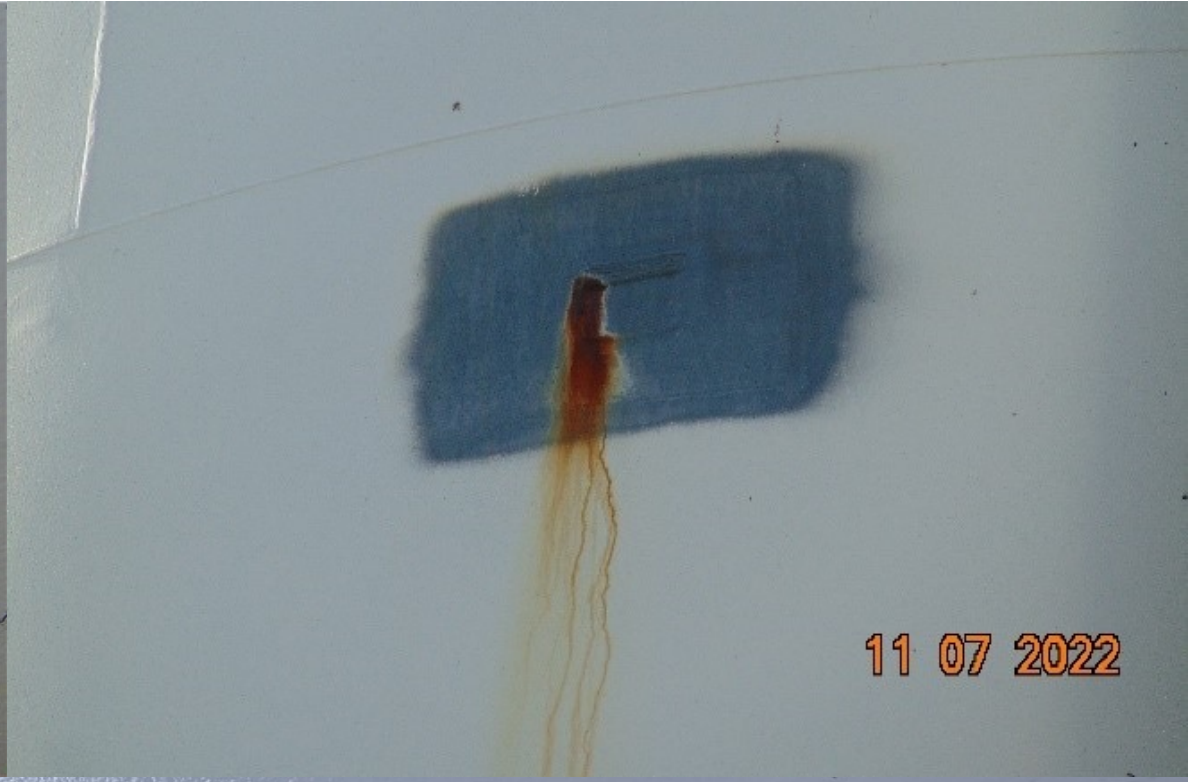
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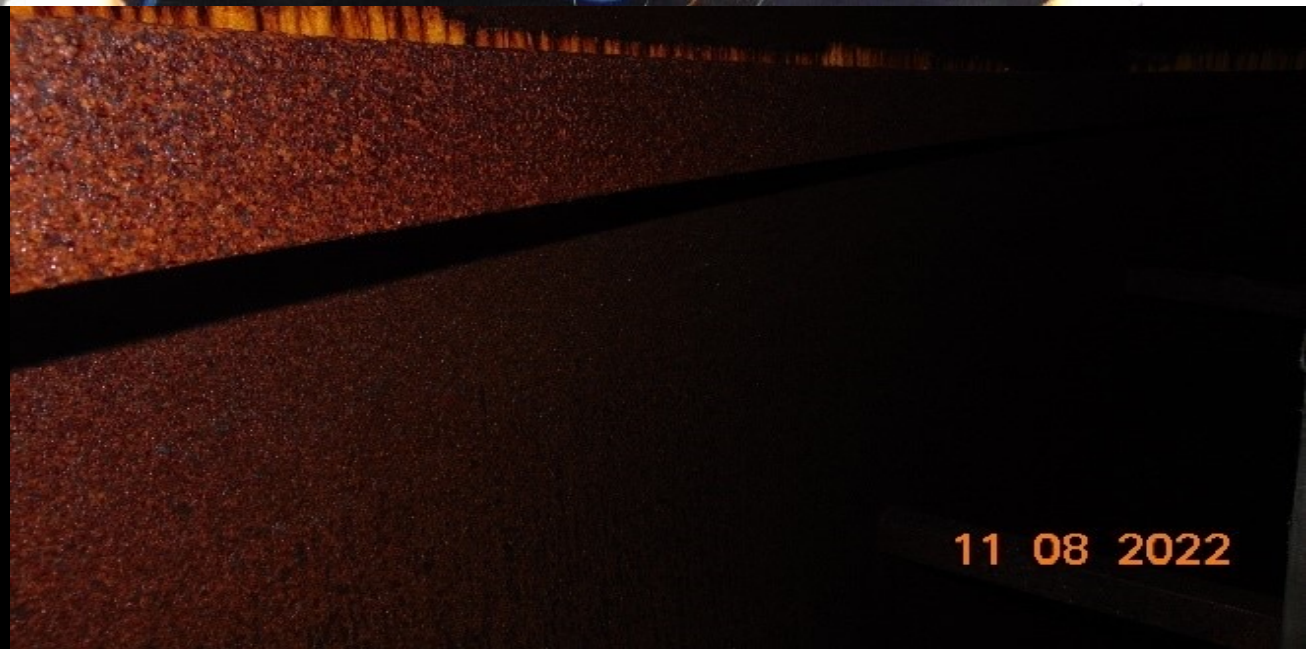
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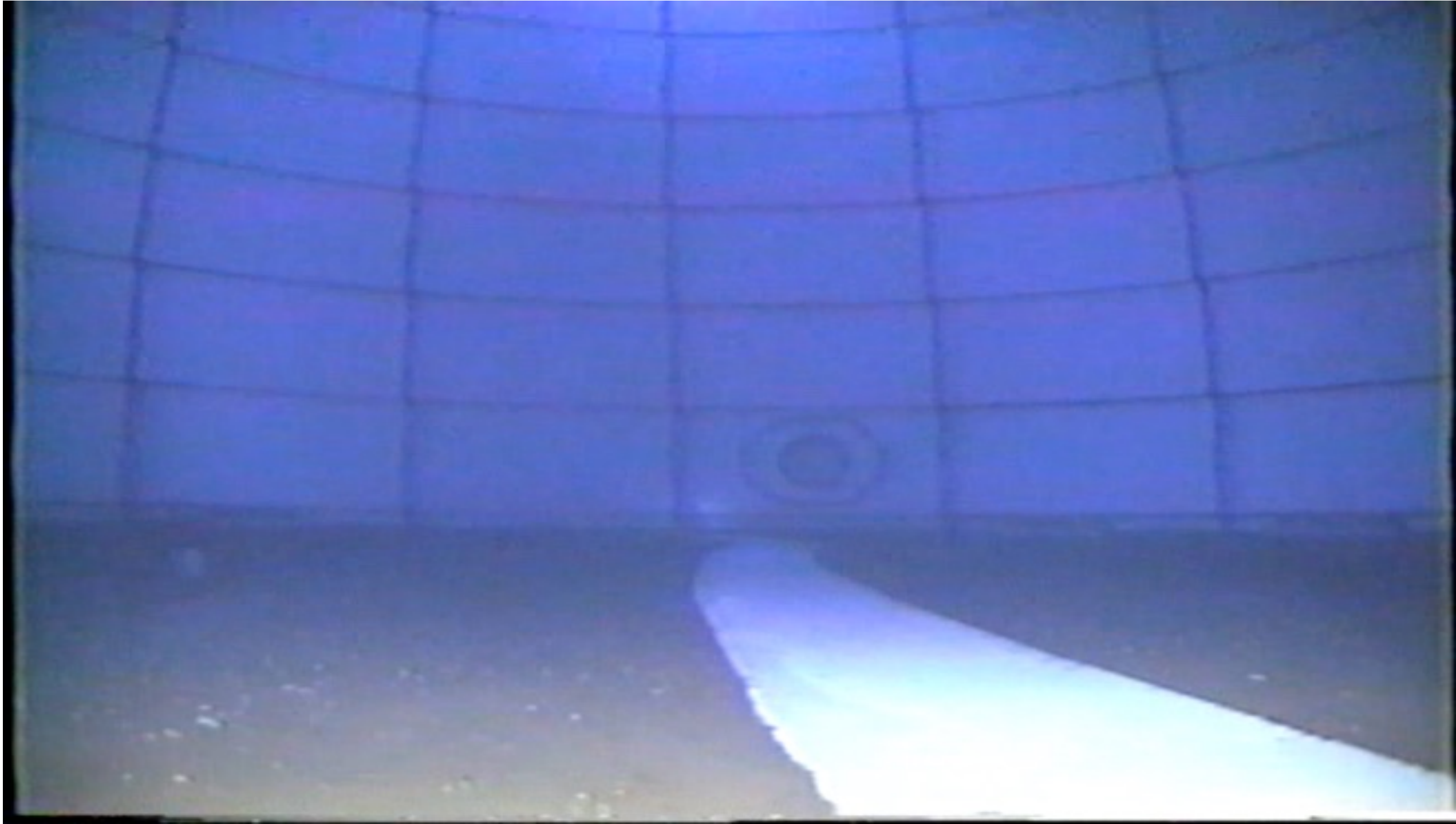


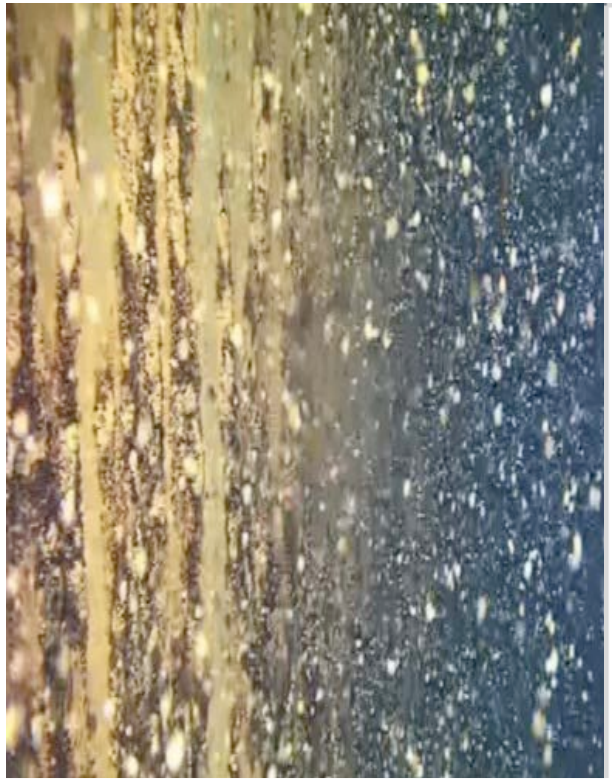
B-scan and statistical assessment

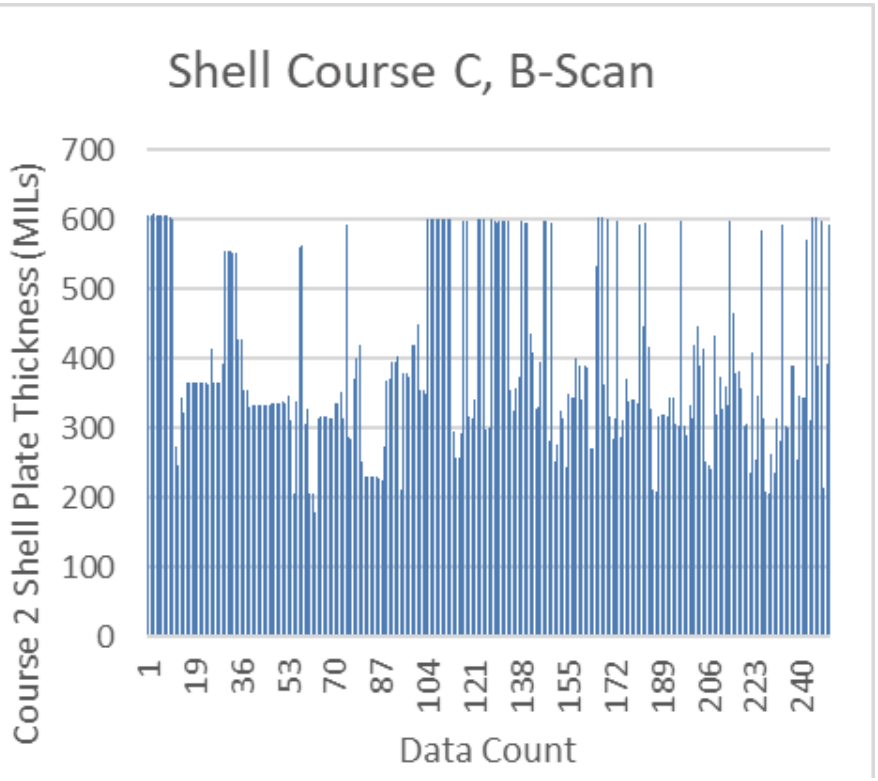
Extreme value statistical exterior B-scan ultrasonic thickness measurements

1,000s of data points

Performed with tank on line

Tmin calculations both AWWA and API



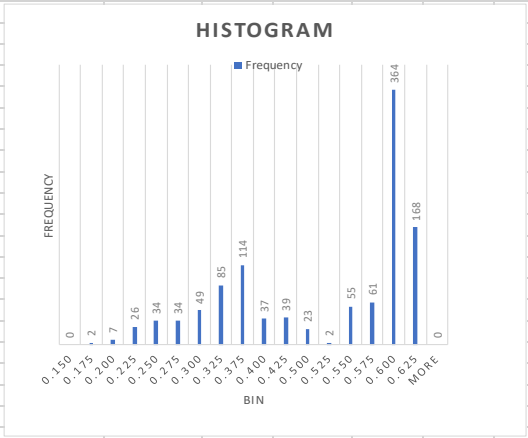


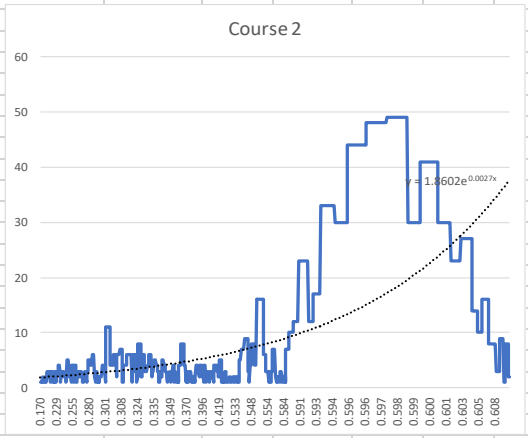
Statistical Assessment Wall Thickness

- Calculations for Tmin provided
- Approximately 1,066 thickness measurements each in analysis for shell course 1 and shell course 2
- Tmin exceeded in data set shell course 2

Percent area of Shell Course 2 below TMIN (AWWA) of 0.472-in						40.818%
Percent area of Shell Course 2 Below T min (API 653) of 0.349-in						27.455%

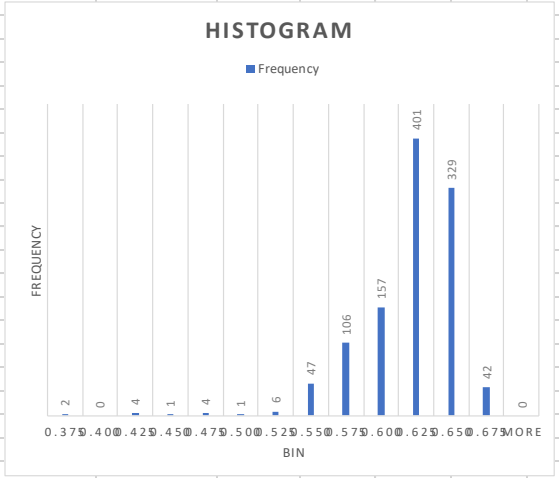
Summary Data		Percentile			*Bin*	*Frequency*
		P10	10%	0.279	0.150	0
Mean	0.480367273	P25	25%	0.337	0.175	2
Standard Error	0.004186147	P50	50%	0.561	0.200	7
Median	0.561	P75	75%	0.598	0.225	26
Mode	0.598	P90	90%	0.603	0.250	34
Standard Deviation	0.138838794	P99	99%	0.619	0.275	34
Sample Variance	0.019276211				0.300	49
Kurtosis	-1.306940991				0.325	85
Skewness	-0.590370222				0.375	114
Range	0.453				0.400	37
Minimum	0.170				0.425	39
Maximum	0.623				0.500	23
Sum	528.404				0.525	2
Count	1100				0.550	55
					0.575	61
					0.600	364
					0.625	168
					More	0

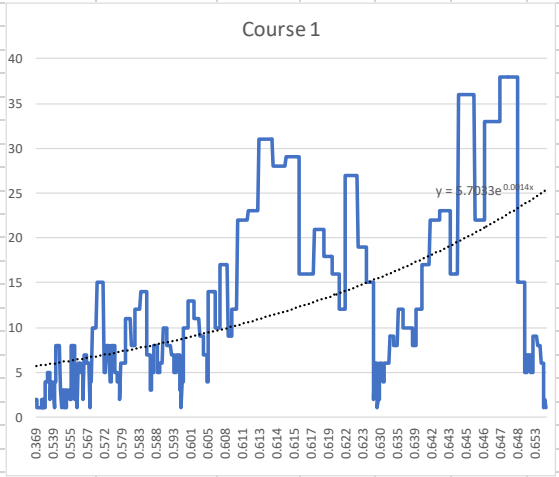




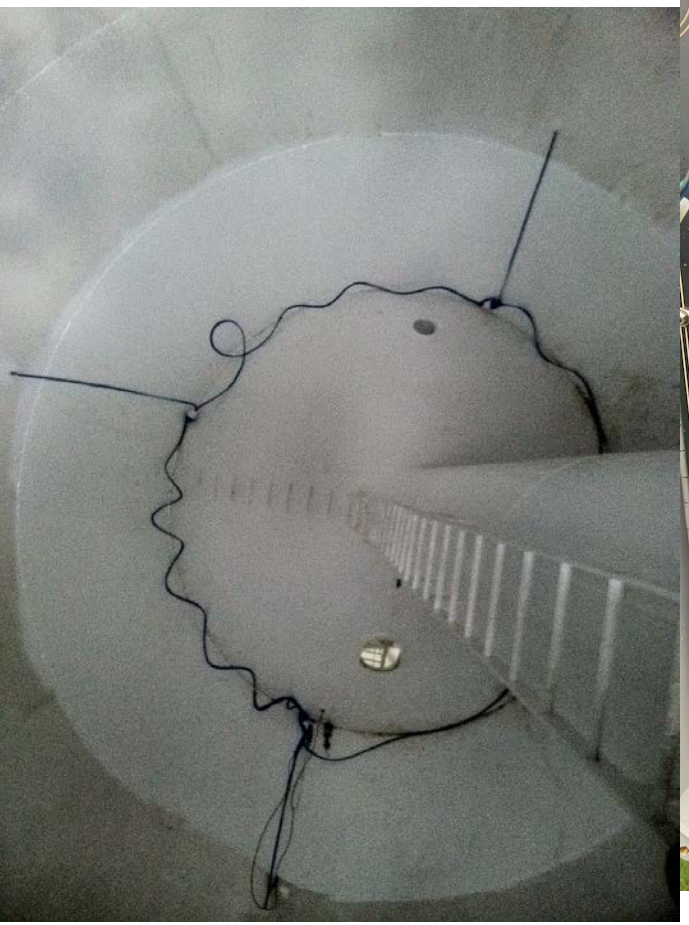
Percent area of Shell Course 1 below TMIN (AWWA) of 0.515-in						0.909%
Percent area of Shell Course 1 Below T min (API 653) of 0.349-in						0.000%

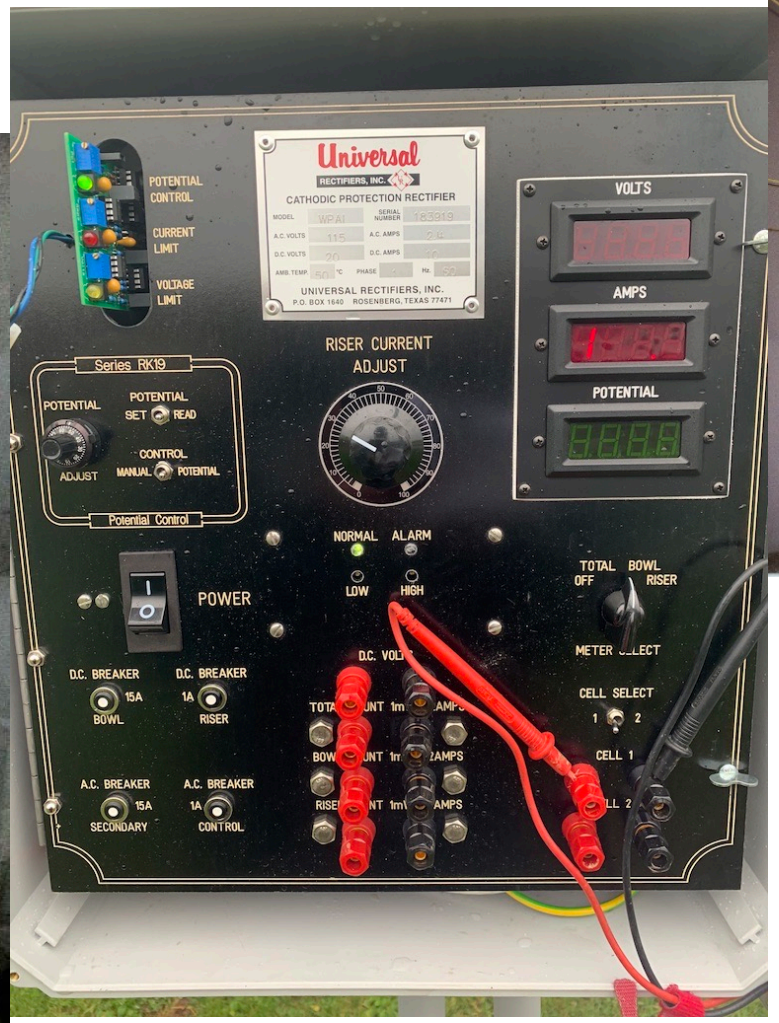
Summary Data		Percentile			*Bin*	*Frequency*
		P10	10%	0.5669	0.375	2
Mean	0.609912727	P25	25%	0.591	0.400	0
Standard Error	0.001087594	P50	50%	0.615	0.425	4
Median	0.615	P75	75%	0.64	0.450	1
Mode	0.648	P90	90%	0.647	0.475	4
Standard Deviation	0.036071404	P99	99%	0.655	0.500	1
Sample Variance	0.001301146				0.525	6
Kurtosis	7.179210423				0.550	47
Skewness	-1.862585634				0.575	106
Range	0.298				0.600	157
Minimum	0.369				0.625	401
Maximum	0.667				0.650	329
Sum	670.904				0.675	42
Count	1100				More	0

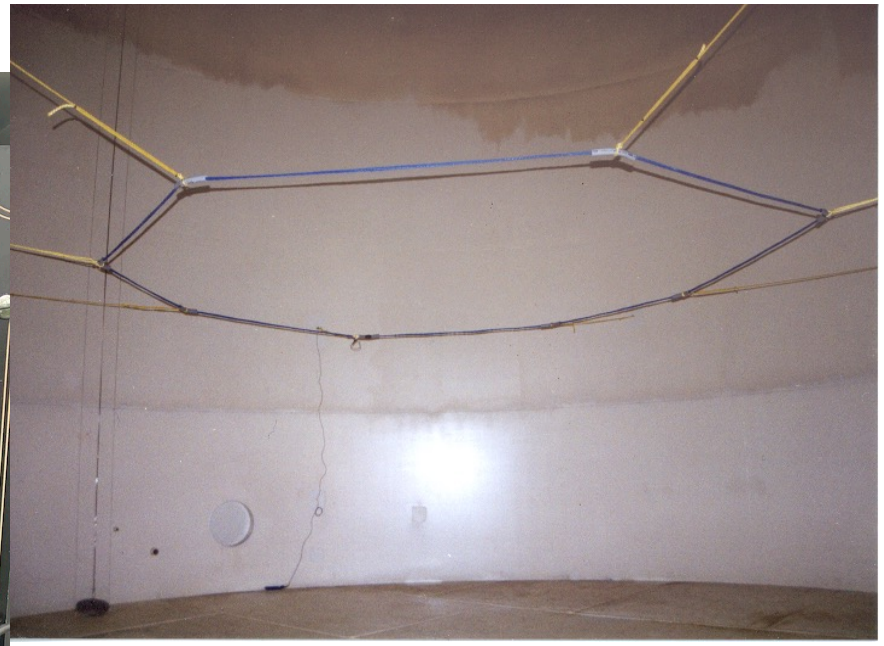




ICCP Systems Potential Controlled







Repair & Protection Methods

- Typical mechanisms and remediation strategy
- Repairs
- Coatings and Linings
- Impressed Current Cathodic Protection, ICCP, auto potential control
- Remote monitoring corrosion rate and rectifier operation
- Monitoring Durations
  - Mechanism intervention strategies
    - Optimal intervention timing

Questions?

Scott Paul, PE
Technical Director
CorrTech Inc.
508-435-0090 Office
774-276-0351 Cell
Spaul@CorrTech-inc.com

References

- EPRI Buried Pipe Reference Guide
- AMPP RP-0285 “Corrosion Control of underground Storage Tank Systems by Cathodic Protection”
- Inspection standards cited
  - API 653, inspection, repair and reconstruction
  - API 570, piping systems
  - API 575, low pressure tanks
  - ASME, piping and high-pressure storage
  - STI, SP001-00, Inspection shop fabricated tanks
  - UL 142, construction standards