

- Paper 1

Holistic Corrosion Data Management by
Ryan Finlayson, CEO & President, Rysco
Corrosion Services Inc. Alberta, Canada

- Paper 1

BIO - Ryan Finlayson is the founder of Rysco Corrosion Services Inc and the Rysco Group of Companies, a corrosion-focused set of businesses with international operations, services, and manufacturing. With humble beginnings working from his garage in 2007, Ryan and his growing team have continued to pursue technical innovation and value-added solutions for all their worldwide clients. Prior to Rysco Corrosion, Ryan worked for 7 years with Baker Hughes in their production chemistry division, learning about applied field techniques for many applications, including corrosion. These experiences helped him prepare the solid foundations of Rysco by placing an emphasis on the importance of continuing education, knowledge sharing, and employee development. Rysco is a long-time contributor to international corrosion associations, and champions these to evolve and improve the corrosion industry. With a formal education in engineering and business, Ryan is a promoter of skill acquisition within his companies, believing that supporting educational initiatives builds strength.



HOLISTIC
CORROSION DATA
MANAGEMENT

Incorporated in 2007 in Alberta, Canada, Rysco Corrosion Services Inc is a provider of internal and external corrosion monitoring services and equipment. We maintain three ISO certifications and are a registered manufacturer, with a full R&D engineering team.



RYSOCO CORROSION

The RYSOCO brand also includes a full integrity entity (Rysco Integrity Services), an international trading entity (Rysco International), a UK entity (Rysco Corrosion UK Limited), and a worldwide representative network. And we are continuing to grow.



IMAGINATION

All of the RYSCO entities place an emphasis on INNOVATION. This means that we focus on efficiencies, improvements, and novel approaches to everything that we do. Including mechanical and electronic equipment, service offerings, and especially data analytics.



WE ARE
CORROSION
ENTHUSIASTS



HOLISTIC APPROACH



In the world of corrosion engineering, it is crucial to have a comprehensive understanding of the corrosion processes that can affect a variety of materials and structures. This requires a holistic approach to corrosion data management that includes gathering, organizing, analyzing, interpreting, and applying data from a wide range of sources.





MAKING SENSE OF IT ALL

HOW DID WE GET HERE



RELEVANT DATA



Internal Corrosion

Many factors can influence internal corrosion, and correlation of these factors can be a tedious and time-consuming task. A novel presentation of influences such as corrosion/pitting rates, temperature, pressure, monitoring position within a system, flow, volumes, bacterial testing, water chemistry, and several other analytical techniques can be a useful method to determine causation, mitigation strategy effectiveness, and the effects of production changes.



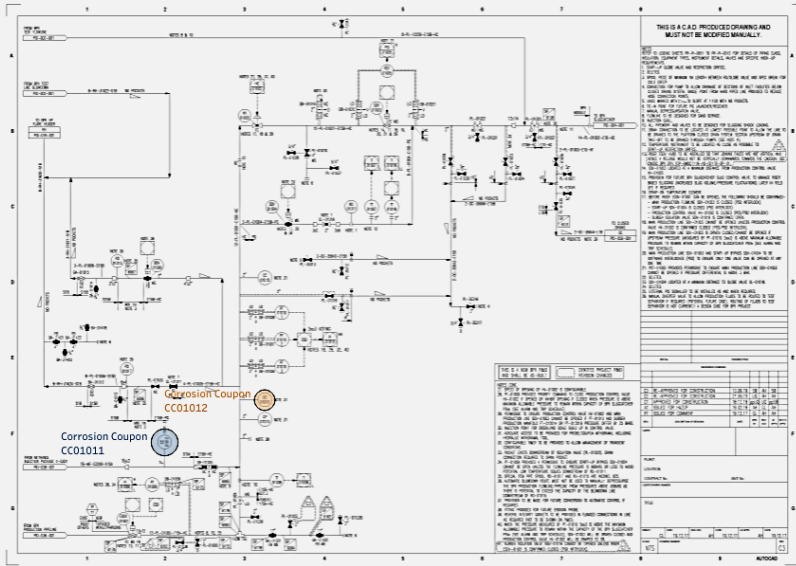
Corrosion Coupon Dashboard

Location All Date Out All values

Location ■ CC01011 ■ CC01012

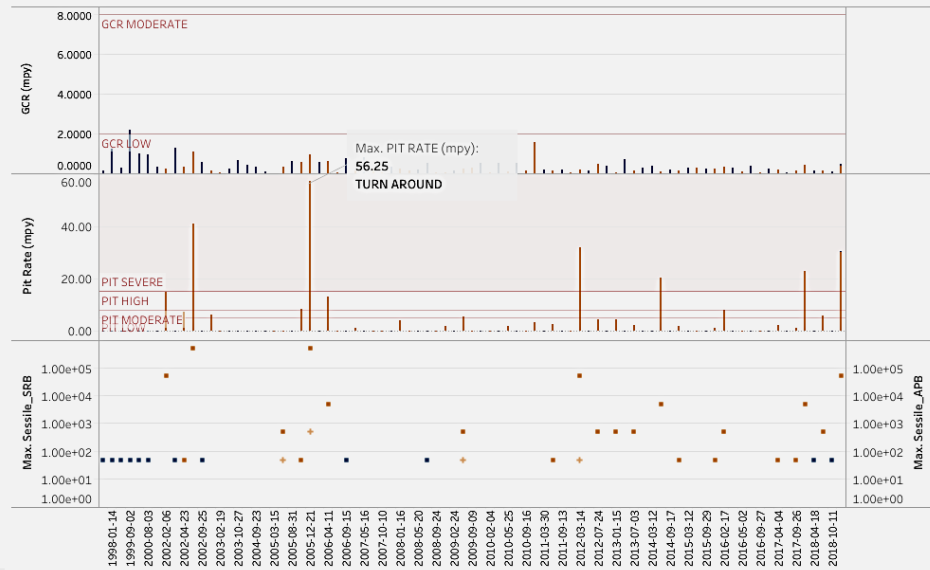


PID_Map



Coupon/Bacteria Corrosion Readings [All]

AMPP/NACE SP0775-2023



Coupon Corrosion Rates Table All [July 29, 1997 to April 4, 2019]

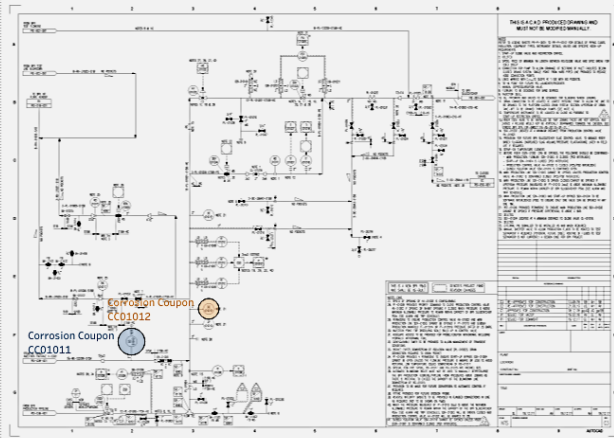
Date Out	Date In	Location	Serial Nu..	Coupon Pho..	Position	Before Cleaning	After Cleaning	PIT DEPTH (mils)	PIT RATE (mpy)	CORROSION RATE (mpy)	NACE GCR	NACE PIT	Exposure	CC01011	CC01012
2019-04-04	2018-09-25	CC01012	E367	▲	Middle	Overall thin wet black fil..	Overall mild etching with ..	16	30.58	0.2634	LOW (<2)	HIGH (>12)	191		◆
			E368	▲	Middle	Overall thin wet black fil..	Overall mild etching with ..	11	21.02	0.3795	LOW (<2)	HIGH (>12)	191		◆
	2018-10-11	CC01011	:A344	▲	Middle	Thick dark film on coupon	MPY - 0.0743 Coupon has ..	0	0.00	0.0743	LOW (<2)	LOW (<5)	175	●	
2018-10-11	2018-04-18	CC01011	:A345	▲	Middle	Thick dark film on coupon	MPY - 0.0798 Coupon has ..	0	0.00	0.0798	LOW (<2)	LOW (<5)	175	●	
			.Z801	▲	Middle	Thin dark film on coupon	MPY - 0.0818 Pitting dept..	0.0005	0.00	0.0818	LOW (<2)	LOW (<5)	176	●	
2018-09-25	2018-03-14	CC01012	.Z803	▲	Middle	Thin dark film on coupon	MPY - 0.0953 Pitting dept..	0.002	0.00	0.0953	LOW (<2)	LOW (<5)	176	●	
			F621	▲	Middle	Overall thin wet black film.	Scattered mild etching wi..	0	0.00	0.1228	LOW (<2)	LOW (<5)	195		
2018-04-18	2017-09-21	CC01011	F622	▲	Middle	Overall thin wet black film.	Scattered mild etching wi..	3	5.62	0.1353	LOW (<2)	MODERATE (<12)	195		
			.Z549	▲	Middle	Thin dark coloured film on..	MPY - 0.1305, Pitting mea..	0.001	0.00	0.1305	LOW (<2)	LOW (<5)	209	●	
2018-03-14	2017-09-26	CC01012	.Z563	▲	Middle	Thin dark coloured film on..	MPY - 0.1127, Pitting mea..	0.001	0.00	0.1127	LOW (<2)	LOW (<5)	209	●	
			C793	▲	Middle	Overall thin wet black film.	Scattered mild etching wi..	10	21.60	0.4095	LOW (<2)	HIGH (>12)	169		
2017-09-26	2017-04-04	CC01012	C794	▲	Middle	Overall thin wet black film.	Scattered mild etching wi..	10.5	22.68	0.3572	LOW (<2)	HIGH (>12)	169		
			B093	▲	Middle	Overall thin wet black film.	Overall mild etching with ..	0.5	1.04	0.0564	LOW (<2)	LOW (<5)	175		
			B094	▲	Middle	Overall thin wet black film.	Overall mild etching with ..	0.5	1.04	0.1323	LOW (<2)	LOW (<5)	175		



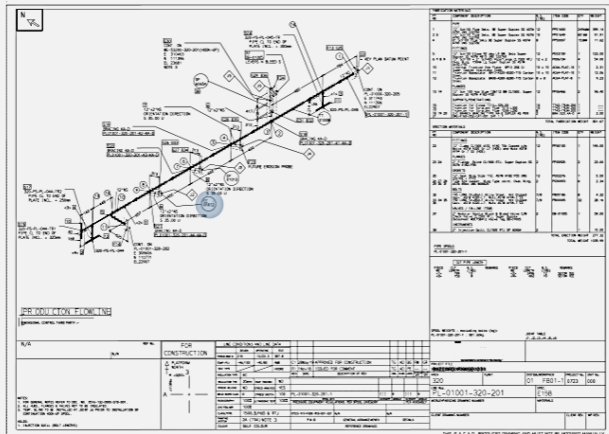
Location
All

TYPE
Corrosion Coupon
Sessile Swab

PID_Map

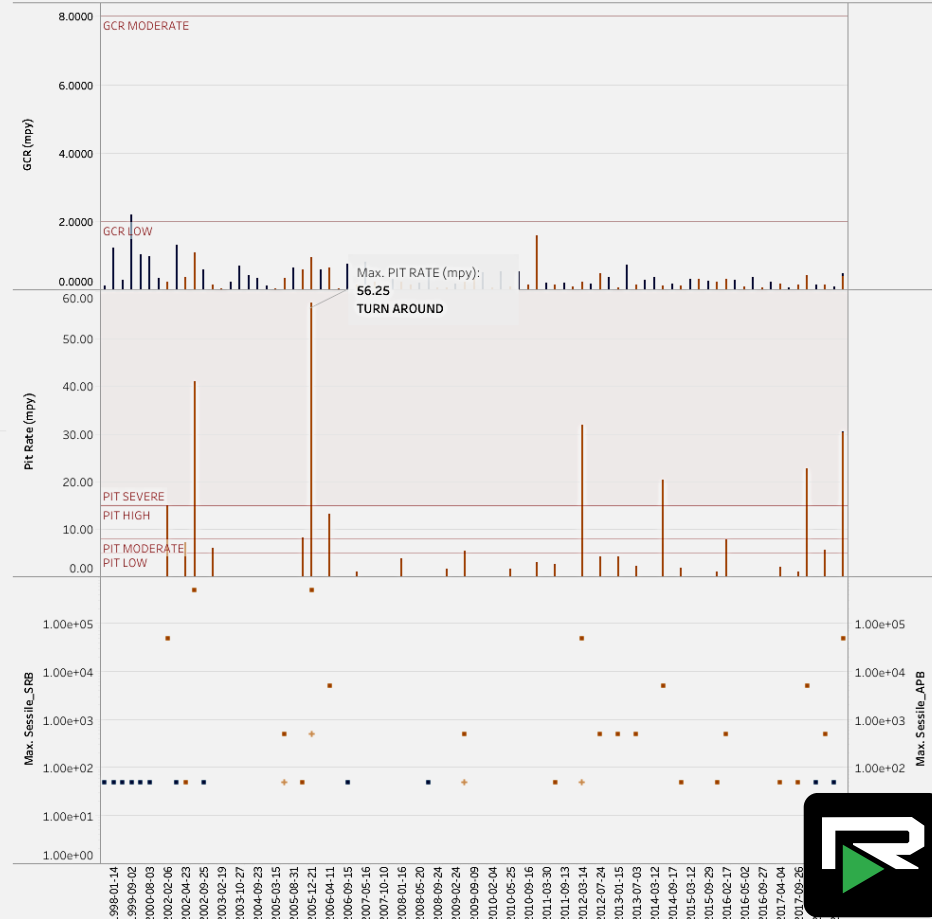


ISO_Map



Coupon/Bacteria Corrosion Readings [All]

AMPP/NACE SP0775-2023



Location
CC01012

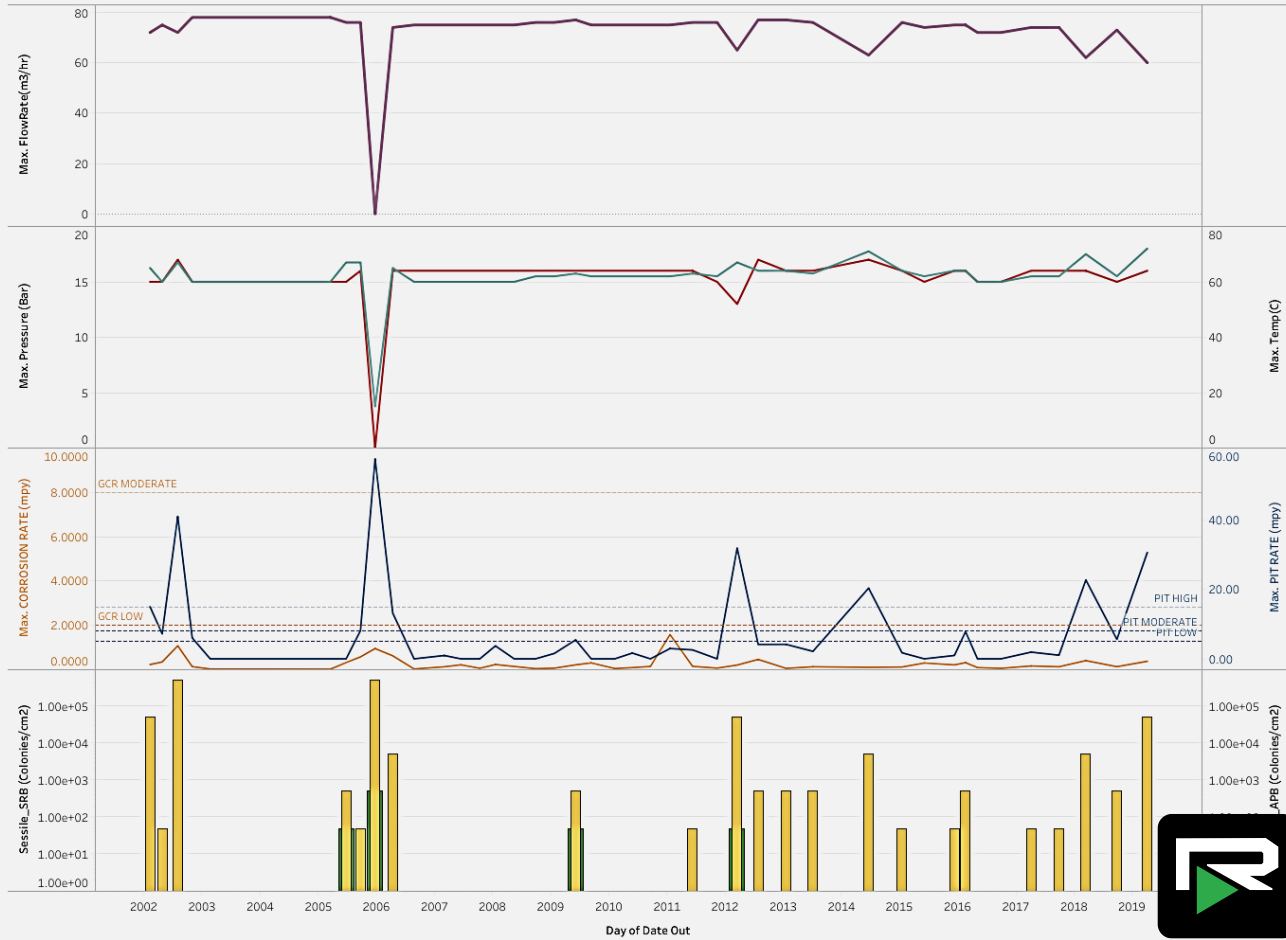
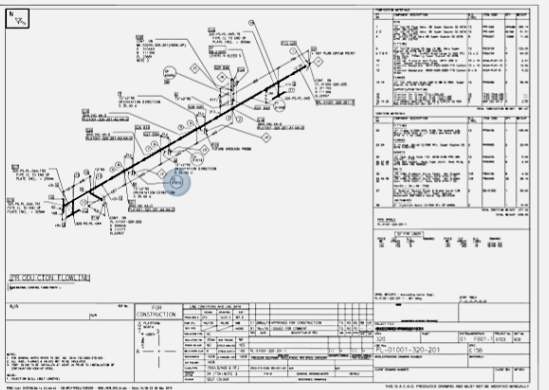
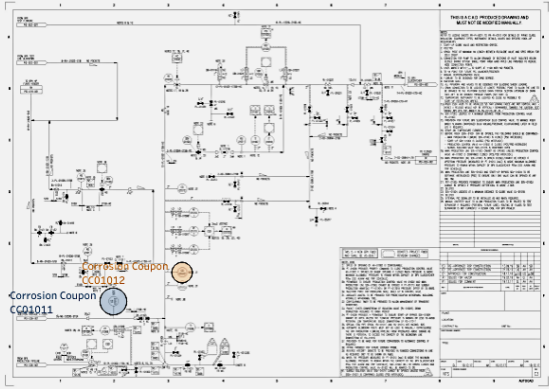
Date Out
1997-07-29 to 2019-04-04
and Null values

Location
CC01011
CC01012

Measure Names
 Max. CORROSI...
 Max. PIT RATE (...)
 Max. FlowRate(...)
 Max. Sessile_A...
 Max. Sessile_S...
 Max. Temp(C)

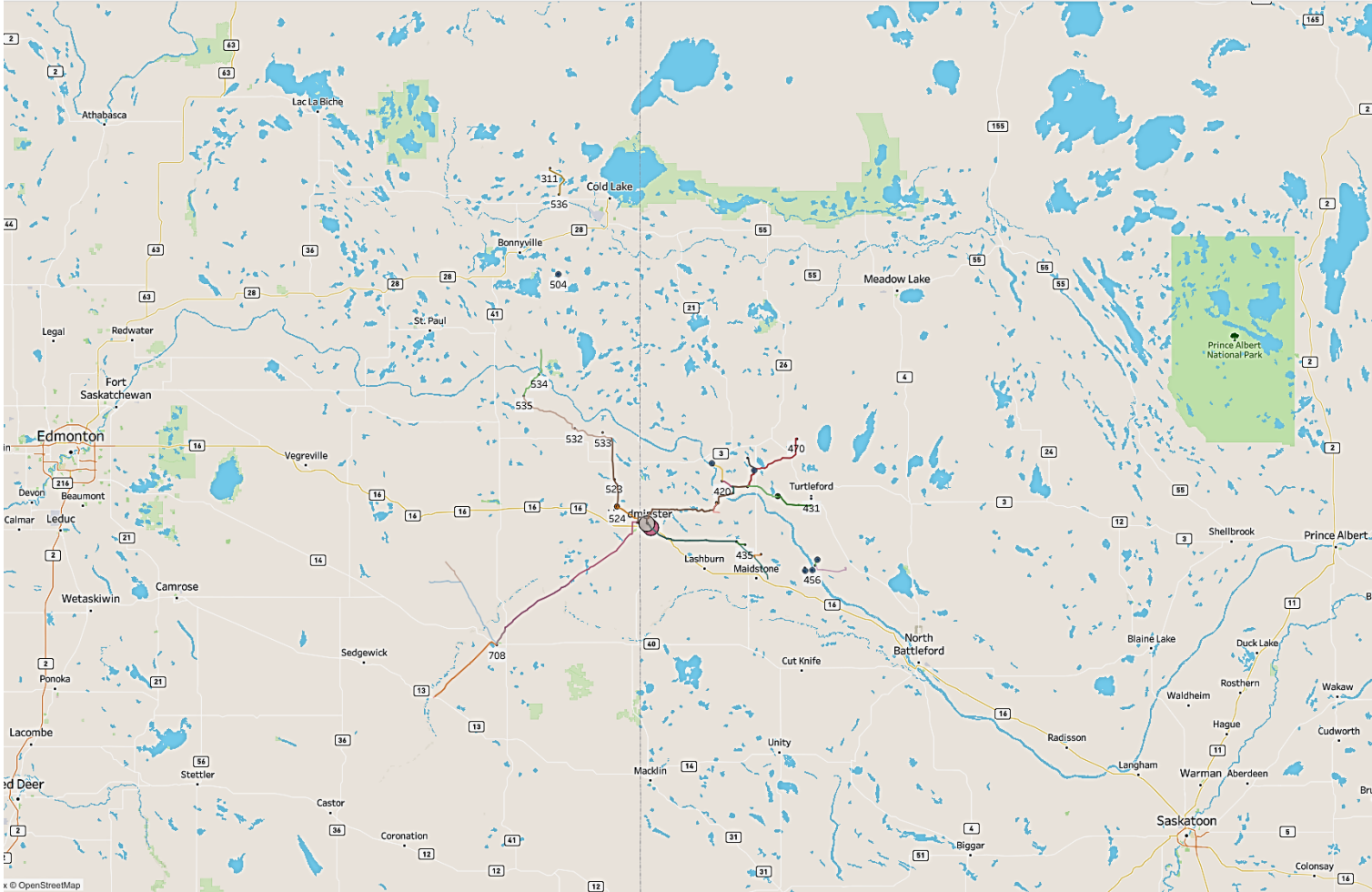


Data Overlay CC01012 February 6, 2002 to April 4, 2019



lidstream Max Bacteria & Pipelines [2023 Spring]

type : SRB



Max. Result

- 0
- 1,000
- 2,000
- 3,000
- 4,000
- 5,000

Pipeline

- 3CLEC (Condensate)
- 3DVAL (Condensate)
- 3EDAMMW
- 3RUL2
- 3TANG (Condensate)
- 4EDMW (Blend) - parallel
- 4OLMA
- 4OLX
- 4SAND (Blend)
- 4SPRN
- 6BELL (Blend)
- 6BPLD (Condensate)
- 6BPLT (KD/Tops)
- 6CELT (Blend)
- 6KINS (Blend)
- 6MER (Blend) - Parallel to
- 6MERC (Condensate)
- 6MERC (Condensate)
- 6NTFL (Blend)
- 6RUL2 (Blend) - parallel to
- 6SPRC (Condensate)
- 6TANG (Blend)
- 6WWTP (Blend)
- 6COHA02 (Blend) - Idle
- 6ETIC (Condensate)
- 8KINS (Blend)
- 8LLOC (Condensate)
- 8OLMA
- 8OLX
- 8PIKS (Blend)
- 8RUSH (Blend) - parallel to
- 8TUCK (Condensate)
- 8WASC (Condensate)
- 10BPS (Blend)
- 12BOLN (Blend) and 12BOLS
- 12BPB (Blend)
- 12EDME (Blend)
- 12MAR (Blend)
- 12MAX (Blend)
- 12MER (Blend) - Parallel to
- 12SPRC (Blend)
- 12SYW (Blend)
- 12TUCK (Blend)
- 16ELK (Blend)
- 16FOT (Blend)
- 16MAID (Blend)
- 20LLO (Blend)
- 20WAI (Blend)
- 20WAS (Blend)
- 20WHT (Blend)
- 24LLO (Blend)



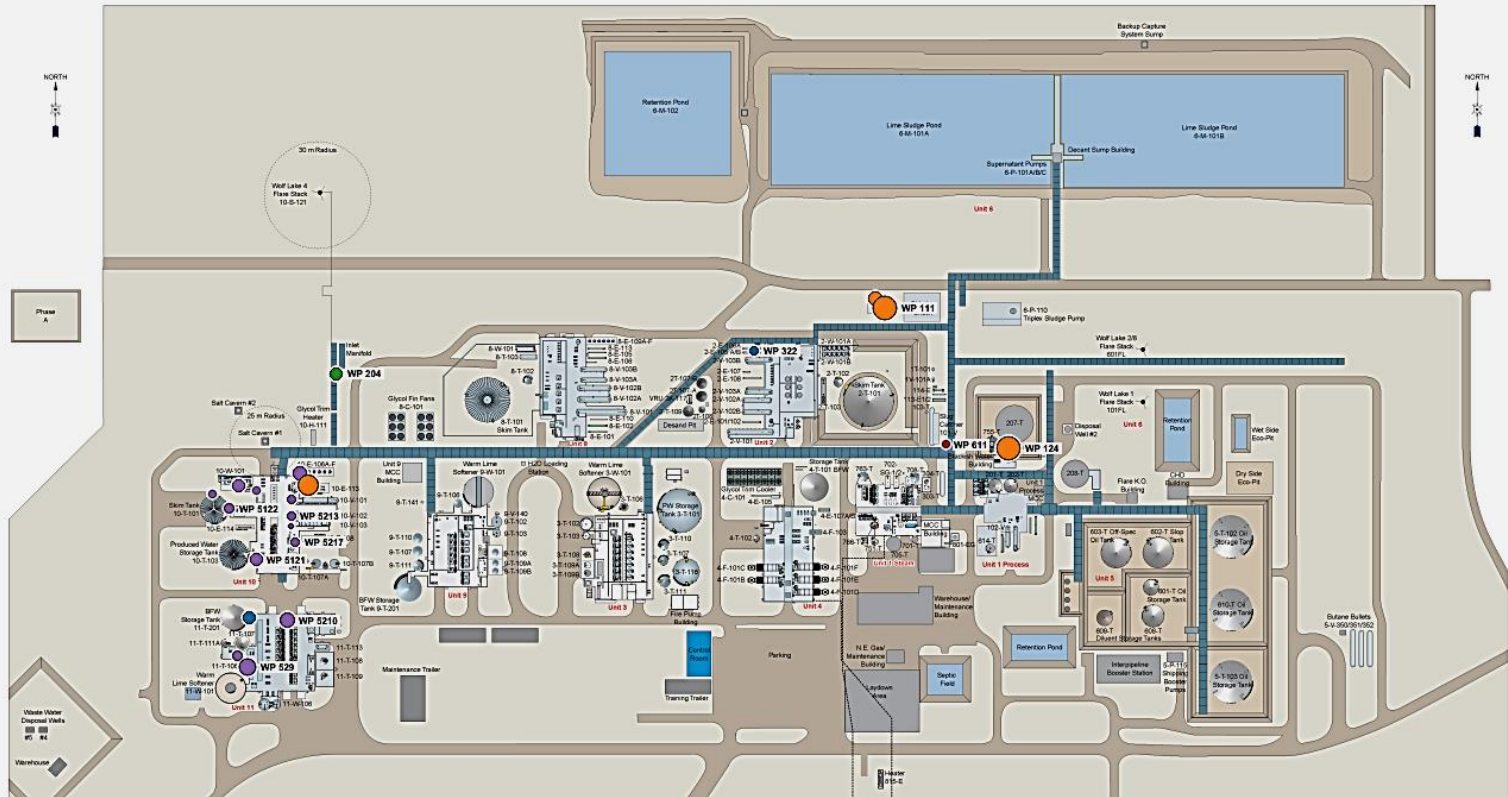


WOLF LAKE SITE MAP

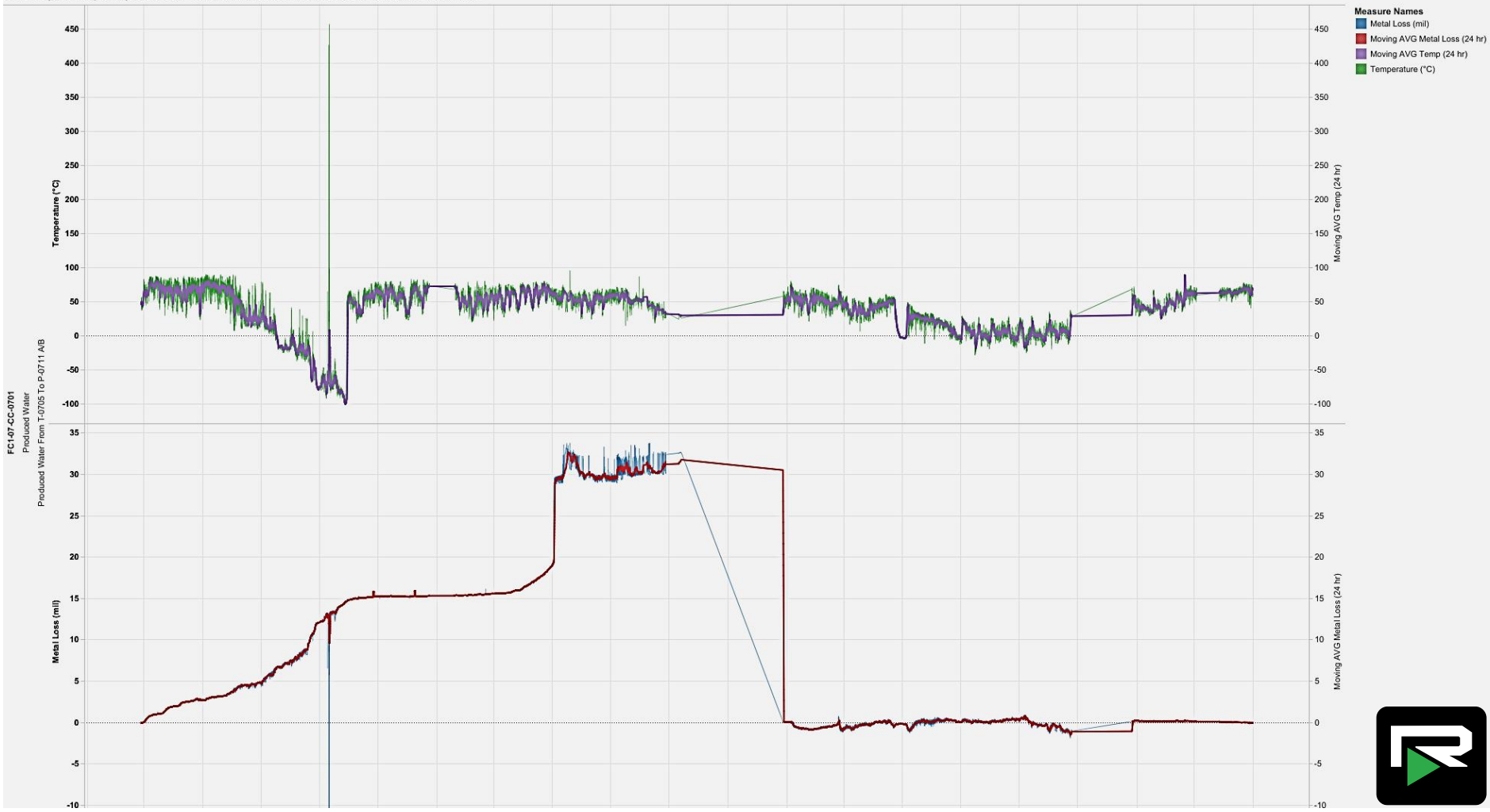
AVG GCR Using MAX (mpy)

- 0.1606
- 5.0000
- 10.0000
- 15.0000
- 18.7340

- ### Production
- Boiler Feed Water
 - Brackish Water
 - Emulsion
 - Gas
 - Produced Water
 - Utility Water

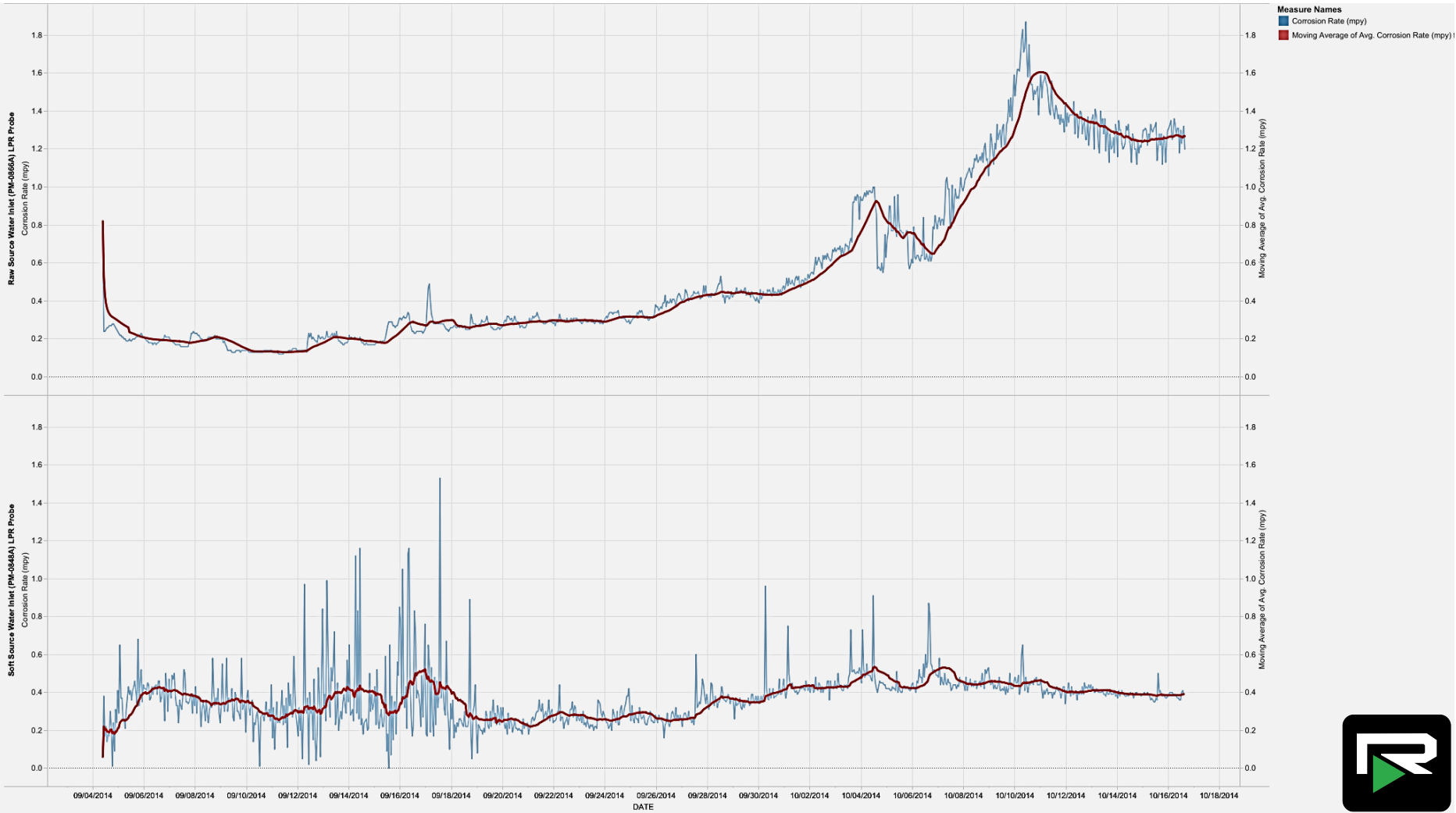


ML/Temp Overlay Unique FC1-07-CC-0701 Produced Water From T-0705 To P-0711 A/B



FC1-07-CC-0701
Produced Water
Produced Water From T-0705 To P-0711 A/B





2016

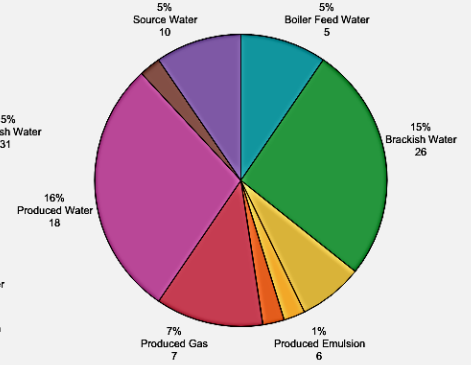
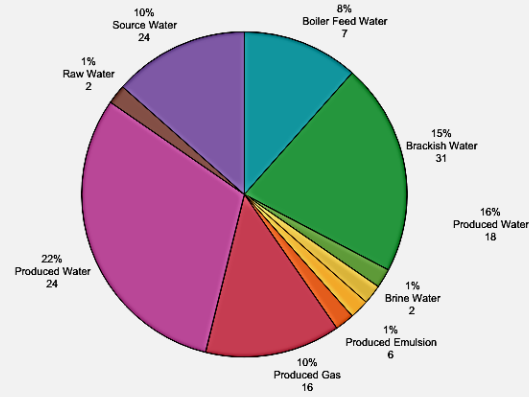
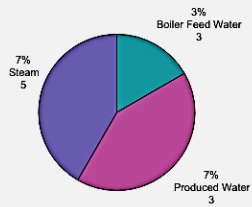
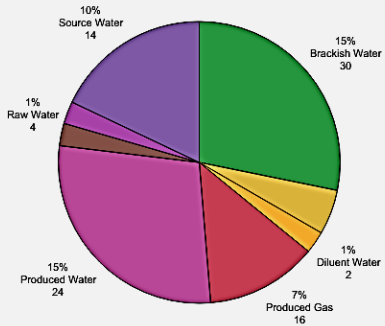
2017

DATE OUT

2018

2019

- Production**
- Boiler Feed Water
 - Brackish Water
 - Brine Water
 - Diluent
 - Produced Emulsion
 - Produced Gas
 - Produced Water
 - Raw Water
 - Sales Oil
 - Source Water
 - Steam



RELEVANT DATA

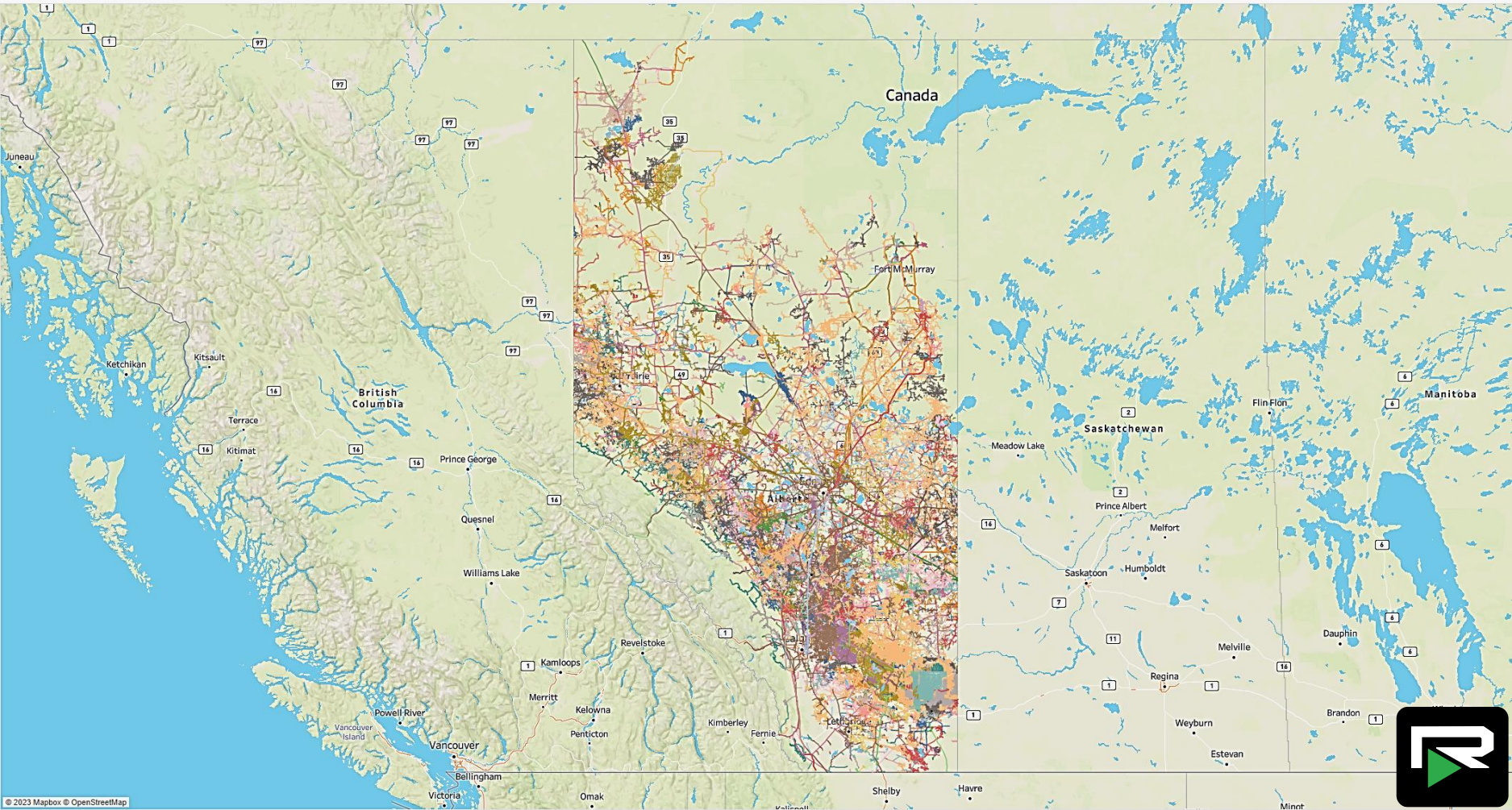


External Corrosion

From a holistic perspective, one of the primary challenges with external corrosion mitigation can be the sheer volume of data collected. Data review via tables is not always reasonable, so the presentation of large datasets as 'visual data' often speeds up the analysis. This technique can be applied to cathodic protection annual adjustive surveys, aid in the trouble-shooting of interference, analysis of current transfer, and the presentation of ECDA techniques.

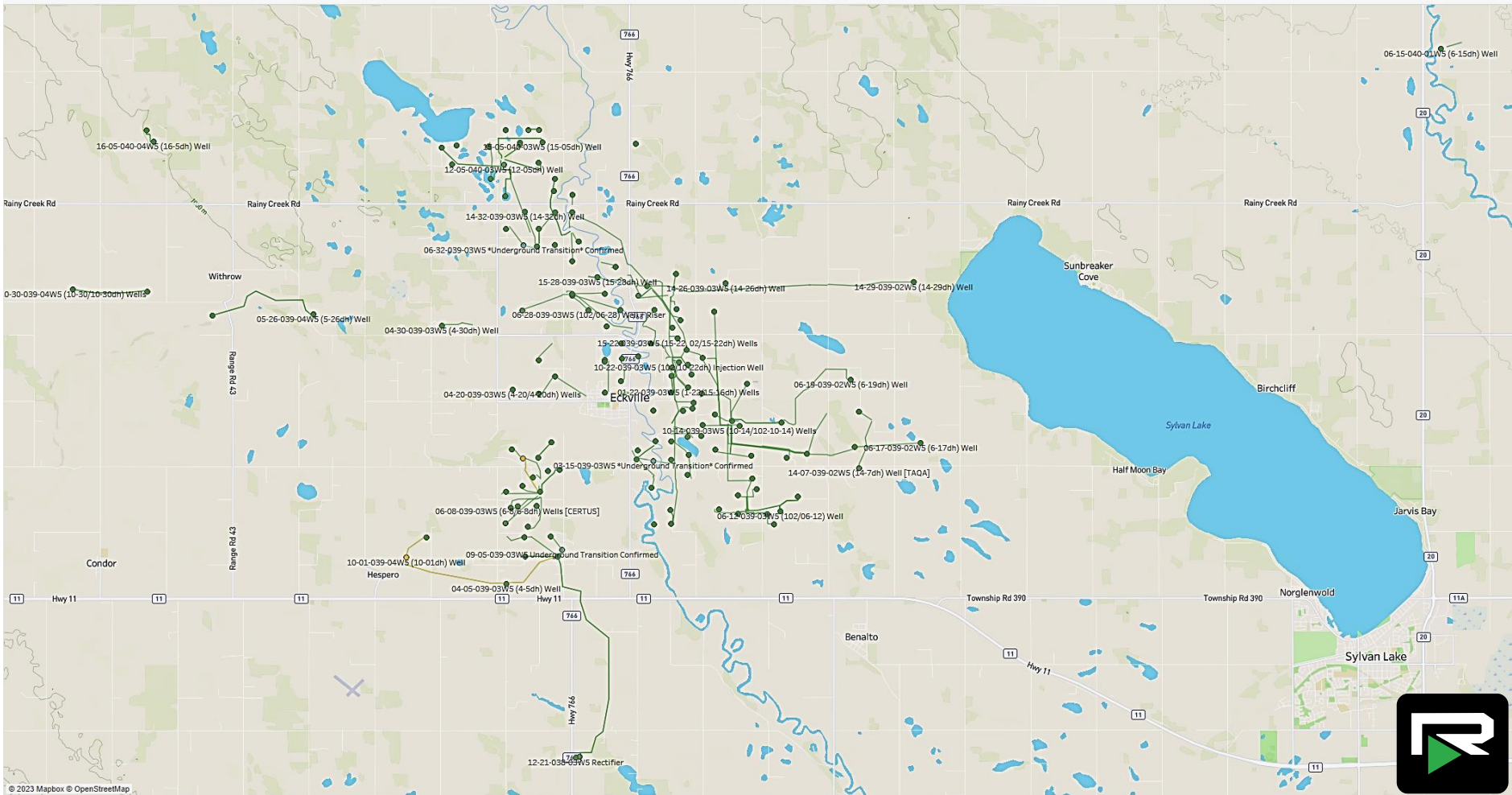


AB Pipeline Map (Streets)



Cathodic Protection Criteria Results (Outdoors) - CENOVUS MEDICINE RIVER

2022



© 2023 Mapbox © OpenStreetMap



License/LSD Report

Customer Name: All License Line: 2954-9 Lsd: All Season: All



CriteriaResu... ■ CP Pass

CriteriaResu... ● CP Pass

Data by License

All - WESTEROSE NORTH_WEST - Lic: 2954-9

Lsd	Infrastructure Description	License Line	Service Date	Season	Survey	AllComments	ON (-mVcse)	OFF (-mVcse)	Deficiency Tier	
04-03-046-28W4 Battery	4" NG Steel to 13-34-045-28W4	2954-9	1/4/2023	2022	INTERRUPTED		1487	1104	NONE	●
			8/3/2021	2021	INTERRUPTED		1321	1002	NONE	●
			10/7/2020	2020	INTERRUPTED		1503	1075	NONE	●
13-34-045-28W4 Battery 4" NG Steel fr 04-03-046-28W4	4" NG Steel fr 04-03-046-28W4	2954-9	1/4/2023	2022	INTERRUPTED		1378	1051	NONE	●
			8/3/2021	2021	INTERRUPTED		1227	1004	NONE	●
			10/6/2020	2020	INTERRUPTED		1342	1056	NONE	●
			10/2/2019	2019	INTERRUPTED		1044	933	NONE	●



CIPS/DCVG/MAP Data

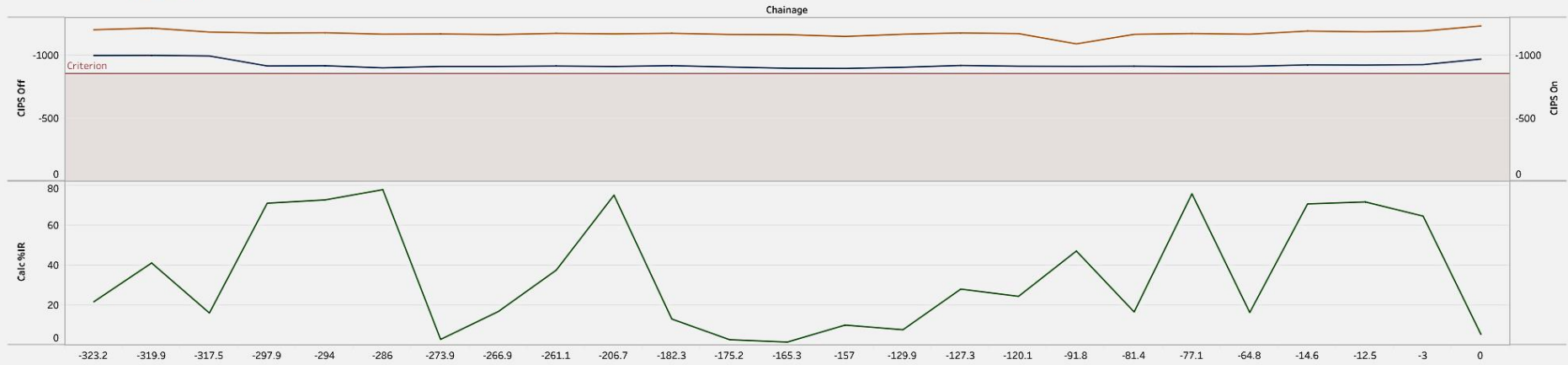
License
56484-4

Chainage
All values

- Legend
- Max. CIPS Off
 - Max. CIPS On
 - Max. Calc %IR



CIPS/DCVG Data [56484-4]



MAP [56484-4]



MAP (%IR Detail) [All]



Max. Calc %IR

- 1.42
- 20.00
- 40.00
- 60.00
- 80.00
- 94.81

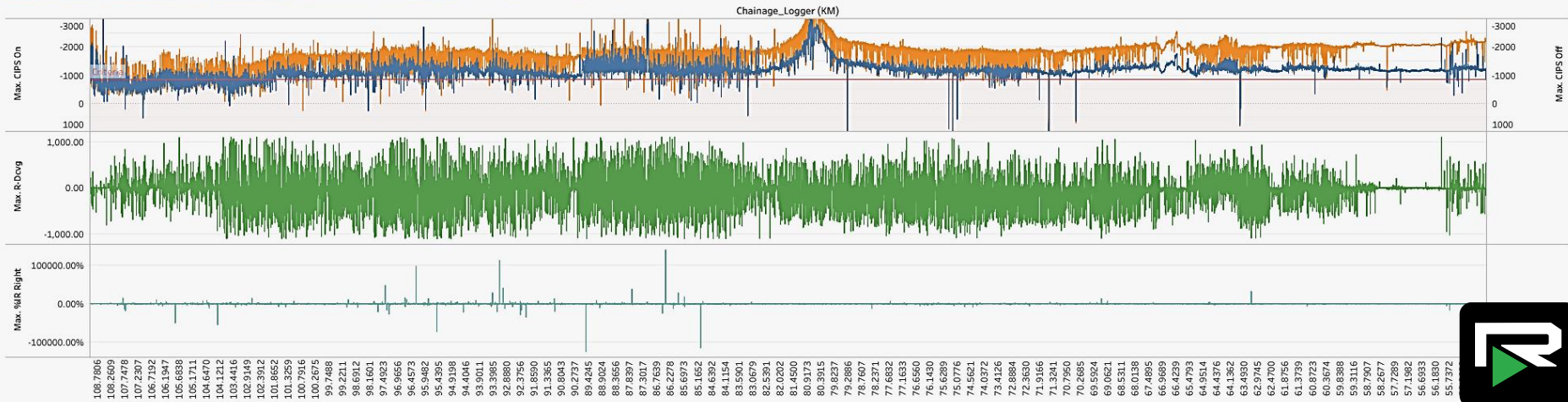
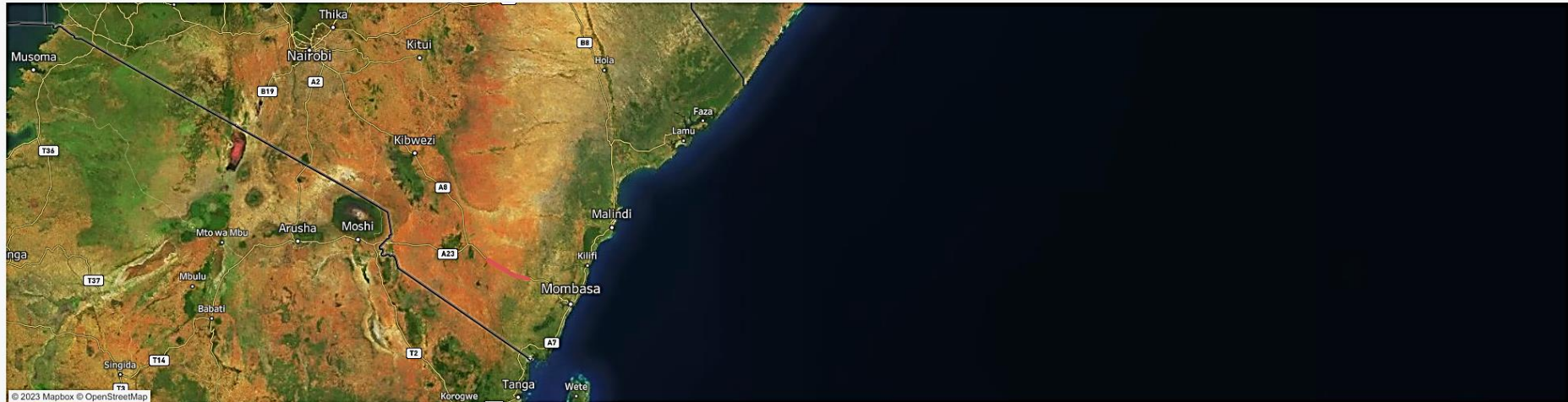
License

- 56484-3
- 56484-4



Validated No
Date (day) All
Crew All

Validated No
Max. %IR Right
Max. CIPS Off
Max. CIPS On
Max. R-Dcvg



FINAL THOUGHTS

Overall, holistic corrosion data management is essential for identifying and mitigating the risks associated with corrosion and ensuring the long-term durability and safety of critical infrastructure, equipment, and materials. With the right tools, expertise, and collaborative approach, corrosion engineering professionals can stay ahead of the curve and develop effective strategies for managing corrosion in a rapidly changing world.

