

CRUDE OIL STORAGE TANK 8 INTERNAL INSPECTION REVIEW

William Mott, PE

$\left(\frac{\partial}{\partial \tau}\right)$ taku
engineering

PWSRCAC Board Meeting

May, 2021

STUDY FINDINGS



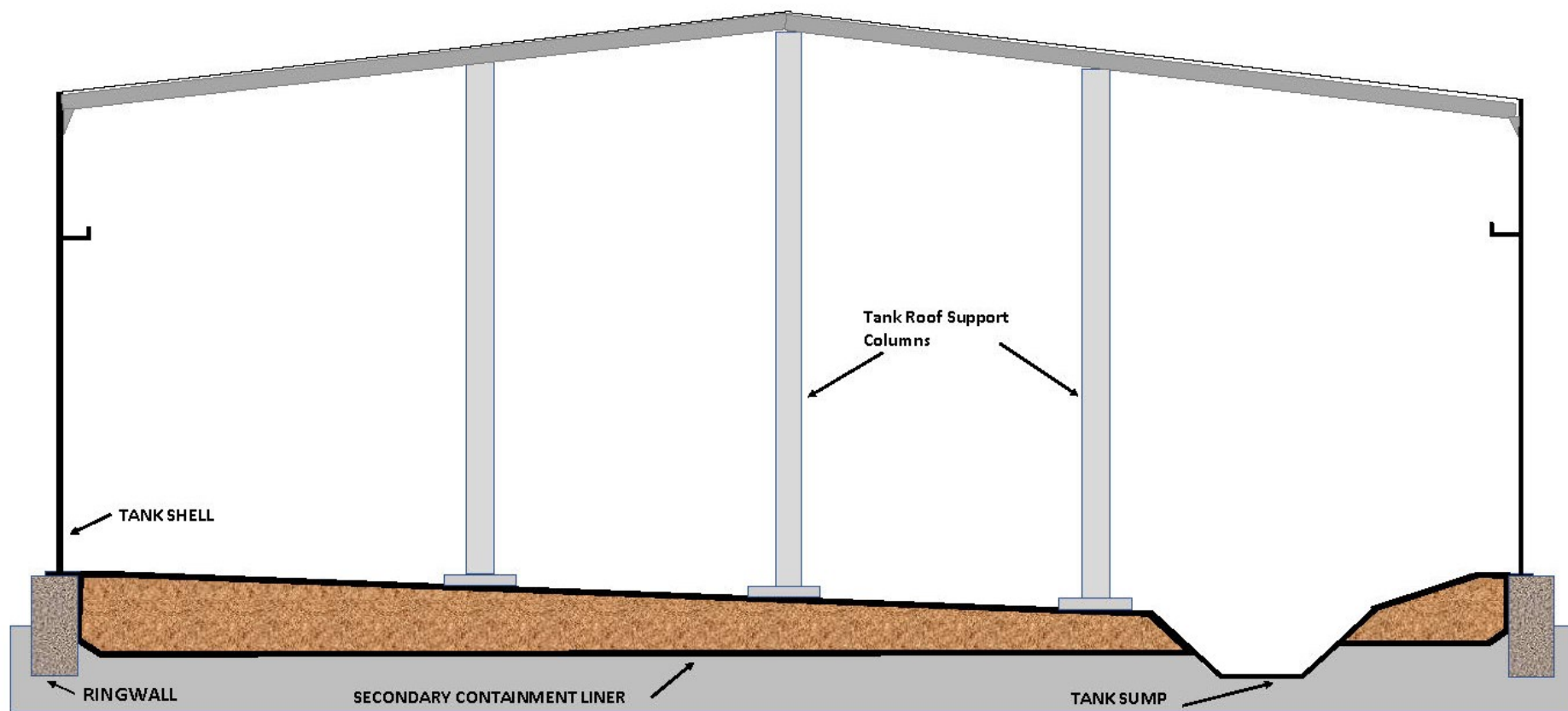
Primary Project Goal

Review Alyeska's maintenance and inspection procedures, processes, inspection results and repairs for VMT Crude Tank 8, to identify opportunities to reduce the risk of damage to personnel, property and the environment.

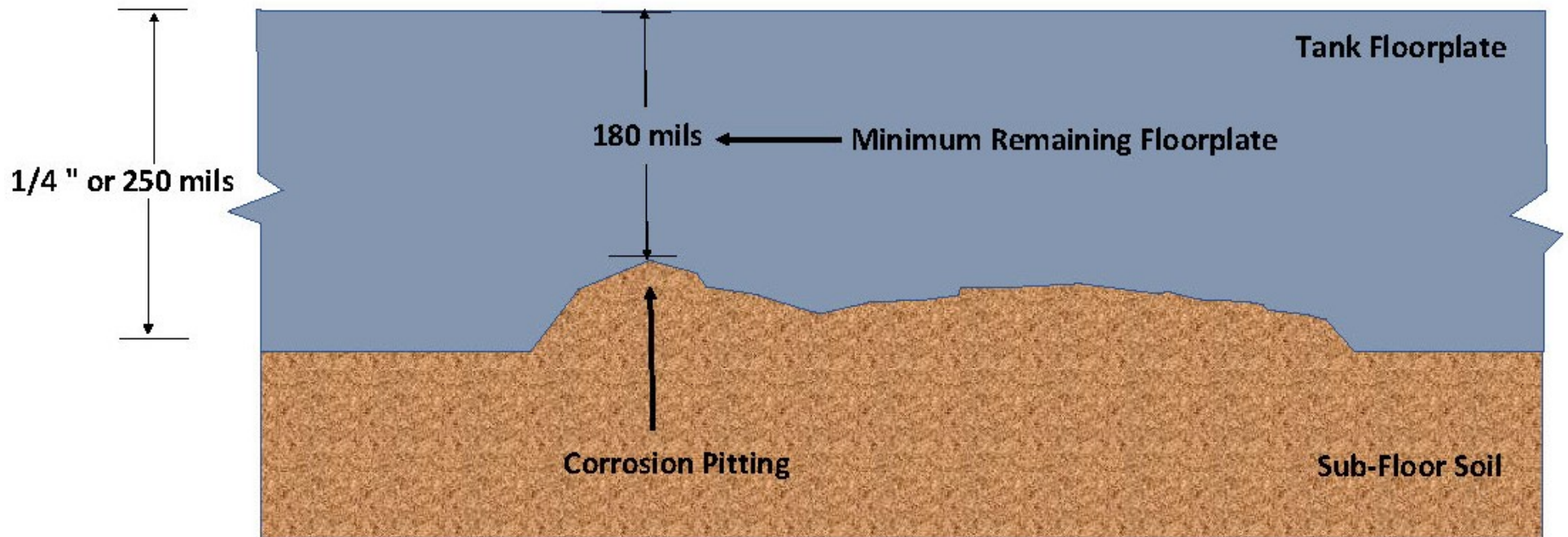
Background Tank 8 Information



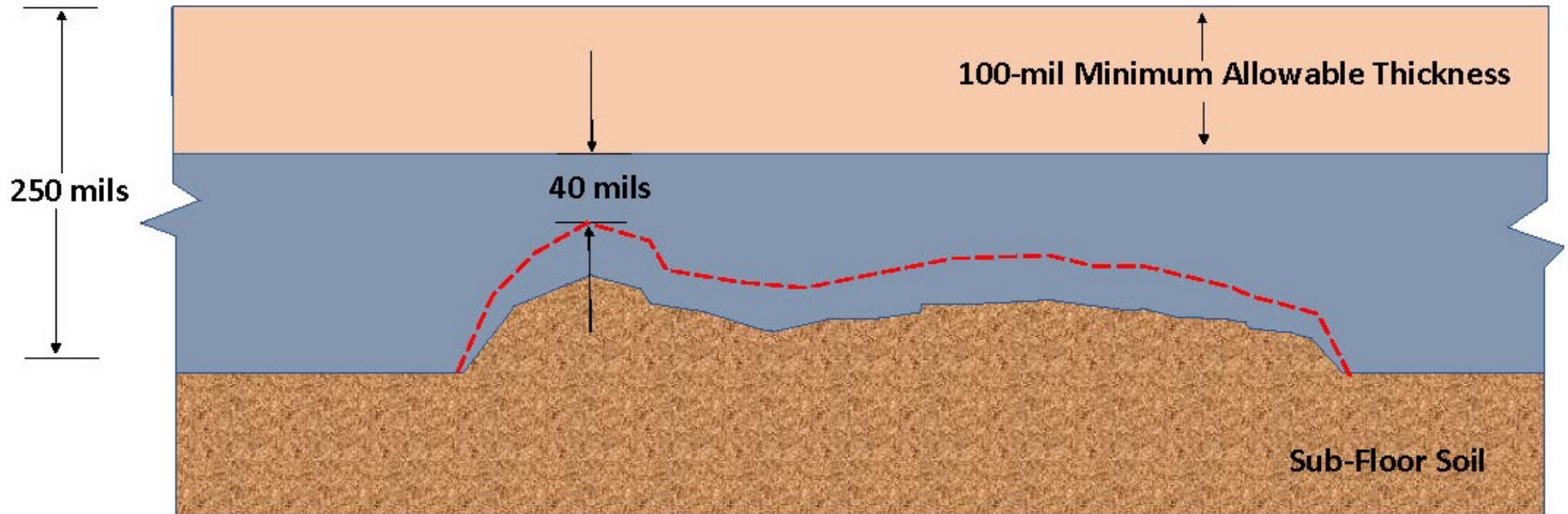
API 653 Inspections



Finding #1 – 2020 API 653 Report/Return to Temporary Service



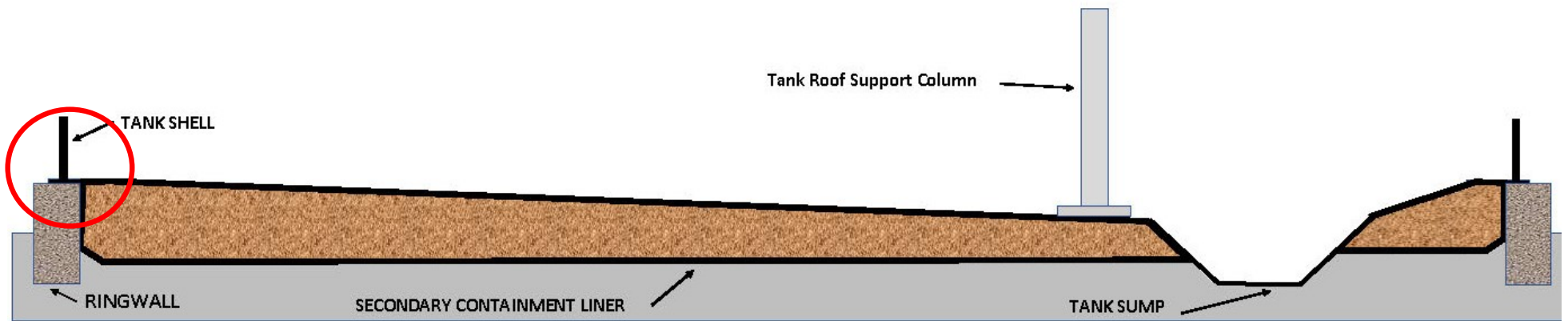
Finding #1 – 2020 API 653 Report/Return to Temporary Service



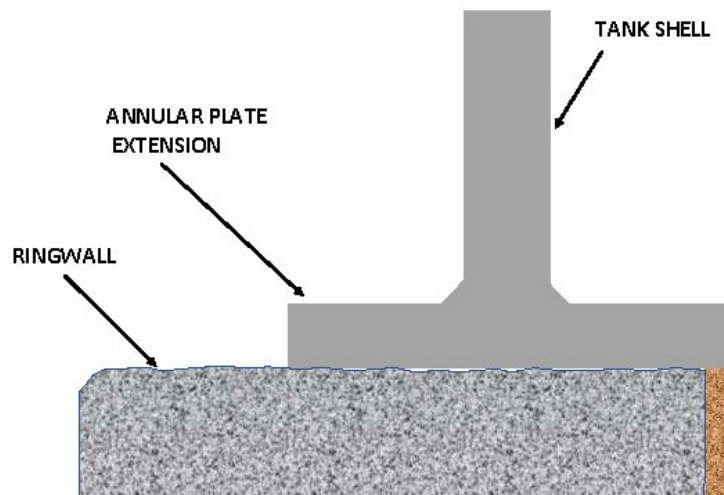
*Finding #1 – 2020 API 653 Report/Return to
Temporary Service*

- There is very low risk of a corrosion failure during the current service interval (2020-2023).

Finding # 2 – Sub-Floor Water Build-up

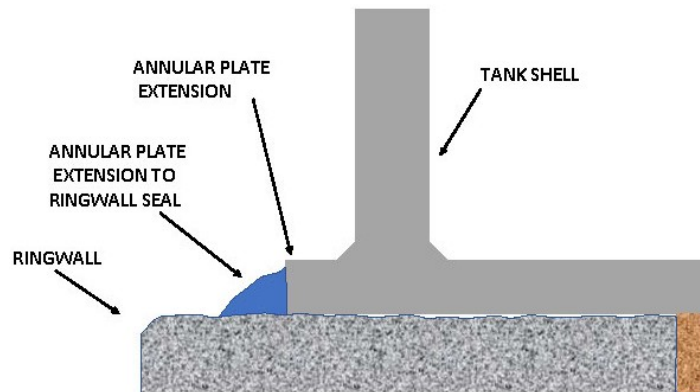


Finding # 2 – Potential Causes: Annular Plate Extension Seal



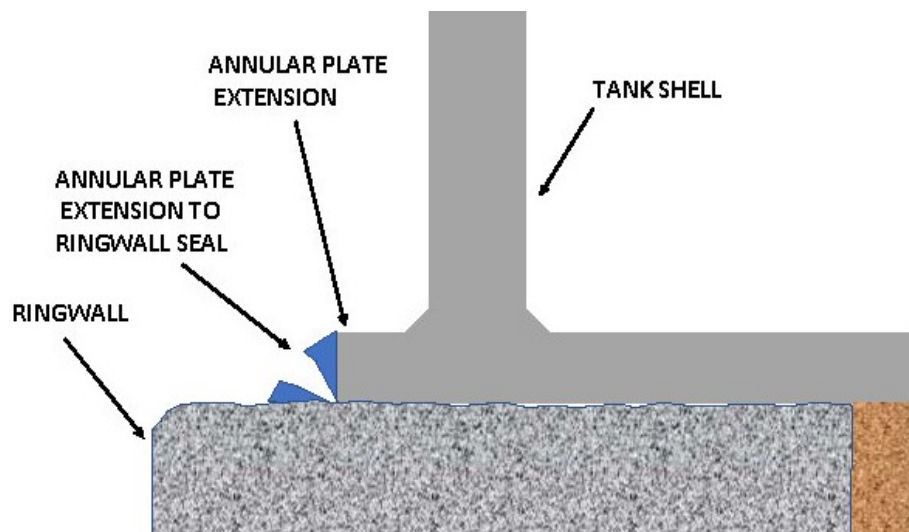
Ringwall/Floorplate Extension
without a seal

Finding # 2 – Potential Causes: Annular Plate Extension Seal



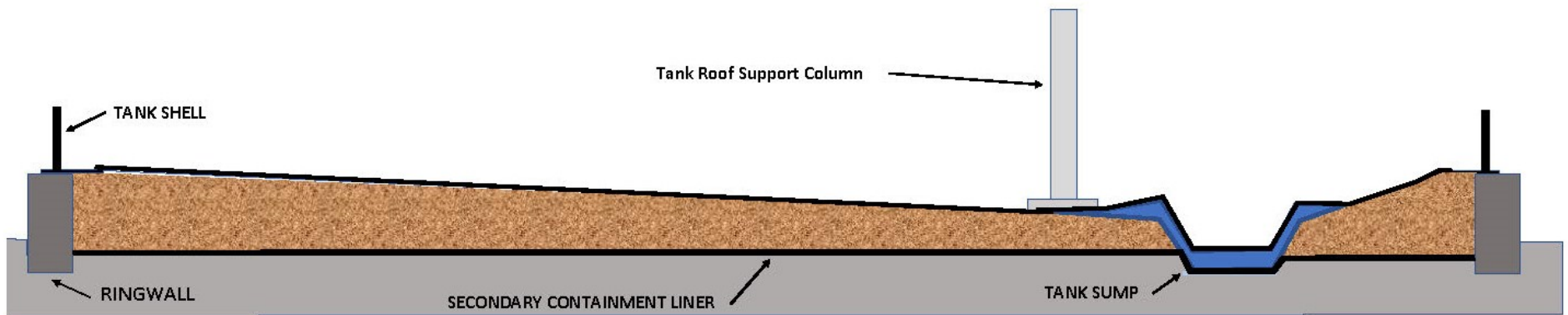
Typical Ringwall/Floorplate
Extension Seal

Finding # 2 – Annular Plate Extension Seal Failure

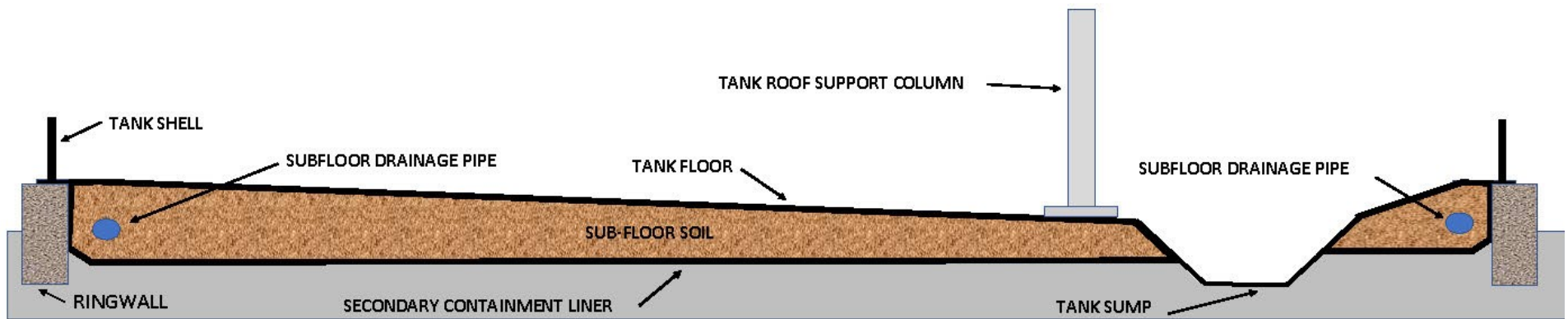


Damaged Ringwall/Floorplate
Extension Seal

Finding # 2 – Sub Floor Water Saturation Risk



Finding # 2 – Sub Floor Water Saturation Risk



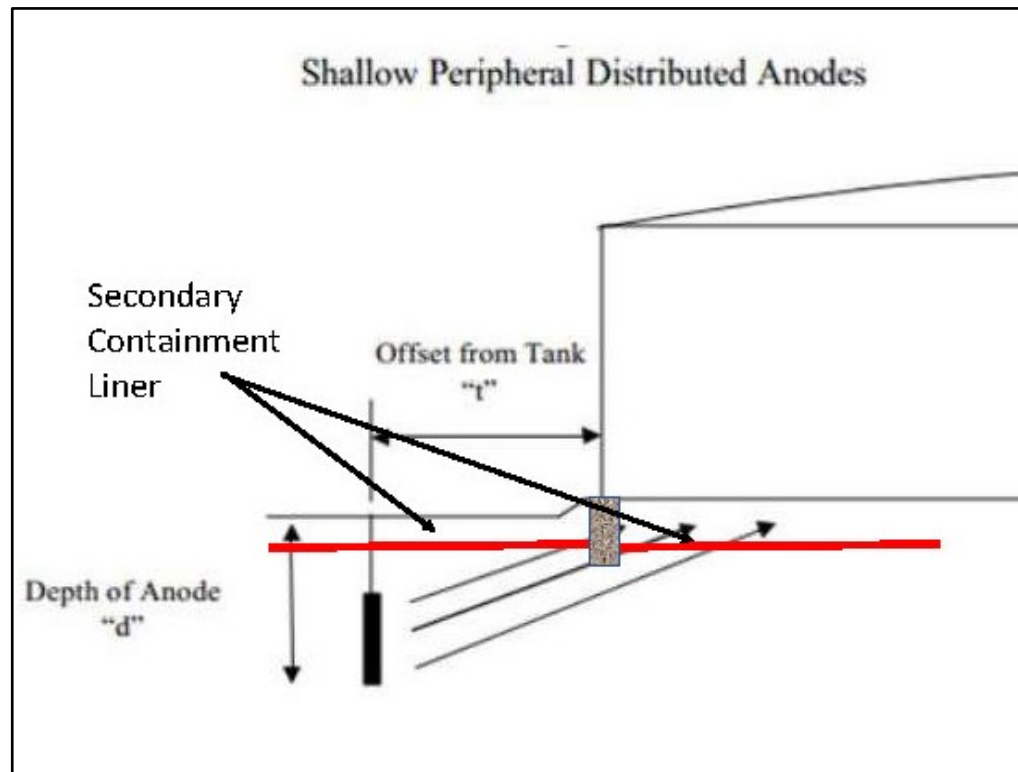
Finding # 2 – Sub Floor Water Saturation Risk



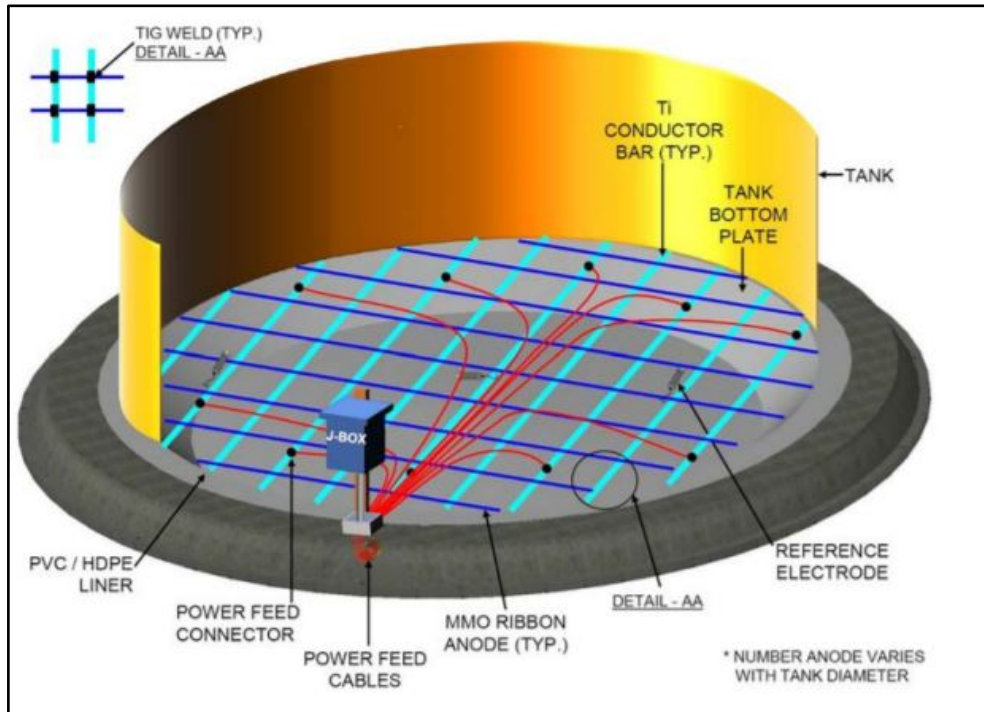
Finding # 3 – Tank Cathodic Protection Monitoring



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Cathodic Protection System monitoring requirements are dictated by standards published by the National Association of Corrosion Engineers (NACE).

NACE defines several criteria for CP. The two criteria most widely used are:

- IR Free potential of -850 mV
- 100 mV of polarization

Finding # 3 – Tank Cathodic Protection Monitoring

5/30/2018 (

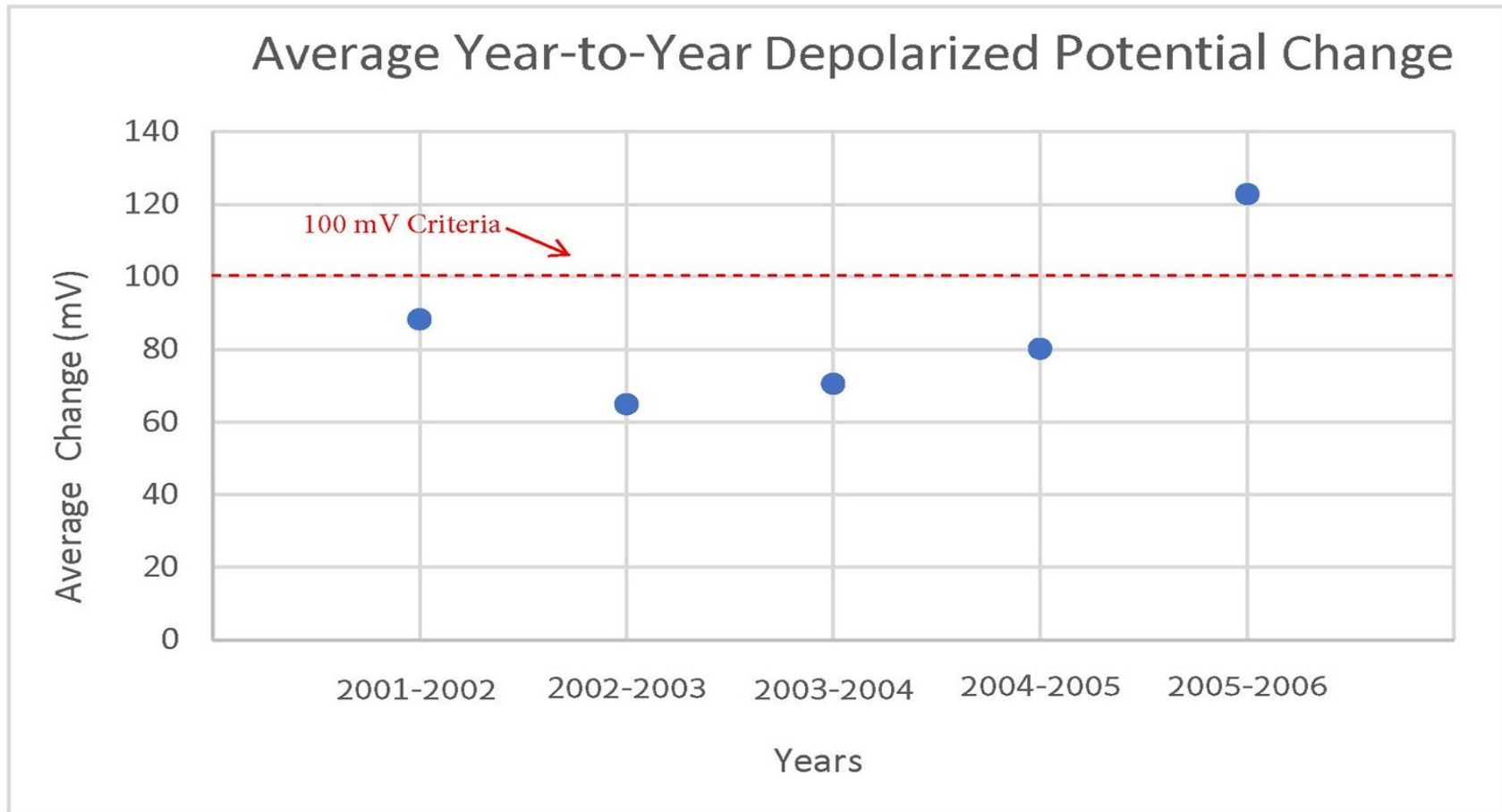
Alyeska Pipeline Service Company Test Point Inspection Grid

Segment Code and Pipe	Inspection Date	Location (ft)	Calculated Shift (V)	Structure P/S (V)	Structure IRF (V)*	Effective Depol Date	Effective Depol P/S (V)
TANK 08 - NORTHEAST TUBE	6/24/2017 11:04:40 AM	90	0.332	-1.524	-0.514	7/13/2015	-0.182
TANK 08 - NORTHEAST TUBE	5/30/2018 09:41:50 AM	90	0.289	-1.411	-0.471	7/13/2015	-0.182
TANK 08 - NORTHEAST TUBE	6/27/2016 03:59:22 PM	100	0.42	-1.376	-0.57	7/13/2015	-0.15
TANK 08 - NORTHEAST TUBE	6/24/2017 11:06:00 AM	100	0.463	-1.294	-0.613	7/13/2015	-0.15
TANK 08 - NORTHEAST TUBE	5/30/2018 09:42:40 AM	100	0.417	-1.025	-0.567	7/13/2015	-0.15
TANK 08 - SOUTHWEST TUBE	6/27/2016 12:24:21 PM	10	0.131	-2.626	-0.382	7/13/2015	-0.251
TANK 08 - SOUTHWEST TUBE	6/24/2017 10:43:20 AM	10	0.731	-5.222	-0.982	7/13/2015	-0.251
TANK 08 - SOUTHWEST TUBE	5/30/2018 09:56:10 AM	10	0.214	-2.083	-0.465	7/13/2015	-0.251
TANK 08 - SOUTHWEST TUBE	6/27/2016 12:24:42 PM	20	0.252	-4.517	-0.486	7/13/2015	-0.234
TANK 08 - SOUTHWEST TUBE	6/24/2017 10:44:00 AM	20	0.92	-7.451	-1.154	7/13/2015	-0.234
TANK 08 - SOUTHWEST TUBE	5/30/2018 09:56:50 AM	20	0.401	-2.404	-0.635	7/13/2015	-0.234

7/13/2015

*Note: Readings more negative than -1.4V are due to being taken in close proximity to the MMO grid wires.

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Alyeska Pipeline Service Company
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-1.154

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Finding # 3 – Tank Cathodic Protection Monitoring

-2.684

-2.144

Segment Code and Pipe	Inspection Date	Location (ft)	Calculated Shift (V)	Structure P/S (V)	Structure IRF (V)*	Effective Depol Date	Effective Depol P/S (V)	*Note: Readings more negative than -1.4V are due to being taken in close proximity to the MMO grid wires.
TANK 07 - NORTHEAST TUBE	6/27/2016 11:49:03 AM	100	0.974	-10.028	-1.213	7/13/2015	-0.244	<small>This document is proprietary and the property of TAPCO. Its sole use is for Alyeska Pipeline Service Company ("Alyeska"), and the state and federal regulatory agencies with authority to view the information. It may not be used for commercial or any other use. Any other use must be expressly permitted in writing by Alyeska as Agent for TAPCO. This use restriction includes reproduction or redistribution of this document or any portion of this document.</small>
	6/24/2017 10:08:00 AM		0.66	-4.679	-0.904	7/13/2015	-0.244	
	5/27/2018 04:49:20 PM		1.072	-7.207	-1.316	7/13/2015	-0.244	
TANK 07 - NORTHEAST TUBE	6/27/2016 11:49:32 AM	110	0.507	-16.855	-0.812	7/13/2015	-0.325	
	6/24/2017 10:08:19 AM		0.361	-2.982	-0.686	7/13/2015	-0.325	
	5/27/2018 04:49:40 PM		1.023	-7.393	-1.148	7/13/2015	-0.325	
TANK 07 - NORTHEAST TUBE	6/27/2016 11:50:04 AM	120	0.344	-1.421	-0.654	7/13/2015	-0.31	
	6/24/2017 10:08:38 AM		0.466	-3.513	-0.776	7/13/2015	-0.31	
	5/27/2018 04:50:00 PM		2.374	-19.157	-2.684	7/13/2015	-0.31	
TANK 07 - NORTHEAST TUBE	6/27/2016 11:50:42 AM	125	0.409	-2.846	-0.661	7/13/2015	-0.252	
	6/24/2017 10:09:09 AM		0.458	-1.74	-0.71	7/13/2015	-0.252	
	5/27/2018 04:51:40 PM		1.374	-10.925	-1.626	7/13/2015	-0.252	
TANK 07 - SOUTHWEST TUBE	6/27/2016 12:04:29 PM	10	0.433	-3.062	-0.688	7/13/2015	-0.255	
	6/24/2017 09:50:20 AM		1.889	-15.417	-2.144	7/13/2015	-0.255	
	5/27/2018 03:57:23 PM		0.972	-7.804	-1.227	7/13/2015	-0.255	

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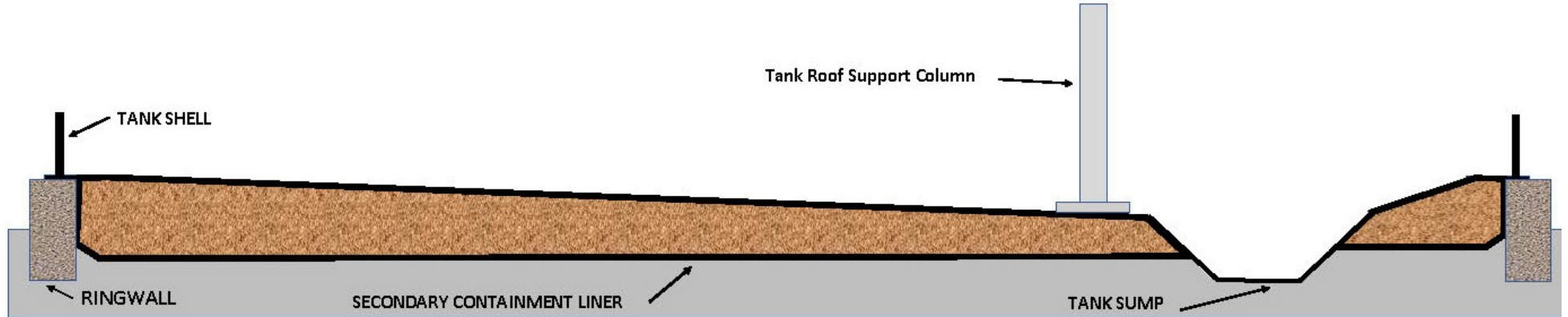
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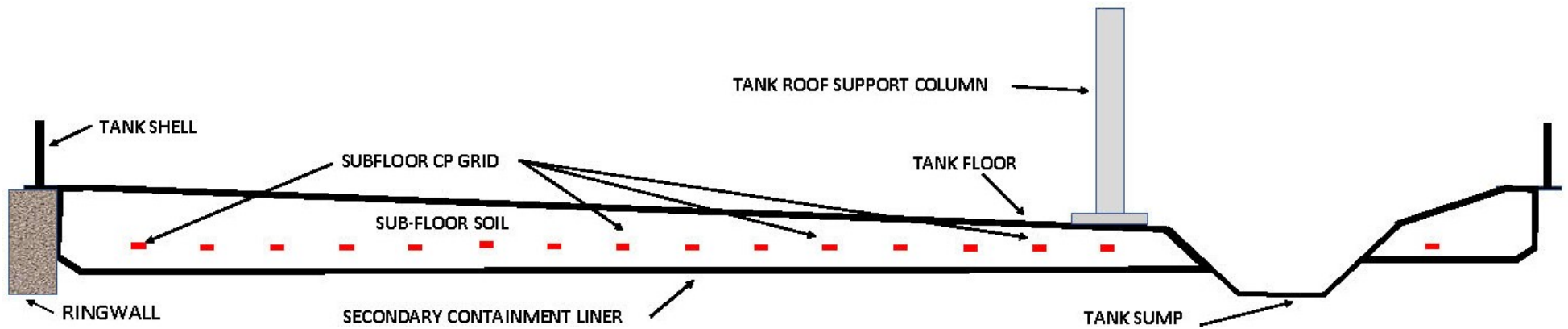
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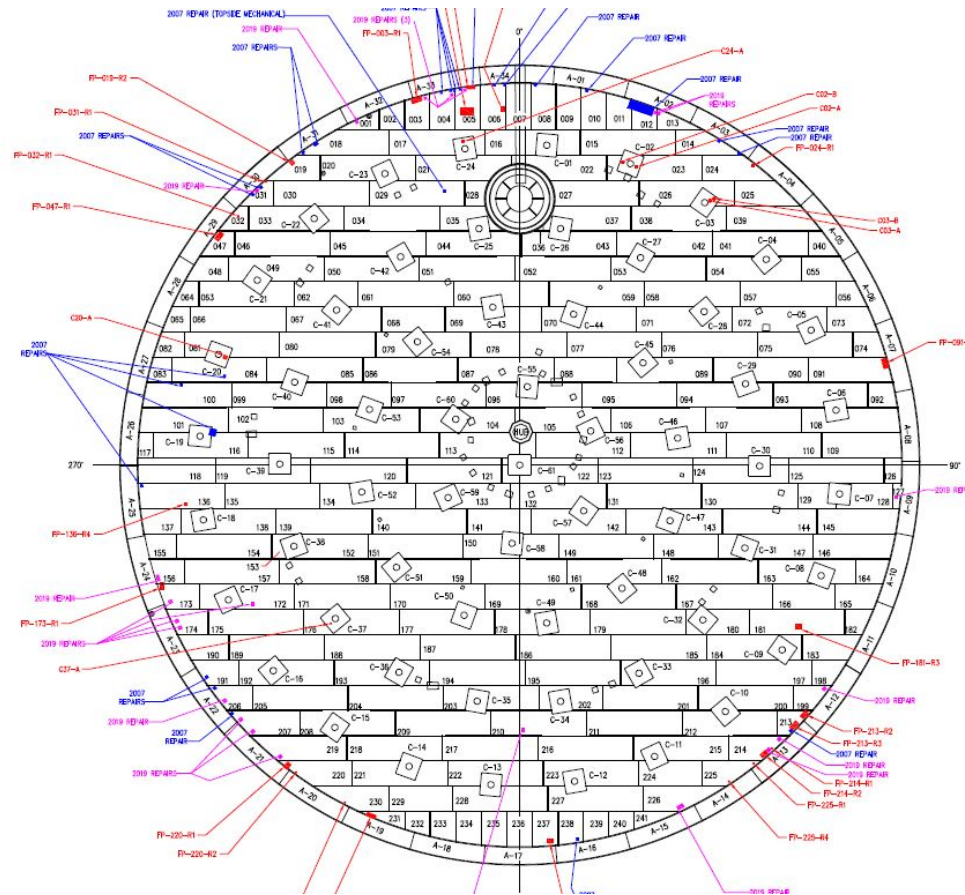
Finding # 4 – Tank Secondary Containment



Finding # 5 – Bottomside CP System Design



Finding # 5 – Bottomside CP System Design



Summary of Findings

- Tank 8 Return to Temporary Service
- Sub-Floor Water Accumulation
- Tank Cathodic Protection Monitoring
- Tank Secondary Containment
- CP Design Issues

Questions?

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Thank You for the opportunity present here today!

