CRUDE OIL STORAGE TANK 8 INTERNAL INSPECTION REVIEW PWSRCAC Board Meeting January, 2021 STATUS AND PRELIMINARY 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 personel, property and the environment.

Background Tank 8 Information



API 653 Inspections



<u>Initial Finding #1 – 2020 API 653 Report/Return to</u> <u>Temporary Service</u>



Initial Finding #1 – 2020 API 653 Report/Return to

Temporary Service



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<u>Initial Finding #1 – 2020 API 653 Report/Return to</u> <u>Temporary Service</u>

• The corrosion rates utilized to justify a 4-year service interval were conservative and reasonable. There is very low risk of a corrosion failure during the current service interval.

<u>Initial Finding # 2 – Sub-Floor Water Build-up</u>



Initial Finding # 2 – Potential Causes: Annular Plate

Extension Seal



Ringwall/Floorplate Extension without a seal



TANK SHELL

Typical Ringwall/Floorplate Extension Seal

Initial Finding # 2 – Annular Plate Extension Seal Failure



2007 Condition of the Tank 8 Annular Plate Extension Seal



Typical Ringwall/Floorplate Extension Seal

Initial Finding # 2 – Sub Floor Water Saturation Risk



Initial Finding # 2 – Sub Floor Water Saturation Risk



<u>Initial Finding #3 – Tank Cathodic Protection Monitoring</u>



Initial Finding # 3 – Tank Cathodic Protection Monitoring



<u>Initial Finding #3 – Tank Cathodic Protection Monitoring</u>





Initial Finding # 3 – Tank Cathodic Protection Monitoring

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

NACE defines two criteria for cathodic protection

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

<u>In</u>itial Finding # 3 – Tank Cathodic Protection Monitoring

~	Test Point	Inspectio	"Instant				
Segment Code and Pipe	Inspection Date	Location (ft)	Polarization Calculated Shift (V)	"On" Structure P/S (V)	Off" 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 - 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

Alyeska Pipeline Service Company

Initial Finding # 3 – Tank Cathodic Protection Monitoring



Alyeska Pipeline Service Company

	Test Point	Inspectio	n Grid	<u>es a</u>		8	
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 (3:59:22 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	5/30/2015 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 19:56:10 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



<u>Initial Finding #3 – Tank Cathodic Protection Monitoring</u>

Alyeska Pipeline Service Company

	Test Point	Inspectio	n Grid	12			
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	7/12/2015	-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



<u>Initial Finding # 3 – Tank Cathodic Protection Monitoring</u>

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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 6/24/2017 10:08:00 AM 5/27/2018 04:49:20 PM	100	0.974 0.66 1.072	-10.028 -4.679 -7.207	-1.213 -0.904 -1.316	7/13/2015 7/13/2015 7/13/2015	-0.244 -0.244 -0.244	This document a proprietary and the property of TAPS, its sole use is for Agada Papahe Service Company ("Ayeria") and the state and federal explainting agrounds with admontary two the information. It may not be used in motion of the state of the state of the state of the state of the information of the document or any parties of this document.
TANK 07 - NORTHEAST TUBE	6/27/2016 11:49:32 AM 6/24/2017 10:08:19 AM 5/27/2018 04:49:40 PM	110	0.507 0.361 1.023	-16.855 -2.982 -7.393	-0.882 -0.€86 <mark>-1. 48</mark>	7/13/2015 7/13/2015 7/13/2015	-0.325 -0.325 -0.325	
TANK 07 - NORTHEAST TUBE	6/27/2016 11:50:04 AM 6/24/2017 10:08:38 AM 5/27/2018 04:50:00 PM	120	0.344 0.466 2.374	-1.421 -3.513 -19.257	-0.554 -0.775 -2.684	7/13/2015 7/13/2015 13/2015	-0.31 -0.31 -0.31	
TANK 07 - NORTHEAST TUBE	6/27/2016 11:50:42 AM 6/24/2017 10:09:09 AM 5/27/2018 04:51:40 PM	125	0.409 0.458 1.374	-2.846 -1.74 -10.925	-0.661 -0.71 <mark>-1.626</mark>	7/13/2015 7/13/2015 7/13/2015	-0.252 -0.252 -0.252	
TANK 07 - SOUTHWEST TUBE	6/27/2016 12:04:29 PM 6/24/2017 09:50:20 AM 5/27/2018 03:57:23 PM	10	0.433 1.889 0.972	-3.062 -15.4.7 -7.804	-0.688 -2.144 -1.227	7/13/2015 7/13/2015 7/13/2015	-0.255 -0.255 -0.255	

Initial Finding # 3 – Tank Cathodic Protection Monitoring

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

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				
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<u>Initial Finding #4 – Tank Secondary Containment</u>



<u>Summary</u>

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

<u>Next Steps</u>

- Pending Data
- Final Report Development
- Report and Recommendations in May

Questions?



Thank You for the opportunity to update you!



Reference Slide



