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Mechanical Seal Analysis (MSA)

Date	6/11/21	**Pump Position**	T Boiler Blowdown Pump
MSA #	2021-024	**Seal Manufacturer**	FSI
Inquiry #	I-21-0062	**Seal Model**	MS1015+0028SXSX77
Customer	Anchor Seals	**Shaft Size**	1.75”
Customer Ref #	2200842	**Drawing #**	-
End User	USS Clairton Works	**Seal Serial #**	TEC-0739
Pump House	TEC	**Inboard Rotary Material**	Silicon Carbide
Contact	Brandon Spithaler	**Inboard Stationary Material**	Silicon Carbide
Phone	412-865-2101	**Outboard Rotary Material**	-
Salesperson	House	**Outboard Stationary Material**	-
		Elastomers	Viton

General Seal Condition

Seal was returned assembled.

Figure 1: Seal Assembly

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The Flush Port was found to be clear.

Figure 2: Flush Port

Seal Face Conditions

The silicon carbide stationary face showed signs of damage. The damage near the anti-rotation insert suggests a hard start on the seal face.

Figure 3 &4: Stationary Face

The silicon carbide rotary face showed signs of excessive wear.

Figure 5: Rotary Face

Metal Components, Springs, Pins

The Gland, sleeve and drive collars are in good working order.

Figure 6: Metal Components

The springs looked to be in good working order.

Figure 7: Springs

Elastomers

The O rings showed signs of deformity and destruction from excessive heat.

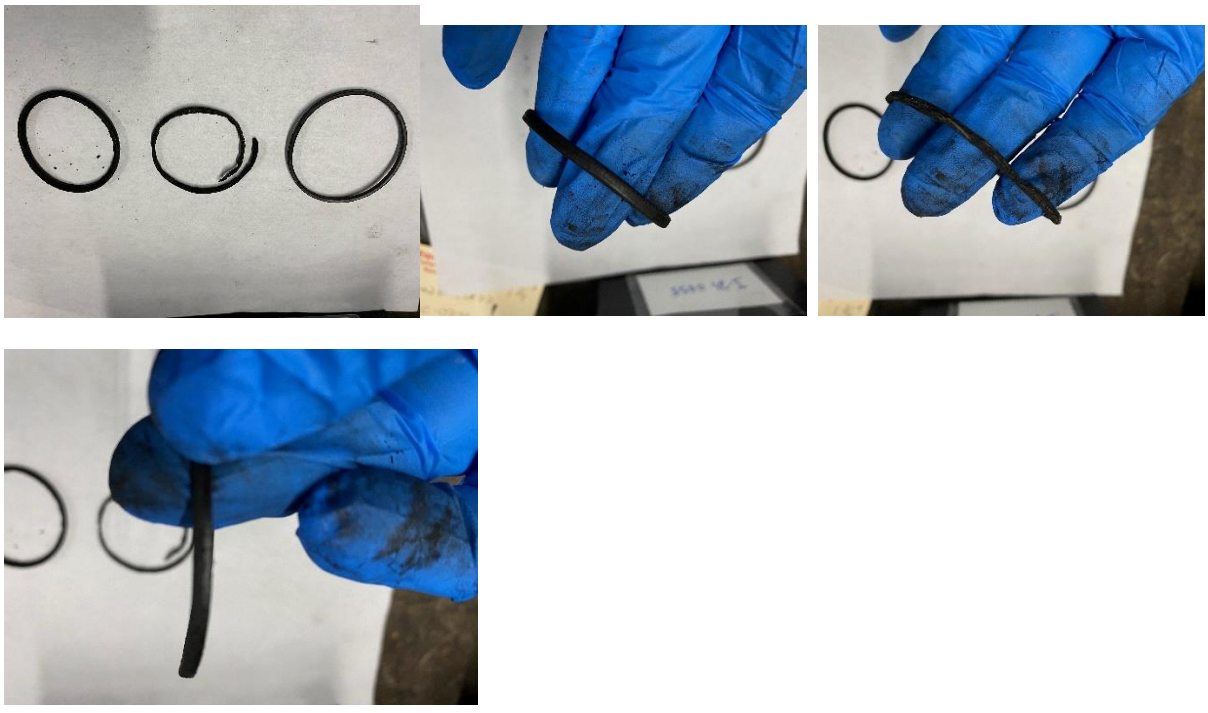

Figure 8-11: Elastomer Components

Failure Explanation/Recommendation

Failure Explanation: It appears the seal failure was caused by overheating the elastomers and seal faces. The excessive heat was a result of the lack of lubricity at the seal face interchange. This is based on the temperature of the pumping media and the heat generated by the seal faces. The damage to back the stationary seal face is most likely due to "stick-slip" occurring, based on the lack of lubricity across the seal faces. That torque and resulting impact between the thrust disk and the seal face caused the breaking of the seal face.

Recommendation: Review and confirm the process conditions of this application. Taking into consideration the lack of lubricity provided by a hot water service we may want to look into using Carbon, Silicon Carbide, EPDM for this application moving forward.

Additional Note: