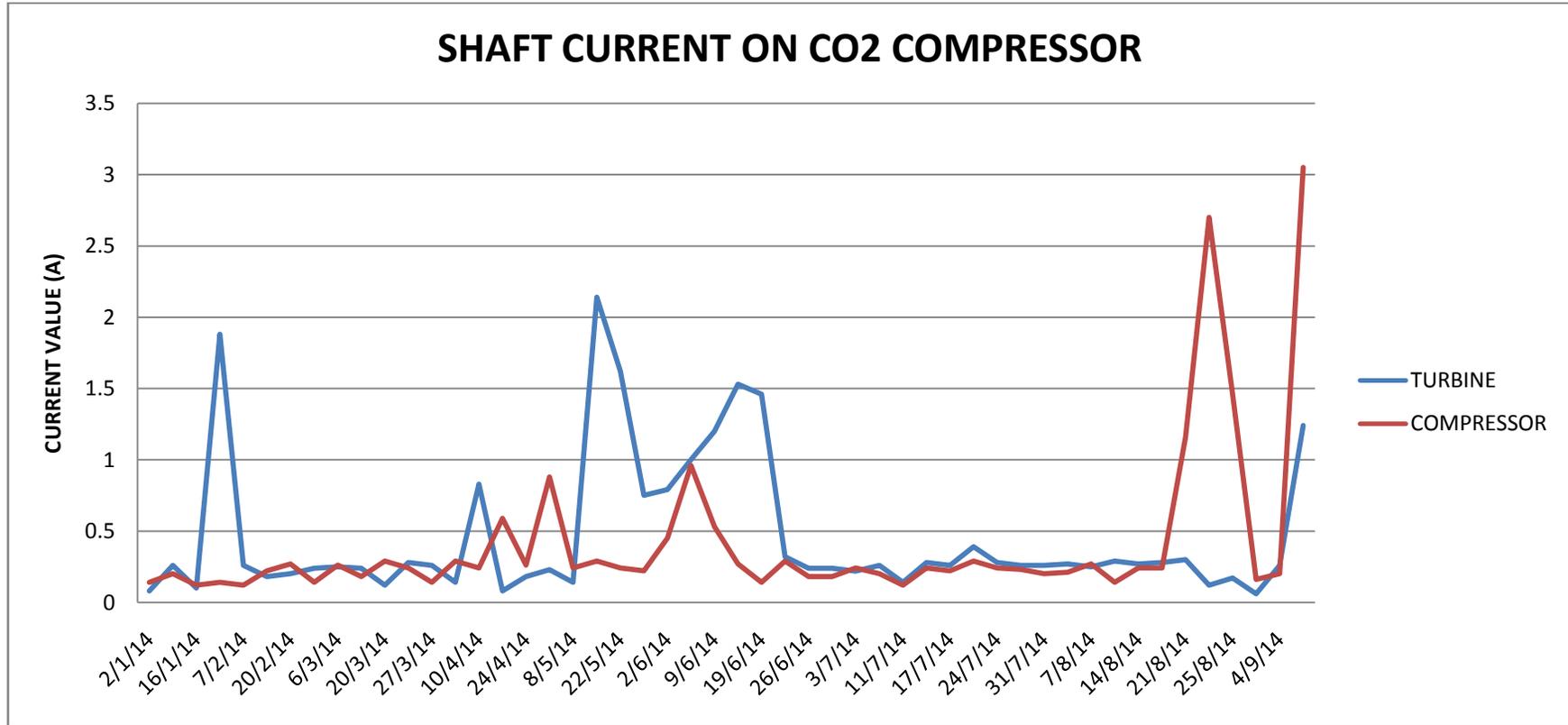


HISTORY SUMMARY

1. Shaft current measured through earth brush on TB side and HP compressor side.



2. History summary

Time	Description	Abnormality	Countermeasures	Result	Notes
06/2011 – 01/2012	- High axial displacement up to near trip value. - High thrust bearing temp.	High axial displacement and temp. of thrust bearing.	Installed more an earth brush on NDE of HP Comp in 01/2012.	The Axial displacement is stable; however, the temp of thrust bearing has still been high (up to 110oC).	Attach 1
01/2012 – 08/2012	- Stable axial displacement. 0.42-0.43mm.	- After about 2-3 months of operation, the small spike on Orbit recorded at	Keep closely monitoring on MMS system and measure frequently the	In Minor Maintenance 08/2012: The vanish burn in Thrust bearing of HP comp. No abnormal	Attach 2.

	<ul style="list-style-type: none"> - High thrust bearing temperature with value up to above 100oC. - Stable vibration with value in acceptance (15-16um: NDE). 	<p>NDE side of HP comp. was still present.</p> <ul style="list-style-type: none"> - High temp and fluctuating abnormally at thrust bearing of HP comp. 	shaft current through earth brush once a week.	Corrosion/erosion/pitting in thrust bearing and thrust disk was recorded with visual check.	
08/2012 – 09/2013	<ul style="list-style-type: none"> - Stable axial displacement. 0.40mm. - High thrust bearing temperature with value up to above 100oC. - Stable vibration with value in acceptance (15-16um: NDE, 25-26um: DE). 	<ul style="list-style-type: none"> - After about 2-3 months of operation, The small spike on Orbit recorded at NDE side of HP comp. was still present. - High temp and fluctuating abnormally at thrust bearing of HP comp. 	Keep closely monitoring on MMS system and measure frequently the shaft current through earth brush once a week.	In Minor Maintenance 09/2013: The vanish burn in Thrust bearing of HP comp, journal bearing. No abnormal Corrosion/erosion/pitting or sparking trace in thrust bearing, thrust disk, journal, gear surface was recorded with visual check.	Attach 3.
09/2013 – 28/05/2014	<ul style="list-style-type: none"> - Stable axial displacement. 0.35mm. - Stable thrust bearing Temperature with value up to above 85-90oC. - Stable vibration with value in acceptance (15-16um: NDE, DE: 26um). 	After about 6 months of operation, The electrical discharge has occurred with long spike on orbit.	28/05/2014: replace a new earth brush. Keep closely monitoring on MMS system and measure frequently the shaft current through earth brush once a week.	Inspecting result when shutdown on 28/05/2014 shows that the earth brush at TB side was worn out with “Fog trace” on journal of TB and pitting on earth brush. The earth brush at NDE of HP comp. was slightly worn out.	Attach 04.
28/05/2014 – now	<ul style="list-style-type: none"> - Stable axial displacement. 0.35mm. - Stable thrust bearing Temperature with value up to above 85-90oC. - Stable vibration with value in acceptance (15-16um: NDE, DE: 15-16um). 	- The small spike on Orbit recorded at NDE side of HP comp. was still present.	Keep closely monitoring on MMS system and measure frequently the shaft current through earth brush once a week.		Attach 05