

Appendix I – Kinetic Data, Sub-aqueous Column Tests

Table I.1: Summary of Trace Element Concentrations for Saturated Column Tests

	Sat. Col ID	Deposit	Tailings Type	pH	SO4	Total Ammonia	Diss.-P	Al	Sb	As	Cd	Ca	Cr	Co	Cu	Fe	Pb	Mn	Hg	Mo	Ni	Se	Ag	Sr	Zn
				pH Units	mg/L	mgN/L	mgP/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Median	SAD-2	Doris Central	Flotation	8.25	8.7	0.05	0.016	0.0051	0.00011	0.0017	0.000022	22.1	0.0001	0.000046	0.00075	0.0035	0.000071	0.030	0.000002	0.035	0.0010	0.00011	0.000008	0.10	0.0064
	SAD-4	Doris North	Mixed	8.04	56	0.099	0.018	0.033	0.00020	0.0009	0.000015	16.0	0.0001	0.00044	0.0013	0.041	0.000054	0.036	0.000002	0.010	0.0016	0.00013	0.000018	0.057	0.0066
	SAD-5	Doris Connector	Flotation	7.76	26	0.53	0.0093	0.011	0.00014	0.0005	0.000022	16.1	0.0001	0.00026	0.0013	0.037	0.000048	0.046	0.000002	0.027	0.0017	0.00007	0.000020	0.033	0.0067
Maximum	SAD-2	Doris Central	Flotation	8.55	136	0.34	0.31	0.0098	0.00026	0.0036	0.00017	71.7	0.0003	0.00019	0.019	0.028	0.00073	0.12	0.00002	0.071	0.0031	0.00025	0.000031	0.18	0.029
	SAD-4	Doris North	Mixed	8.29	197	0.78	0.065	0.051	0.00050	0.0020	0.000036	30.8	0.00013	0.0011	0.0019	0.15	0.00067	0.093	0.000003	0.024	0.0029	0.00090	0.00027	0.129	0.0095
	SAD-5	Doris Connector	Flotation	8.24	481	7.1	0.34	0.027	0.00032	0.0010	0.000052	62.6	0.0003	0.0016	0.0031	0.053	0.00033	0.29	0.000002	0.040	0.0057	0.00046	0.000072	0.219	0.0097



Client: Newmont Mining Corporation

Project Name: Hope Bay

Maxxam Project No: 2-21-941

SAD Column 4 (Doris North mixed); Sample ID: Composite of 4 samples (See Compositing List)

Method:			pH Meter	ORP Meter		pH Meter	ORP Meter	EC Meter	Auto Turbidity	Titration & Calculation			SIE	Ion Chromatography			Colourimetry		
Sampling Period: 2 Day Cycle (Wednesday to Friday)	Cycle No.	Target Pore Vol. Collected	Input (DI Water) Analysis (done In-Situ)			Output (Sample) Analysis (done In-Situ)				Sulphate	Acidity		Total Alkalinity	Fluoride	Chloride	Nitrate-N	Nitrite-N	Total Ammonia	Diss.-P
			Date Analyzed	pH	ORP	Date Analyzed	pH	ORP	EC		to pH 4.5	to pH 8.3	to pH 4.5						
Units:		ml		pH Units	mV		pH Units	mV	µS/cm	mg/L	mg CaCO3/L		mg CaCO3/L	mg/L	mg/L	mg/L	mg/L	mgN/L	mgP/L
DLs for ICP-MS																			
DLs for ICP-ES		5.0		0.01	5.0		0.01	5.0	0.5	0.5	0.5	0.5	0.5	0.01	0.5	0.02	0.005	0.005	0.005
18 to 20-Jan-12	0	250	18-Jan-12	6.43	240	20-Jan-12	7.92	300	644	197	#N/A	2	62	0.07	19.0	-0.02	-0.005	0.061	0.038
15 to 17-Feb-12	1	250	15-Feb-12	6.24	260	17-Feb-12	7.89	300	508	145	#N/A	2	55	0.05	20.0	-0.02	-0.005	0.098	0.017
14 to 16-Mar-12	2	250	14-Mar-12	6.46	260	16-Mar-12	8.04	320	316	98	#N/A	-1	53	0.04	7.8	-0.02	-0.005	0.100	0.065
11 to 13-Apr-12	3	250	11-Apr-12	6.20	300	13-Apr-12	8.09	350	386	87	#N/A	-1	58	0.05	13.0	0.08	-0.005	0.200	0.024
9 to 11-May-12	4	250	9-May-12	6.22	280	11-May-12	8.03	390	248	36	#N/A	-1	40	0.05	2.6	0.11	0.005	0.780	0.018
6 to 8-Jun-12	5	250	6-Jun-12	6.27	260	8-Jun-12	8.23	310	261	58	#N/A	-1	48	0.05	3.5	-0.02	-0.005	0.160	0.007
4 to 6-Jul-12	6	250	4-Jul-12	6.23	270	6-Jul-12	8.07	350	228	53	#N/A	-1	50	0.05	3.8	-0.02	-0.005	0.120	0.021
1 to 3-Aug-12	7	250	1-Aug-12	6.20	265	3-Aug-12	7.98	310	167	26	#N/A	2	33	0.03	2.0	-0.02	-0.005	0.110	0.020
29 to 31-Aug-12	8	250	29-Aug-12	6.44	265	31-Aug-12	8.29	350	339	64	#N/A	1	86	0.09	5.2	-0.02	-0.005	0.054	-0.005
26 to 28-Sept-12	9	250	16-Sep-12	6.57	250	28-Sep-12	8.02	300	300	43	#N/A	1	72	0.08	#N/A	-0.02	-0.005	0.089	#N/A
24 to 26-Oct-12	10	250	24-Oct-12	6.37	220	26-Oct-12	8.22	200	248	37	#N/A	3	76	0.09	4.1	-0.02	-0.005	0.092	0.017

Notes:

Input volume is not measure.

Column is left to rest undisturbed for 4 weeks between each pore volume collection.

No pore volume determination. Pore volume of 250 ml was determined by client based on their data available.

To continue with pore volume collection until a -5% decrease of solute is observed in comparison to the initial solute concentration.



Method:			Gravimetry	Calculation	Dissolved Metals by ICP-MS or ES; Hg by CVAH Method											
Sampling Period: 2 Day Cycle (Wednesday to Friday)	Cycle No.	Target Pore Vol. Collected	TDS	Hardness CaCO3	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co	Cu
Units:		ml	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
DLs for ICP-MS					LDL:0.0002; UDL: 50.0	0.00002	0.00002	0.00002	0.00001	0.000005	0.05	0.000005	LDL:0.05; UDL: 500.0	0.0001	0.000005	LDL: 0.00005; UDL: 10.0
DLs for ICP-ES		5.0	10	0.5	0.05								0.05			0.02
18 to 20-Jan-12	0	250	338	146	0.051	0.00050	0.00085	0.00853	-0.00001	-0.000005	0.11	0.000013	30.8	-0.0001	0.000975	0.00146
15 to 17-Feb-12	1	250	318	117	0.041	0.00045	0.00093	0.00658	-0.00001	-0.000005	0.16	0.000016	26.6	-0.0001	0.001110	0.00138
14 to 16-Mar-12	2	250	186	87	0.036	0.00023	0.00067	0.00461	-0.00001	-0.000005	0.08	0.000009	20.4	-0.0001	0.000588	0.00119
11 to 13-Apr-12	3	250	226	88	0.0362	0.00022	0.00105	0.0055	-0.00001	-0.000005	0.17	0.000014	19.9	-0.0001	0.000572	0.00173
9 to 11-May-12	4	250	108	54.6	0.0255	0.000171	0.000511	0.00277	-0.00001	-0.000005	0.076	0.00002	15	-0.0001	0.000175	0.00107
6 to 8-Jun-12	5	250	136	60.8	0.033	0.000185	0.000883	0.00437	-0.00001	-0.000005	0.077	0.0000126	13.6	-0.0001	0.00042	0.00066
4 to 6-Jul-12	6	250	#N/A	60.3	0.0266	0.000164	0.00126	0.0195	-0.00001	-0.000005	0.081	0.000036	13.7	-0.0001	0.00046	0.00145
1 to 3-Aug-12	7	250	#N/A	35.9	0.0249	0.000105	0.000702	0.0159	-0.00001	-0.00001	-0.05	0.0000	8.32	0.00013	0.000238	0.00169
29 to 31-Aug-12	8	250	190	86.0	0.0349	0.000301	0.00198	0.0128	-0.00001	-0.000005	0.138	0.000018	19.6	-0.0001	0.000572	0.000911
26 to 28-Sept-12	9	250	96	57.5	0.00943	0.000136	0.000492	0.016	-0.00001	0.000007	0.166	0.000023	15.8	-0.0001	0.000224	0.00186
24 to 26-Oct-12	10	250	-10	68	0.0321	0.000357	0.00177	0.00885	-0.00001	0.000009	0.107	0.000016	16.1	-0.0001	0.000363	0.00116

Notes:

Input volume is not measure.

Column is left to rest undisturbed for 4 weeks b

No pore volume determinatione. Pore volume

To continue with pore volume collection until a



Method:																	
Sampling Period: 2 Day Cycle (Wednesday to Friday)	Cycle No.	Target Pore Vol. Collected	Fe	Pb	Li	Mg	Mn	Hg (CVAF)	Mo	Ni	P	K	Se	Si	Ag	Na	Sr
Units:		ml	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
DLs for ICP-MS			LDL: 0.001; UDL: 50.0	0.000005	0.0005	LDL:0.05; UDL: 500.0	0.00005	0.002	0.00005	0.00002	0.002	LDL: 0.05; UDL: 500.0	0.00004	0.1	0.000005	LDL:0.05; UDL: 500.0	0.00005
DLs for ICP-ES		5.0	0.01			0.05						0.3				0.1	
18 to 20-Jan-12	0	250	0.098	0.000066	0.0121	16.9	0.0930	-0.002	0.01630	0.0015	0.045	15.1	0.00090	1.3	0.000006	57.6	0.1290
15 to 17-Feb-12	1	250	0.146	0.000123	0.0110	12.3	0.0610	-0.002	0.01120	0.0021	0.024	18.0	0.00026	1.6	0.000269	44.8	0.0977
14 to 16-Mar-12	2	250	0.065	0.000041	0.0076	8.7	0.0683	-0.002	0.00781	0.00171	0.074	10.0	0.00058	1.4	0.000095	26.9	0.0681
11 to 13-Apr-12	3	250	0.07	0.000067	0.0075	9.29	0.0541	0.002	0.00958	0.00273	0.027	15.6	0.00041	1.7	0.000223	27.4	0.075
9 to 11-May-12	4	250	0.0371	0.000019	0.00427	4.19	0.026	-0.002	0.0097	0.00166	0.0035	4.45	0.000065	1.83	-0.000005	18.8	0.0295
6 to 8-Jun-12	5	250	0.0445	0.0000442	0.00614	6.49	0.0356	0.003	0.00881	0.000924	0.0171	7.79	0.000126	1.56	0.000015	19.1	0.0528
4 to 6-Jul-12	6	250	0.0374	0.0000346	0.00595	6.33	0.0395	-0.002	0.0107	0.000889	0.0238	6.81	0.000131	1.68	0.0000123	17	0.05
1 to 3-Aug-12	7	250	0.0255	0.000062	0.00372	3.7	0.0252	-0.002	0.00643	0.000987	0.0214	5.2	0.000081	1.07	0.000021	10.2	0.0303
29 to 31-Aug-12	8	250	0.0519	0.000059	0.00982	8.97	0.032	-0.002	0.0194	0.00285	0.0148	11.6	0.000106	3.03	0.000009	23.6	0.08
26 to 28-Sept-12	9	250	0.0329	0.000669	0.00498	4.4	0.036	-0.002	0.0238	0.000875	0.016	9.24	0.000088	2.28	0.000087	16.7	0.03
24 to 26-Oct-12	10	250	0.0335	0.000048	0.0087	6.78	0.0204	0.002	0.0148	0.00187	0.0175	11.2	0.000147	2.97	0.000107	14	0.06

Notes:

Input volume is not measure.

Column is left to rest undisturbed for 4 weeks b

No pore volume determinatione. Pore volume

To continue with pore volume collection until a



Method:											
Sampling Period: 2 Day Cycle (Wednesday to Friday)	Cycle No.	Target Pore Vol. Collected	Te	Tl	Th	Sn	Ti	U	V	Zn	Zr
Units:		ml	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
DLs for ICP-MS			0.00002	0.000002	0.000005	0.00001	0.0005	0.000002	0.0002	LDL:0.0001; UDL: 10.0	0.0001
DLs for ICP-ES		5.0								0.005	
18 to 20-Jan-12	0	250	0.00006	0.000020	-0.000005	0.0046	-0.0005	0.000165	0.0004	0.0022	-0.0001
15 to 17-Feb-12	1	250	0.00236	0.000017	-0.000005	0.0053	-0.0005	0.000119	0.0003	0.0071	-0.0001
14 to 16-Mar-12	2	250	0.00010	0.000008	-0.000005	0.0047	-0.0005	0.000073	0.0003	0.0044	-0.0001
11 to 13-Apr-12	3	250	0.00413	0.000006	-0.000005	0.0074	-0.0005	0.000065	0.0004	0.0061	-0.0001
9 to 11-May-12	4	250	0.000059	-0.000002	-0.000005	0.0116	-0.0005	0.000045	-0.0002	0.00438	-0.0001
6 to 8-Jun-12	5	250	0.000038	0.000003	-0.000005	0.00801	-0.0005	0.0000362	0.00034	0.00342	-0.0001
4 to 6-Jul-12	6	250	0.0000	0.000002	-0.000005	0.0086	-0.0005	0.000045	0.00082	0.00858	-0.0001
1 to 3-Aug-12	7	250	0.0001	0.0000	-0.000005	0.0058	-0.0005	0.000041	0.00023	0.00954	-0.0001
29 to 31-Aug-12	8	250	0.00050	0.000002	-0.000005	0.0156	-0.0005	0.00006	0.0003	0.00762	-0.0001
26 to 28-Sept-12	9	250	0.00235	-0.000002	-0.000005	0.0104	-0.0005	0.000006	-0.0002	0.00729	-0.0001
24 to 26-Oct-12	10	250	0.00	0.00	-0.000005	0.0176	-0.0005	0.000035	0.00049	0.00846	-0.0001

Notes:

Input volume is not measure.

Column is left to rest undisturbed for 4 weeks b

No pore volume determinatione. Pore volume

To continue with pore volume collection until a



Client: Newmont Mining Corporation

Project Name: Hope Bay

Maxxam Project No: 2-21-941

SAD Column 5 (Doris Connector flotation); Sample ID: HB1-4 thru HB1-24 Comp RT Saturated Clmn Test Maxxam

Method:				pH Meter	ORP Meter		pH Meter	ORP Meter	EC Meter	Auto Turbidity	Tiration & Calculation			SIE	Ion Chromatography		Colourimetry		
Sampling Period: 2 Day Cycle (Wednesday to Friday)	Cycle No.	Target Pore Vol. Collected	Input (DI Water) Analysis (done In-Situ)			Output (Sample) Analysis (done In-Situ)				Sulphate	Acidity		Total Alkalinity	Fluoride	Chloride	Nitrate-N	Nitrite-N	Total Ammonia	Diss.-P
			Date Analyzed	pH	ORP	Date Analyzed	pH	ORP	EC		to pH 4.5	to pH 8.3	to pH 4.5						
Units:		ml		pH Units	mV		pH Units	mV	µS/cm	mg/L	mg CaCO3/L		mg CaCO3/L	mg/L	mg/L	mg/L	mg/L	mgN/L	mgP/L
DLs for ICP-MS																			
DLs for ICP-ES		5.0		0.01	5.0		0.01	5.0	0.5	0.5	0.5	0.5	0.5	0.01	0.5	0.02	0.005	0.005	0.005
18 to 20 - Jan-12	0	250	18-Jan-12	6.41	260	20-Jan-12	8.03	295	1642	481	#N/A	2	212	0.13	34.0	0.03	0.01	7.10	0.344
15 to 17-Feb-12	1	250	15-Feb-12	6.87	220	17-Feb-12	8.06	290	375	76	#N/A	2	80	0.09	9.4	-0.02	0.006	1.8	0.068
14 to 16-Mar-12	2	250	14-Mar-12	6.57	240	16-Mar-12	7.36	380	489	127	#N/A	2	90	0.10	20.0	-0.02	-0.005	1.2	0.029
11 to 13-Apr-12	3	250	11-Apr-12	6.25	250	13-Apr-12	7.37	400	288	40	#N/A	2	71	0.09	5.0	-0.02	-0.005	0.9	0.013
9 to 11-May-12	4	250	9-May-12	6.78	260	11-May-12	7.86	330	240	47	#N/A	-1	58	0.08	7.6	-0.02	-0.005	0.07	0.009
6 to 8-Jun-12	5	250	6-Jun-12	6.58	240	8-Jun-12	7.65	310	103	12	#N/A	-1	40	0.03	1.3	0.03	-0.005	0.2	0.009
4 to 6-Jul-12	6	250	4-Jul-12	6.38	230	6-Jul-12	7.56	290	162	22	#N/A	1	58	0.04	2.2	-0.02	-0.005	0.32	0.008
1 to 3-Aug-12	7	250	1-Aug-12	6.25	250	3-Aug-12	7.45	305	275	30	#N/A	1	78	0.09	2.7	-0.02	-0.005	0.500	-0.005
29 to 31-Aug-12	8	250	29-Aug-12	6.50	230	31-Aug-12	8.20	330	193	14	#N/A	1	73	0.07	10.0	-0.02	-0.005	0.26	0.006
26 to 28-Sept-12	9	250	16-Sep-12	6.35	250	28-Sep-12	7.99	290	169	10	#N/A	2	70	0.07	6.7	-0.02	-0.005	0.56	0.009
24 to 26-Oct-12	10	250	24-Oct-12	6.59	200	26-Oct-12	8.24	210	146	6	#N/A	2	65	0.07	2.6	-0.02	0.005	0.58	0.111

Notes:

Input volume is not measure.

Column is left to rest undisturbed for 4 weeks between each pore volume collection.

No pore volume determination. Pore volume of 250 ml was determined by client based on their data available.

To continue with pore volume collection until a -5% decrease of solute is observed in comparison to the initial solute concentration.



Method:			Gravimetry	Calculation	Dissolved Metals by ICP-MS or ES; Hg by CVAF Method											
Sampling Period: 2 Day Cycle (Wednesday to Friday)	Cycle No.	Target Pore Vol. Collected	TDS	Hardness CaCO3	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co	Cu
Units:		ml	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
DLs for ICP-MS					LDL:0.0002; UDL: 50.0	0.00002	0.00002	0.00002	0.00001	0.000005	0.05	0.000005	LDL:0.05; UDL: 500.0	0.0001	0.000005	LDL: 0.00005; UDL: 10.0
DLs for ICP-ES		5.0	10	0.5	0.05								0.05			0.02
18 to 20 - Jan-12	0	250	954	276.0	0.0104	0.00032	0.00100	0.00582	0.00002	-0.000005	0.24	0.000052	62.6	0.0003	0.00163	0.00119
15 to 17-Feb-12	1	250	196	79.6	0.0265	0.00019	0.00051	0.00832	-0.00001	-0.000005	0.10	0.000016	20.4	-0.0001	0.00033	0.00047
14 to 16-Mar-12	2	250	294	97.5	0.0147	0.00022	0.00064	0.00695	-0.00001	-0.000005	0.23	0.000023	25.8	-0.0001	0.000354	0.00062
11 to 13-Apr-12	3	250	162	64.1	0.0111	0.00018	0.00043	0.00463	-0.00001	-0.000005	0.15	0.000009	17.2	-0.0001	0.000212	0.00151
9 to 11-May-12	4	250	132	51.7	0.0218	0.000136	0.000643	0.00695	-0.00001	0.000005	0.119	0.000031	12.3	0.00011	0.000316	0.0011
6 to 8-Jun-12	5	250	64	36.2	0.0262	0.000088	0.000328	0.00231	-0.00001	0.0000098	-0.05	0.0000145	10.5	-0.0001	0.000179	0.00185
4 to 6-Jul-12	6	250	94	53.0	0.00833	0.000126	0.000552	0.0064	-0.00001	-0.000005	0.056	0.0000242	15.2	-0.0001	0.000211	0.00142
1 to 3-Aug-12	7	250	#N/A	61.7	0.0133	0.000141	0.000534	0.0083	-0.00001	-0.00001	0.11	0.0000280	16.3	0.00017	0.0003	0.00312
29 to 31-Aug-12	8	250	132	60.6	0.00457	0.000141	0.000561	0.0095	-0.00001	-0.000005	0.204	0.000025	16.6	-0.0001	0.000312	0.00208
26 to 28-Sept-12	9	250	150	67.3	0.00923	0.000118	0.000511	0.0162	-0.00001	-0.000005	0.173	0.000021	15.8	-0.0001	0.000208	0.00229
24 to 26-Oct-12	10	250	-10	55.5	0.0113	0.000216	0.000511	0.0135	-0.00001	-0.000005	0.09	0.000015	15.3	-0.0001	0.000196	0.00123

Notes:

Input volume is not measure.

Column is left to rest undisturbed for 4 weeks

No pore volume determination. Pore volume

To continue with pore volume collection until a



Method:																	
Sampling Period: 2 Day Cycle (Wednesday to Friday)	Cycle No.	Target Pore Vol. Collected	Fe	Pb	Li	Mg	Mn	Hg (CVAF)	Mo	Ni	P	K	Se	Si	Ag	Na	Sr
Units:		ml	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
DLs for ICP-MS			LDL: 0.001; UDL: 50.0	0.000005	0.0005	LDL: 0.05; UDL: 500.0	0.00005	0.002	0.00005	0.00002	0.002	LDL: 0.05; UDL: 500.0	0.00004	0.1	0.000005	LDL: 0.05; UDL: 500.0	0.00005
DLs for ICP-ES		5.0	0.01			0.05						0.3				0.1	
18 to 20 - Jan-12	0	250	0.011	0.000119	0.0130	29.20	0.2870	-0.002	0.0396	0.00568	0.314	22.5	0.00020	2.0	-0.000005	224	0.2190
15 to 17-Feb-12	1	250	0.037	0.000111	0.0065	6.96	0.0423	-0.002	0.0259	0.00146	0.070	7.6	0.00006	1.5	-0.000005	38	0.0477
14 to 16-Mar-12	2	250	0.053	0.000075	0.0077	8.02	0.0534	-0.002	0.0372	0.00139	0.023	16.0	0.00020	2.0	0.000038	60	0.0591
11 to 13-Apr-12	3	250	0.036	0.000033	0.0055	5.14	0.033	-0.002	0.0329	0.00194	0.015	9.41	0.00017	1.8	0.000067	25	0.0353
9 to 11-May-12	4	250	0.0501	0.000041	0.00419	5.11	0.0349	-0.002	0.00949	0.00192	-0.002	10.3	0.000079	1.23	0.000024	16.6	0.04
6 to 8-Jun-12	5	250	0.0421	0.000327	0.00176	2.41	0.0919	-0.002	0.00762	0.00189	0.0114	2.18	-0.00004	0.63	0.0000104	6.72	0.0154
4 to 6-Jul-12	6	250	0.0294	0.0000261	0.00331	3.64	0.0927	-0.002	0.0182	0.00198	0.0072	2.82	0.000051	1.27	-0.000005	11.6	0.02
1 to 3-Aug-12	7	250	0.0428	0.000082	0.0055	5.1	0.0528	-0.002	0.0337	0.00121	0.0046	5.36	0.000045	2.2	0.000015	18.3	0.0367
29 to 31-Aug-12	8	250	0.0393	0.000016	0.00426	4.64	0.0501	-0.002	0.0277	0.00265	0.0047	12	0.000458	1.99	0.00005	9.92	0.03
26 to 28-Sept-12	9	250	0.0349	0.000055	0.00459	6.76	0.0374	-0.002	0.0276	0.00114	0.0067	16.7	0.000056	2.24	0.000052	16.1	0.03
24 to 26-Oct-12	10	250	0.0371	0.000029	0.00421	4.2	0.034	-0.002	0.0264	0.00122	0.126	5.56	0.000075	2.29	0.000072	4.95	0.03

Notes:

Input volume is not measure.

Column is left to rest undisturbed for 4 weeks

No pore volume determination. Pore volume

To continue with pore volume collection until a



Method:											
Sampling Period: 2 Day Cycle (Wednesday to Friday)	Cycle No.	Target Pore Vol. Collected	Te	Tl	Th	Sn	Ti	U	V	Zn	Zr
Units:		ml	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
DLs for ICP-MS			0.00002	0.000002	0.000005	0.00001	0.0005	0.000002	0.0002	LDL: 0.0001; UDL: 10.0	0.0001
DLs for ICP-ES		5.0								0.005	
18 to 20 - Jan-12	0	250	0.00002	0.000009	-0.000005	0.0044	-0.0005	0.000033	-0.0002	0.0066	0.0001
15 to 17-Feb-12	1	250	0.00004	-0.000002	-0.000005	0.0094	-0.0005	0.000007	-0.0002	0.0059	-0.0001
14 to 16-Mar-12	2	250	#N/A	-0.000002	-0.000005	0.0103	-0.0005	0.000009	-0.0002	0.0081	-0.0001
11 to 13-Apr-12	3	250	0.00292	-0.000002	-0.000005	0.0129	-0.0005	0.000006	-0.0002	0.0055	-0.0001
9 to 11-May-12	4	250	0.00303	0.000004	-0.000005	0.00632	-0.0005	0.000019	-0.0002	0.00685	-0.0001
6 to 8-Jun-12	5	250	0.0001	0.0000051	-0.000005	0.00329	0.00083	-0.000002	0.00029	0.00717	-0.0001
4 to 6-Jul-12	6	250	0.0000	0.000006	-0.000005	0.00803	-0.0005	0.0000047	0.00063	0.00191	-0.0001
1 to 3-Aug-12	7	250	0.0001	-0.000002	-0.000005	0.0134	-0.0005	0.000022	-0.0002	0.00965	-0.0001
29 to 31-Aug-12	8	250	0.00440	0.000002	-0.000005	0.0111	0.00121	0.000005	0.00027	0.00559	-0.0001
26 to 28-Sept-12	9	250	0.00480	-0.000002	-0.000005	0.0104	-0.0005	0.000012	-0.0002	0.00811	-0.0001
24 to 26-Oct-12	10	250	0.00	0.00	-0.000005	0.0118	-0.0005	0.000005	-0.0002	0.00757	-0.0001

Notes:

Input volume is not measure.

Column is left to rest undisturbed for 4 weeks

No pore volume determination. Pore volume

To continue with pore volume collection until a



Client: Newmont Mining Corporation
 Project Name: Hope Bay
 Maxxam Project No: 2-21-941
 SAD Column 2; Sample ID: DC-BFT-A/B-2009-0108-C (Doris Central-Flotation)

Method:			pH Meter	ORP Meter		pH Meter	ORP Meter	EC Meter	Auto Turbidity	Titration & Calculation			SIE	Ion Chromatography			Colourimetry		
Sampling Period: 2 Day Cycle (Wednesday to Friday)	Cycle No.	Target Pore Vol. Collected	Input (DI Water) Analysis (done In-Situ)			Output (Sample) Analysis (done In-Situ)				Sulphate	Acidity		Total Alkalinity	Fluoride	Chloride	Nitrate-N	Nitrite-N	Total Ammonia	Diss.-P
			Date Analyzed	pH	ORP	Date Analyzed	pH	ORP	EC		to pH 4.5	to pH 8.3	to pH 4.5						
Units:		ml		pH Units	mV		pH Units	mV	µS/cm	mg/L	mg CaCO3/L		mg CaCO3/L	mg/L	mg/L	mg/L	mg/L	mgN/L	mgP/L
DLs for ICP-MS																			
DLs for ICP-ES		5.0		0.01	5.0		0.01	5.0	0.5	0.5	0.5	0.5	0.5	0.01	0.5	0.02	0.005	0.005	0.005
12 to 14-May-10	0	250	12-May-10	6.52	308	14-May-10	7.96	338	563	136	#N/A	2	169	0.23	8.0	-0.02	-0.01	-0.02	0.006
09 to 11-Jun-10	1	250	9-Jun-10	6.48	300	11-Jun-10	8.24	349	457	87	#N/A	-1	165	0.17	5	-0.02	-0.005	0.14	0.006
07 to 09-Jul-10	2	250	7-Jul-10	6.63	289	9-Jul-10	8.10	335	310	38	#N/A	-1	135	0.19	1.80	-0.02	-0.005	-0.05	0.006
04 to 06-Aug-10	3	250	4-Aug-10	6.55	299	6-Aug-10	8.12	367	210	17	#N/A	-1	88	0.17	1	-0.02	-0.005	-0.05	0.017
01 to 03-Sep-10	4	250	1-Sep-10	6.75	290	3-Sep-10	8.27	336	135	9	#N/A	1	55	0.12	0.7	-0.02	-0.005	0.34	-0.005
29-Sep-10 to 1-Oct-10	5	250	29-Sep-10	6.54	299	1-Oct-10	8.21	330	195	15	#N/A	2	84	0.25	-1	-0.02	-0.0050	-0.05	-0.005
27 to 29-Oct-10	6	250	27-Oct-10	6.72	277	29-Oct-10	8.18	320	170	15	#N/A	-1	80	0.24	0.60	0.03	-0.005	-0.05	0.082
24 to 26-Nov-10	7	250	24-Nov-10	6.53	279	26-Nov-10	8.16	308	145	10	#N/A	-1	65	0.17	1	-0.02	-0.005	0.009	-0.005
22 to 24-Dec-10	8	250	22-Dec-10	6.46	280	24-Dec-10	8.25	300	166	11	#N/A	-1	73	0.19	0.70	-0.02	-0.005	0.039	0.069
19 to 21-Jan-11	9	250	19-Jan-11	6.61	271	21-Jan-11	8.13	323	187	11	#N/A	1	80	0.18	0.90	-0.02	-0.005	-0.005	0.157
16 to 18-Feb-11	10	250	16-Feb-11	6.32	286	18-Feb-11	8.20	310	168	6	#N/A	-1	73	0.12	-0.50	-0.2	-0.005	0.035	0.007
16 to 10-Mar-11	11	250	16-Mar-11	6.60	288	18-Mar-11	8.19	293	168	8	#N/A	-1	73	0.15	0.90	-0.02	-0.005	#N/A	0.044
13 to 15-Apr-11	12	250	13-Apr-11	6.35	253	15-Apr-11	8.25	334	179	8	#N/A	-1	80	0.18	0.90	-0.02	-0.005	0.088	0.149
11 to 13-May-11	13	250	11-May-11	6.23	298	13-May-11	8.16	306	206	12	#N/A	-1	83	0.18	-0.50	-0.02	-0.005	0.021	0.008
8 to 10-Jun-11	14	250	8-Jun-11	6.29	250	10-Jun-11	8.11	307	207	10	#N/A	-1	75	0.12	-0.50	-0.02	-0.005	0.024	0.025
6 to 8-Jul-11	15	250	6-Jul-11	6.69	240	8-Jul-11	8.46	350	109	5	#N/A	#N/A	58	0.06	1.40	-0.02	-0.005	0.022	-0.005
3 to 5-Aug-11	16	250	3-Aug-11	6.47	260	5-Aug-11	8.44	390	114	5	#N/A	#N/A	56	0.06	1.10	-0.02	-0.005	0.055	0.006
31-Aug to 2-Sept-11	17	250	31-Aug-11	6.16	330	2-Sep-11	8.51	385	96	3	#N/A	#N/A	40	0.05	0.90	-0.02	-0.005	0.062	0.306
28 to 30-Sept-11	18	250	28-Sep-11	6.00	230	30-Sep-11	8.55	400	92	3	#N/A	#N/A	42	0.04	0.80	-2	-0.05	0.093	0.023
26 to 28-Oct-11	19	250	26-Oct-11	6.45	235	28-Oct-11	8.36	350	119	5	#N/A	#N/A	51	0.06	0.60	-0.02	-0.005	0.059	0.006
23 to 25-Nov-11	20	250	23-Nov-11	6.33	220	25-Nov-11	8.33	350	128	4	#N/A	#N/A	50	0.06	4.00	-0.02	-0.005	0.048	0.0798
21 to 23-Dec-11	21	250	21-Dec-11	6.40	250	23-Dec-11	8.48	320	81	6	#N/A	#N/A	33	0.04	1.00	0.036	-0.005	0.092	0.0442
18 to 20-Jan-12	22	250	20-Jan-12	6.61	255	20-Jan-12	8.52	310	83	3	#N/A	#N/A	38	0.03	1.60	-0.02	-0.005	0.040	0.0152
15 to 17-Feb-12	23	250	15-Feb-12	6.74	220	17-Feb-12	8.39	300	129	5	#N/A	#N/A	70	0.07	1.60	-0.02	-0.005	0.067	0.0290

Notes:

Input volume is not measured.
 Column is left to rest undisturbed for 4 weeks between each pore volume collection.
 No pore volume determination. Pore volume of 250 ml was determined by client based on their data available.
 To continue with pore volume collection until a -5% decrease of solute is observed in comparison to the initial solute concentration.



Method:			Gravimetry	Calculation	Dissolved Metals by ICP-MS or ES; Hg by CVA Method											
Sampling Period: 2 Day Cycle (Wednesday to Friday)	Cycle No.	Target Pore Vol. Collected	TDS	Hardness CaCO3	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co	Cu
Units:		ml	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
DLs for ICP-MS					LDL:0.0002; UDL: 50.0	0.00002	0.00002	0.00002	0.00001	0.000005	0.05	0.000005	LDL:0.05; UDL: 500.0	0.0001	0.000005	LDL: 0.00005; UDL: 10.0
DLs for ICP-ES		5.0	10	0.5	0.05								0.05			0.02
12 to 14-May-10	0	250	360	290	0.004	0.00026	0.002	0.0546	0.000	0.000	0.09	0.000034	71.7	0.000	0.000	0.0012
09 to 11-Jun-10	1	250	300	254	0.0075	0.00019	0.0022	0.0732	-0.00001	-0.000005	0.1	0.000022	51.8	0.0003	0.000193	0.0193
07 to 09-Jul-10	2	250	150	155	0.004	0.0002	0.0026	0.0885	-0.00001	-0.000005	-0.05	-0.000005	35.5	-0.0001	0.00008	0.0008
04 to 06-Aug-10	3	250	110	100	0.0047	0.00014	0.00355	0.0807	-0.00001	-0.000005	-0.05	0.000023	25	0.0002	0.00007	0.00125
01 to 03-Sep-10	4	250	72	59	0.0054	0.00009	0.00167	0.0738	-0.00001	-0.000005	-0.05	0.000022	15.1	-0.0001	0.000046	0.0006
29-Sep-10 to 1-Oct-10	5	250	100	93	0.0035	0.00015	0.00362	0.102	-0.00001	-0.000005	-0.05	0.000074	24.3	-0.0001	0.00004	0.00064
27 to 29-Oct-10	6	250	100	88	0.0033	0.00013	0.00234	0.121	-0.00001	-0.000005	-0.05	0.000172	23.7	-0.0001	0.000033	0.00089
24 to 26-Nov-10	7	250	80	71	0.0028	0.00011	0.00223	0.119	0.0000	-0.000005	-0.05	0.000037	19	0.0001	0.000029	0.00035
22 to 24-Dec-10	8	250	98	82	0.0024	0.00012	0.00191	0.153	-0.00001	-0.000005	-0.05	0.000032	22.4	0.0003	0.000025	0.00101
19 to 21-Jan-11	9	250	96	89	0.0022	0.00014	0.00166	0.168	-0.00001	-0.000005	-0.05	0.000029	24.6	0.0001	0.000017	0.00057
16 to 18-Feb-11	10	250	88	79	0.0041	0.00018	0.00048	0.129	-0.00001	-0.000005	-0.05	0.000017	21.9	-0.0001	0.000026	0.00019
16 to 10-Mar-11	11	250	86	75	0.0059	0.00011	0.00165	0.147	-0.00001	-0.000005	-0.05	0.00003	20.3	-0.0001	0.000033	0.00053
13 to 15-Apr-11	12	250	98	89	0.0055	0.00009	0.00184	0.141	-0.00001	-0.000005	-0.05	0.000014	25.4	-0.0001	0.000057	0.00055
11 to 13-May-11	13	250	100	97	0.0057	0.00009	0.00178	0.169	-0.00001	-0.000005	-0.05	0.000015	26.8	-0.0001	0.000064	0.00047
8 to 10-Jun-11	14	250	110	94	0.0098	0.00016	0.00295	0.105	-0.00001	-0.000005	-0.05	0.000041	25.7	-0.0001	0.000059	0.00073
6 to 8-Jul-11	15	250	62	59	0.0039	0.0001	0.00121	0.105	-0.00001	-0.000005	-0.05	0.000038	16.5	-0.0001	0.000095	0.00078
3 to 5-Aug-11	16	250	64	55	0.0055	0.00014	0.00341	0.122	-0.00001	-0.000005	-0.05	0.000061	15.3	-0.0001	0.000059	0.00088
31-Aug to 2-Sept-11	17	250	48	44	0.0039	0.00006	0.00135	0.0919	-0.00001	-0.000005	-0.05	0.000014	12.6	-0.0001	0.000033	0.00037
28 to 30-Sept-11	18	250	66	43	0.0058	0.00006	0.00064	0.0981	-0.00001	-0.000005	-0.05	0.000005	12.1	-0.0001	0.000031	0.00062
26 to 28-Oct-11	19	250	60	57	0.0087	0.0001	0.00074	0.132	-0.00001	-0.000005	-0.05	0.000007	16.3	-0.0001	0.000045	0.00077
23 to 25-Nov-11	20	250	74	59	0.0091	0.00009	0.00061	0.156	-0.00001	0.000008	0.06	0.000006	17.0	-0.0001	0.000046	0.00065
21 to 23-Dec-11	21	250	44	33	0.0073	0.00008	0.00078	0.0931	-0.00001	-0.000005	-0.05	0.00001	9.47	-0.0001	0.000044	0.00084
18 to 20-Jan-12	22	250	42	34	0.0059	0.00006	0.00034	0.0904	-0.00001	-0.000005	-0.05	-0.00001	9.98	0.0001	0.000056	0.00083
15 to 17-Feb-12	23	250	98	78	0.0045	0.00011	0.00065	0.1910	-0.00001	-0.000005	-0.05	0.00001	22.2	-0.0001	0.000041	0.00096

Notes:

Input volume is not measured.

Column is left to rest undisturbed for 4 weeks b

No pore volume determination. Pore volume of

To continue with pore volume collection until a -



Method:																	
Sampling Period: 2 Day Cycle (Wednesday to Friday)	Cycle No.	Target Pore Vol. Collected	Fe	Pb	Li	Mg	Mn	Hg (CVAF)	Mo	Ni	P	K	Se	Si	Ag	Na	Sr
Units:		ml	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
DLs for ICP-MS			LDL: 0.001; UDL: 50.0	0.000005	0.0005	LDL:0.05; UDL: 500.0	0.00005	0.002	0.00005	0.00002	0.002	LDL: 0.05; UDL: 500.0	0.00004	0.1	0.000005	LDL:0.05; UDL: 500.0	0.00005
DLs for ICP-ES		5.0	0.01			0.05						0.3				0.1	
12 to 14-May-10	0	250	0.005	0.000	0.009	27.1	0.12	-0.02	0.0353	0.00306	0.008	8.35	0.00022	1.7	0.000005	10.4	0.18
09 to 11-Jun-10	1	250	0.002	0.000154	0.0133	26.2	0.0563	-0.02	0.0239	0.00263	0.005	8.06	0.00013	3.2	-0.000005	8.02	0.154
07 to 09-Jul-10	2	250	-0.001	0.00008	0.009	16.1	0.0435	-0.02	0.0311	0.0017	0.01	5.7	-0.00004	2.5	-0.000005	3.8	0.13
04 to 06-Aug-10	3	250	0.004	0.00001	0.0048	9.06	0.0511	-0.02	0.033	0.00133	-0.002	4.23	0.00013	1.9	0.000022	2.1	0.0817
01 to 03-Sep-10	4	250	0.002	0.000062	0.0028	5.09	0.0413	-0.02	0.0238	0.0006	-0.002	2.16	0.00012	1.2	-0.000005	1.04	0.0568
29-Sep-10 to 1-Oct-10	5	250	0.006	0.000718	0.0045	7.73	0.0299	0.003	0.0587	0.00133	-0.002	3.51	0.0001	2.3	0.000031	1.57	0.109
27 to 29-Oct-10	6	250	0.004	0.000727	0.0043	7.07	0.03	0.007	0.0649	0.00186	0.093	4.31	0.00013	2.8	0.000012	1.37	0.12
24 to 26-Nov-10	7	250	0.0010	0.000163	0.0032	5.66	0.0286	0.003	0.0457	0.00102	0.0060	2.8	0.00008	2	0.000023	0.95	0.0923
22 to 24-Dec-10	8	250	0.002	0.000099	0.0036	6.35	0.0285	-0.002	0.0651	0.00046	0.066	3.24	0.0001	2.4	0.000015	1.07	0.12
19 to 21-Jan-11	9	250	0.001	0.000047	0.0038	6.82	0.018	-0.002	0.0627	0.00057	0.154	3.38	0.00009	2.2	-0.000005	1.2	0.13
16 to 18-Feb-11	10	250	0.001	0.000009	0.0029	5.98	0.023	-0.002	0.035	0.00028	0.004	2.15	0.00017	1.6	-0.000005	0.6	0.10
16 to 10-Mar-11	11	250	0.002	0.000056	0.0028	5.97	0.0194	-0.002	0.0431	0.00065	0.055	2.61	0.00012	1.6	0.000008	0.66	0.09
13 to 15-Apr-11	12	250	0.005	0.000086	0.0034	6.09	0.0324	-0.002	0.0607	0.00047	0.162	2.83	0.00006	2.5	-0.000005	0.76	0.13
11 to 13-May-11	13	250	0.004	0.000076	0.0038	7.2	0.038	-0.002	0.0709	0.00059	0.013	3.06	0.00009	3.1	0.000006	0.83	0.14
8 to 10-Jun-11	14	250	0.028	0.000166	0.0028	7.1	0.0293	-0.002	0.0581	0.00132	0.031	2.43	0.00012	2.5	0.00001	0.63	0.11
6 to 8-Jul-11	15	250	0.003	0.000058	0.0018	4.35	0.0324	-0.002	0.0297	0.00217	0.004	2.31	0.00025	1.5	0.000012	0.36	0.07
3 to 5-Aug-11	16	250	0.002	0.00011	0.0016	4.01	0.0243	-0.002	0.0344	0.00105	0.009	1.8	0.00017	1.4	0.000007	0.37	0.0759
31-Aug to 2-Sept-11	17	250	0.002	0.000495	0.0011	2.93	0.0192	-0.002	0.0187	0.00058	0.441	1.95	0.00008	1.2	0.000008	0.48	0.054
28 to 30-Sept-11	18	250	0.005	0.000064	0.0013	3.02	0.0194	-0.002	0.0214	0.00048	0.013	1.44	0.00008	1.1	0.000007	0.31	0.05
26 to 28-Oct-11	19	250	0.003	0.000014	0.0016	3.86	0.0281	-0.002	0.0293	0.0005	0.005	1.65	0.0001	1.5	0.000009	0.37	0.07
23 to 25-Nov-11	20	250	0.007	0.000038	0.0018	4.04	0.0329	-0.002	0.0341	0.001	0.018	5.69	0.00011	1.7	0.00001	0.44	0.08
21 to 23-Dec-11	21	250	0.013	0.000065	0.0009	2.21	0.019	-0.002	0.0167	0.0019	0.0450	1.73	0.00006	0.8	0.000007	0.3	0.0428
18 to 20-Jan-12	22	250	0.005	0.000049	0.001	2.22	0.0207	-0.002	0.016	0.00111	0.0140	2.2	0.00012	0.9	0.000012	0.32	0.0425
15 to 17-Feb-12	23	250	0.004	0.000037	0.0023	5.47	0.0316	-0.002	0.0417	0.00163	0.0340	3.15	0.0001	2.3	0.000011	0.59	0.0990

Notes:

Input volume is not measured.

Column is left to rest undisturbed for 4 weeks before sampling.

No pore volume determination. Pore volume of column is assumed to be 250 ml.

To continue with pore volume collection until a -



Method:											
Sampling Period: 2 Day Cycle (Wednesday to Friday)	Cycle No.	Target Pore Vol. Collected	Te	Tl	Th	Sn	Ti	U	V	Zn	Zr
Units:		ml	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
DLs for ICP-MS			0.00002	0.000002	0.000005	0.00001	0.0005	0.000002	0.0002	LDL:0.0001; UDL: 10.0	0.0001
DLs for ICP-ES		5.0								0.005	
12 to 14-May-10	0	250	0.000	0.000005	-0.000005	0.005	-0.001	0.00009	0.000	0.0286	0.00
09 to 11-Jun-10	1	250	0.00007	0.000005	-0.000005	0.0318	-0.0005	0.000065	-0.0002	0.011	-0.0001
07 to 09-Jul-10	2	250	0.00	0.00	-0.000005	0.0429	-0.0005	0.00003	-0.0002	0.0116	-0.0001
04 to 06-Aug-10	3	250	0.00008	0.000014	-0.000005	0.0231	-0.0005	0.000019	-0.0002	0.0071	-0.0001
01 to 03-Sep-10	4	250	0.00004	0.000004	-0.000005	0.0207	-0.0005	0.000013	-0.0002	0.0035	-0.0001
29-Sep-10 to 1-Oct-10	5	250	0.00004	-0.000002	0.000007	0.0253	-0.0005	0.000012	-0.0002	0.006	-0.0001
27 to 29-Oct-10	6	250	0.00016	0.000002	-0.000005	0.0237	-0.0005	0.000019	-0.0002	0.0068	-0.0001
24 to 26-Nov-10	7	250	0.00015	0.0000	-0.000005	0.0183	0.0005	0.000017	-0.0002	0.0086	-0.0001
22 to 24-Dec-10	8	250	0.00005	0.000007	-0.000005	0.0185	0.0007	0.000007	-0.0002	0.0061	-0.0001
19 to 21-Jan-11	9	250	0.00009	0.00	-0.000005	0.0176	-0.0005	0.000012	-0.0002	0.0042	-0.0001
16 to 18-Feb-11	10	250	0.00	0.000003	-0.000005	0.0147	-0.0005	0.000013	-0.0002	0.0007	-0.0001
16 to 10-Mar-11	11	250	0.00006	0.000005	-0.000005	0.0141	-0.0005	0.000017	-0.0002	0.0091	-0.0001
13 to 15-Apr-11	12	250	0.00003	0.000024	-0.000005	0.0193	-0.0005	0.000016	-0.0002	0.0091	-0.0001
11 to 13-May-11	13	250	0.00002	0.000003	-0.000005	0.0195	-0.0005	0.000016	-0.0002	0.0075	-0.0001
8 to 10-Jun-11	14	250	-0.00002	0.000003	-0.000005	0.0152	-0.0005	0.000015	-0.0002	0.012	-0.0001
6 to 8-Jul-11	15	250	0.00036	0.000002	-0.000005	0.0116	-0.0005	0.000022	-0.0002	0.0116	-0.0001
3 to 5-Aug-11	16	250	0.00007	0.000004	-0.000005	0.0126	-0.0005	0.000011	-0.0002	0.0067	-0.0001
31-Aug to 2-Sept-11	17	250	-0.00002	0.000004	-0.000005	0.0085	-0.0005	0.000007	-0.0002	0.0041	-0.0001
28 to 30-Sept-11	18	250	0.000070	-0.000002	-0.000005	0.00949	-0.0005	0.000006	0.0002	0.001	-0.0001
26 to 28-Oct-11	19	250	0.000120	-0.000002	-0.000005	0.0122	-0.0005	0.000015	-0.0002	0.001	-0.0001
23 to 25-Nov-11	20	250	0.002600	0.000003	-0.000005	0.0141	-0.0005	0.000013	0.0002	0.0009	-0.0001
21 to 23-Dec-11	21	250	0.000030	0.000002	-0.000005	0.00680	-0.0005	0.000006	-0.0002	0.001	-0.0001
18 to 20-Jan-12	22	250	0.00090	-0.000002	-0.000005	0.0071	-0.0005	0.00001	-0.0002	0.0023	-0.0001
15 to 17-Feb-12	23	250	0.00005	0.000003	-0.000005	0.0136	-0.0005	0.000017	-0.0002	0.0022	-0.0001

Notes:

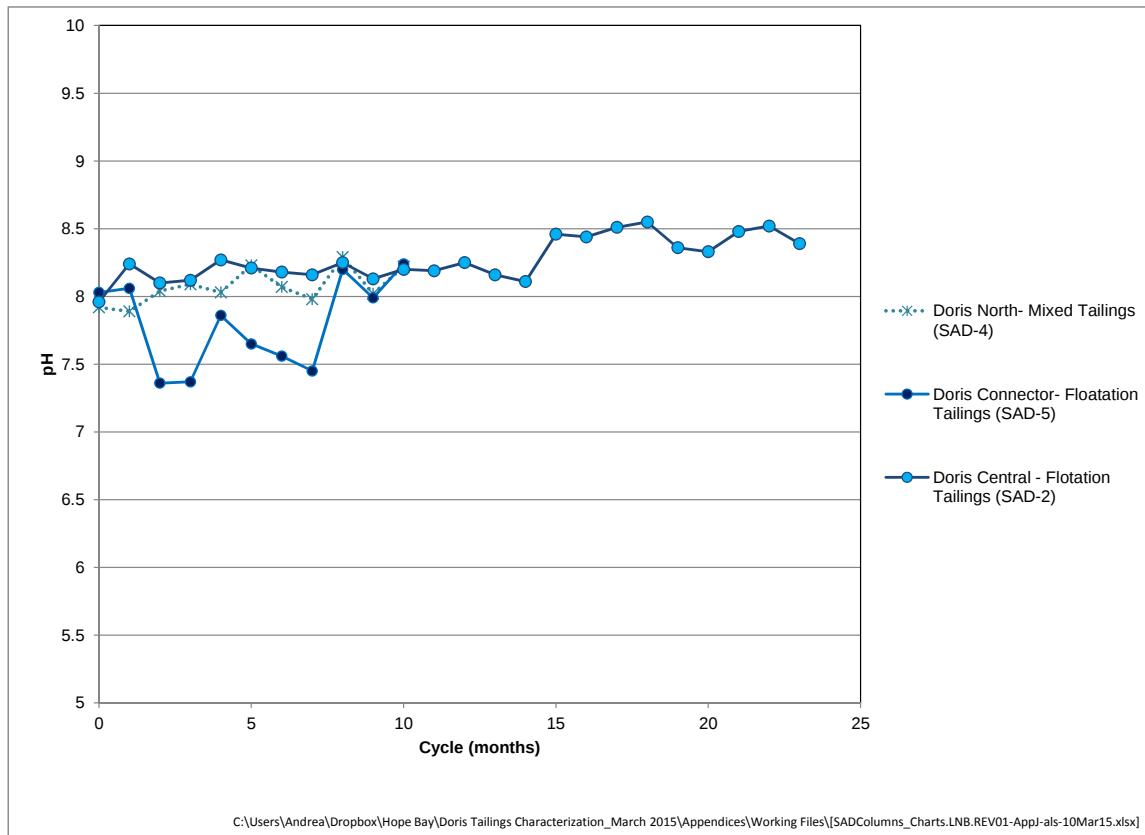
Input volume is not measured.

Column is left to rest undisturbed for 4 weeks b

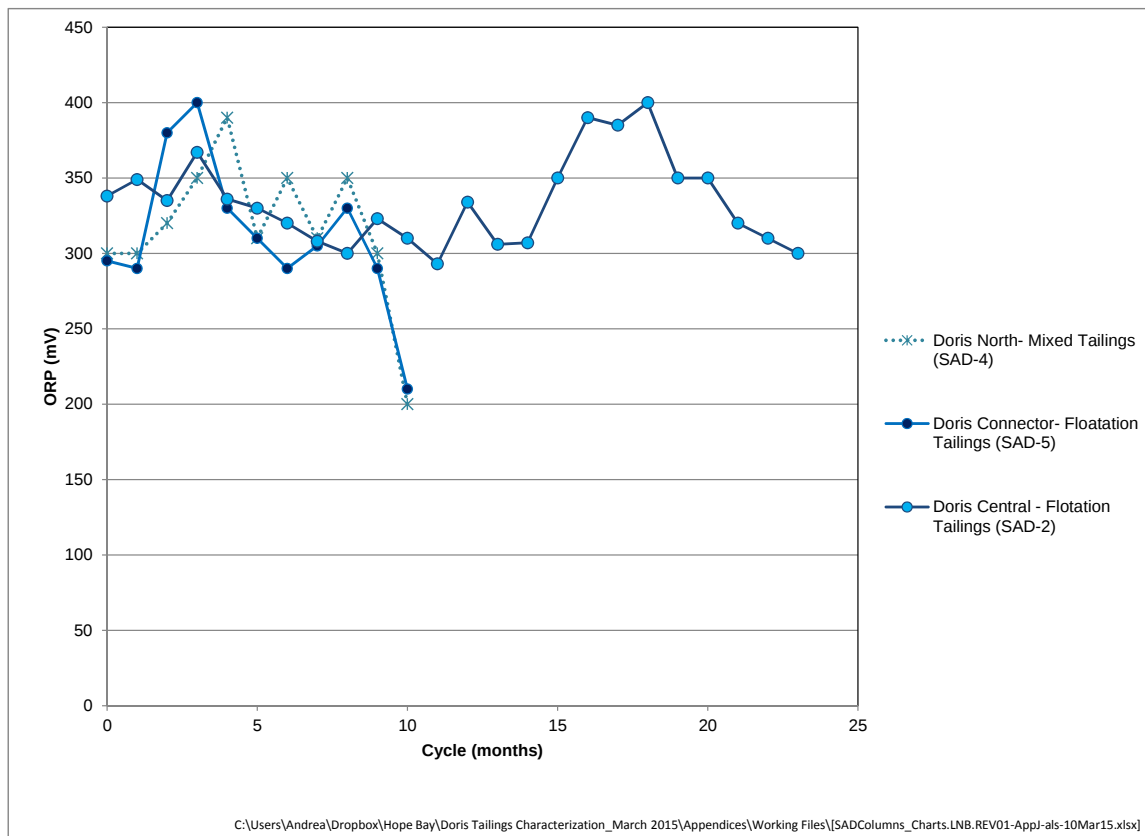
No pore volume determination. Pore volume of

To continue with pore volume collection until a -

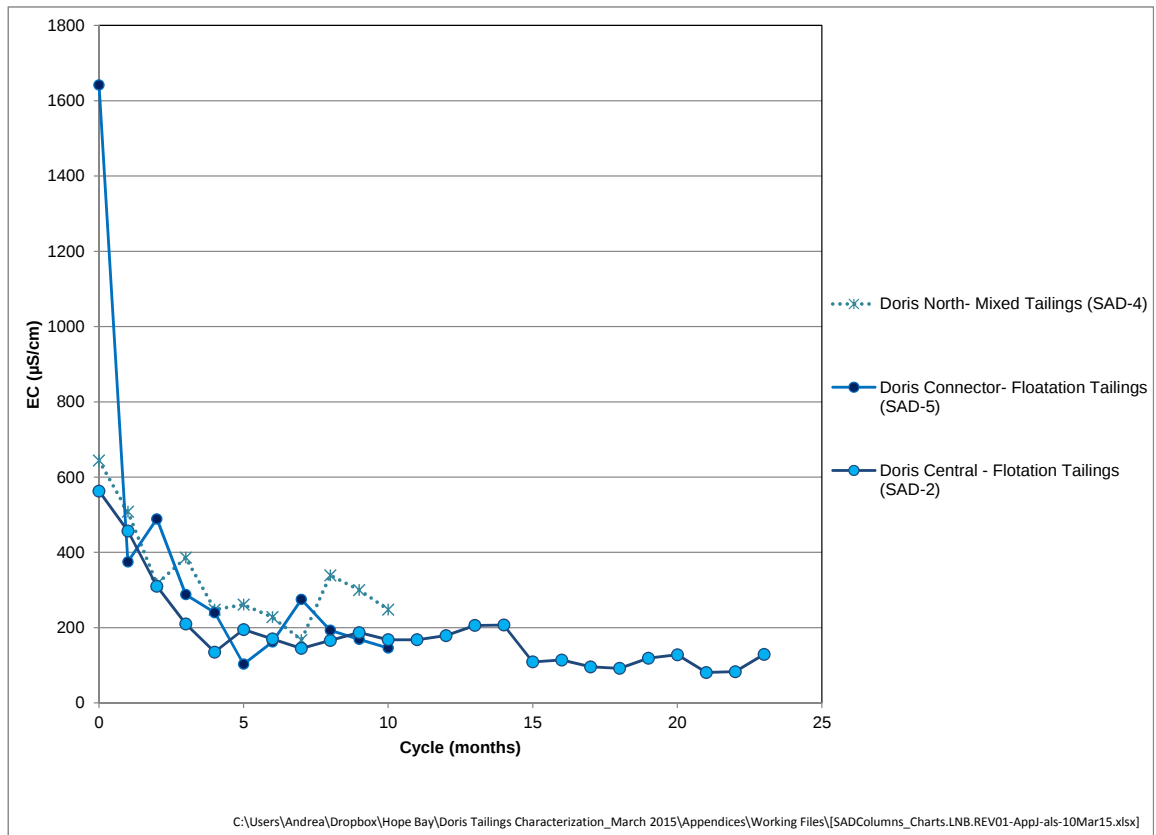
Appendix J – Figures, Sub-aqueous Column Tests



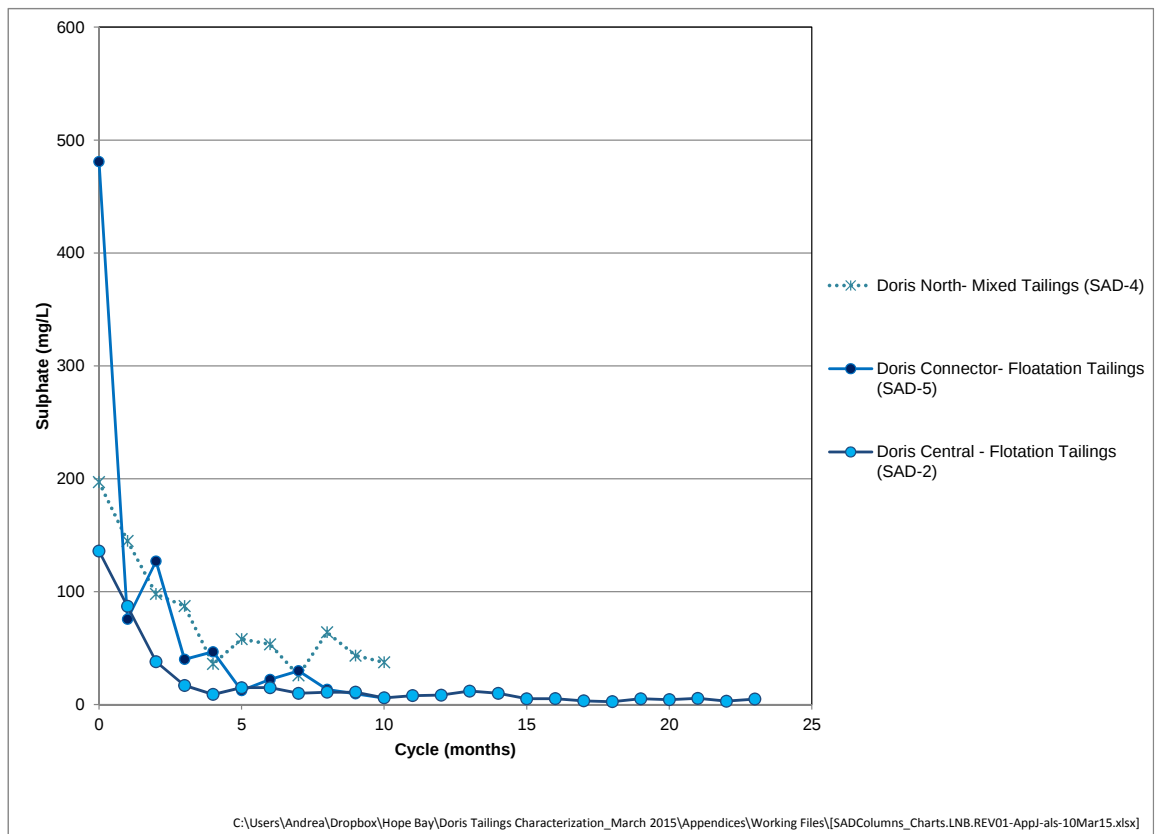
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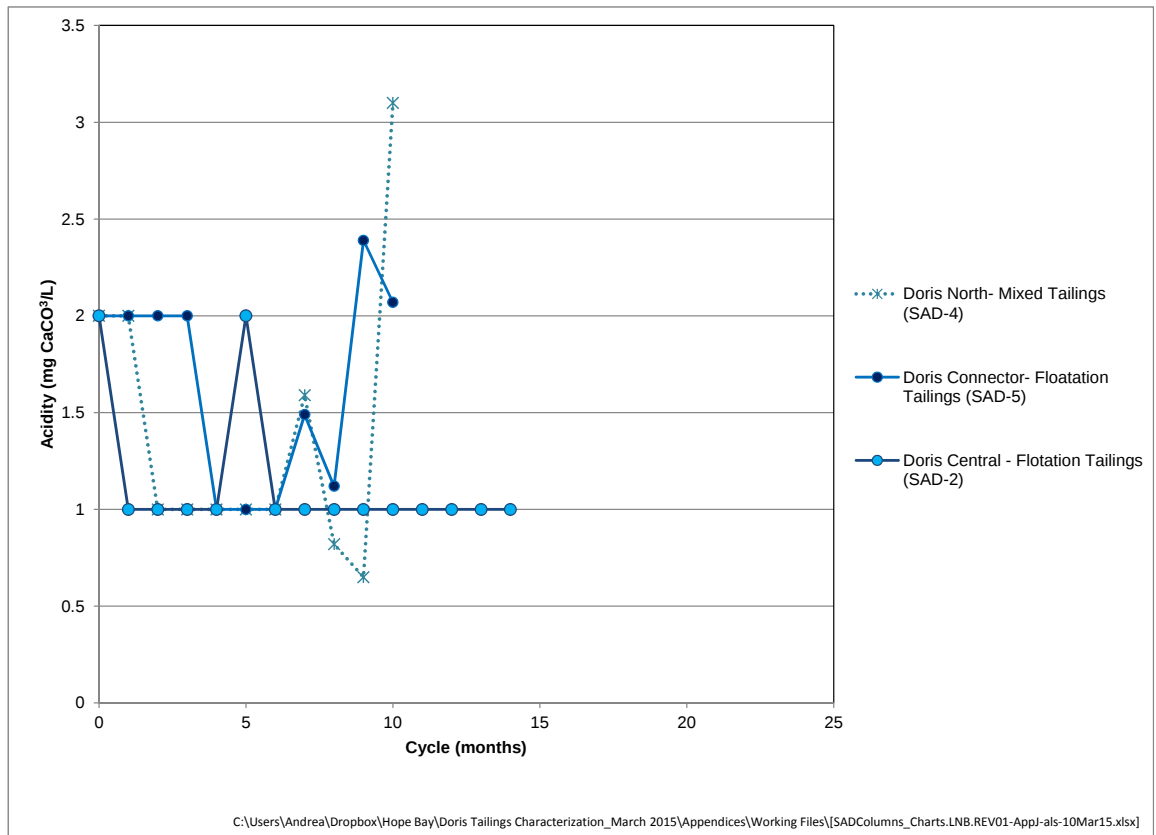
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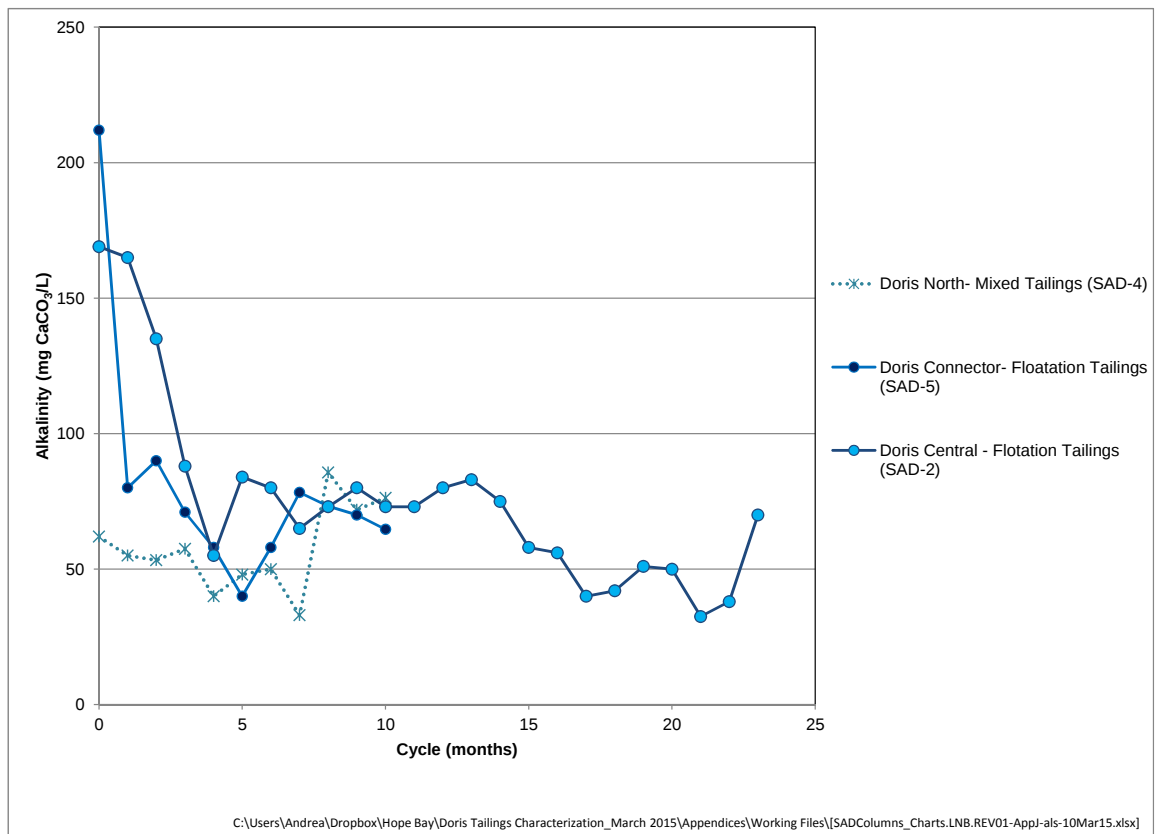
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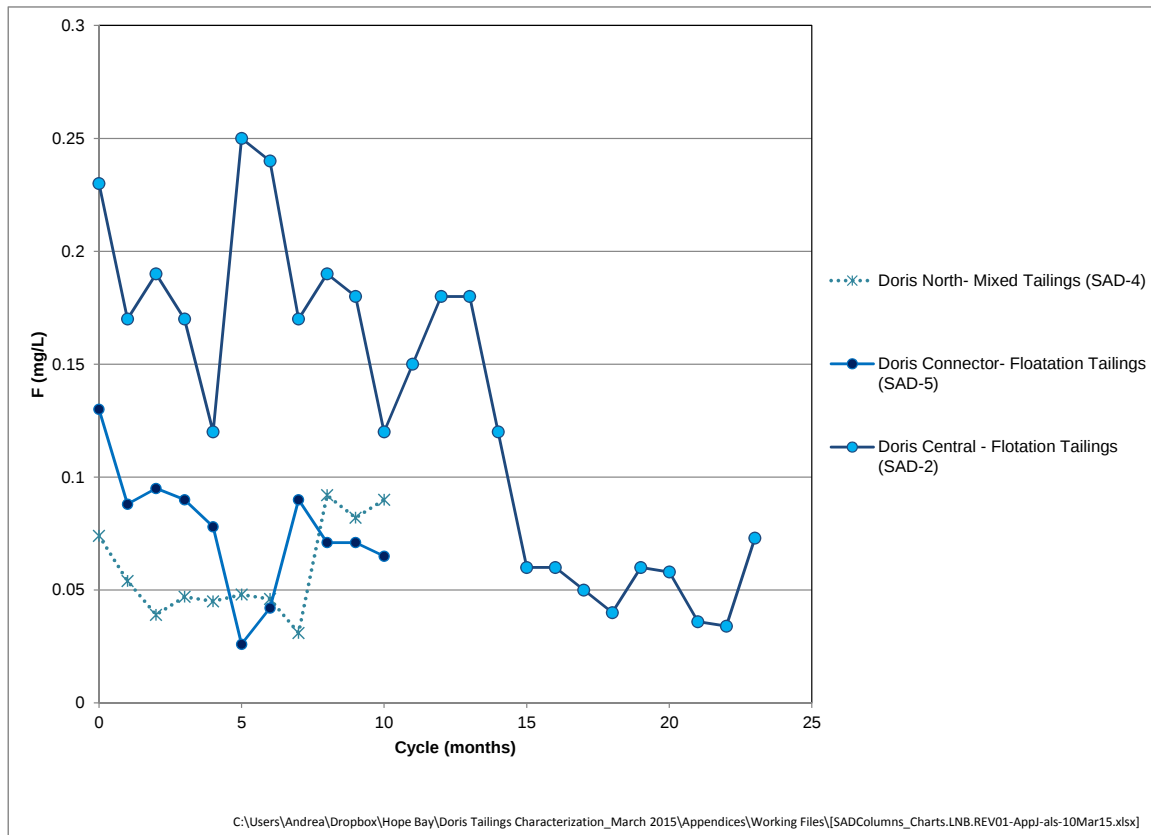
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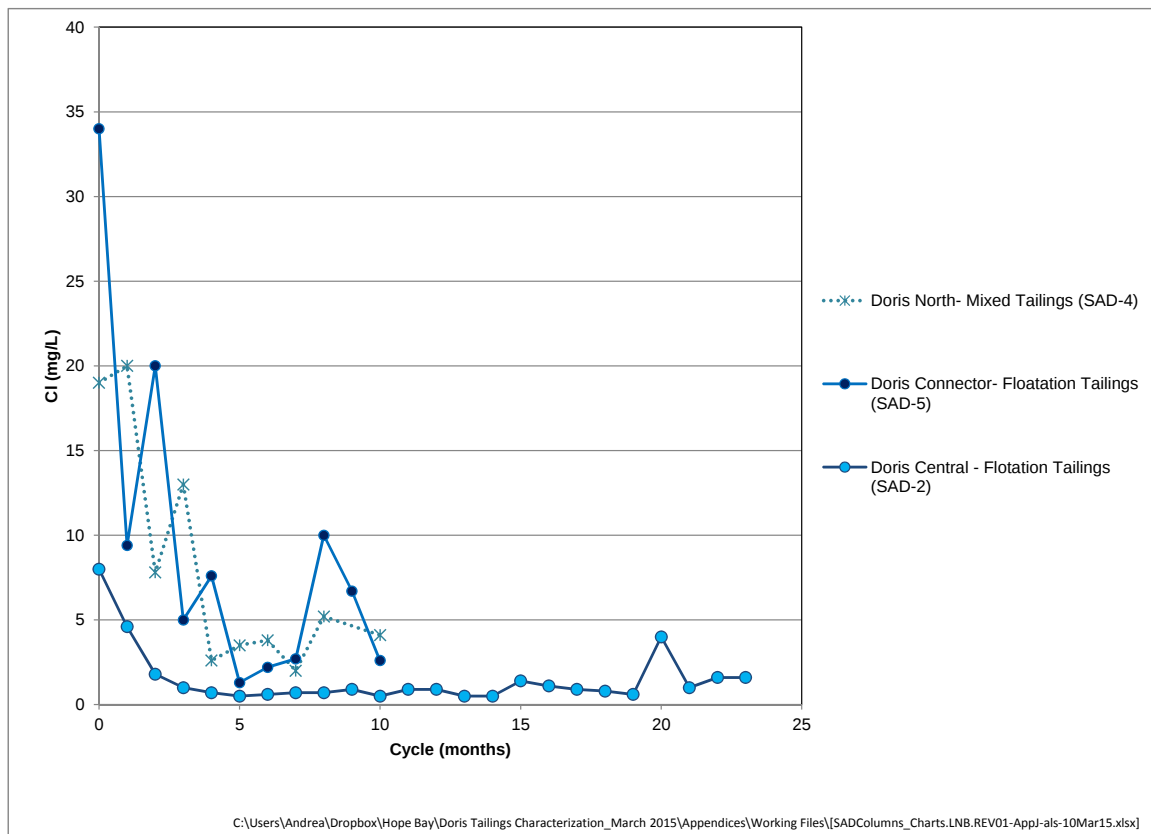
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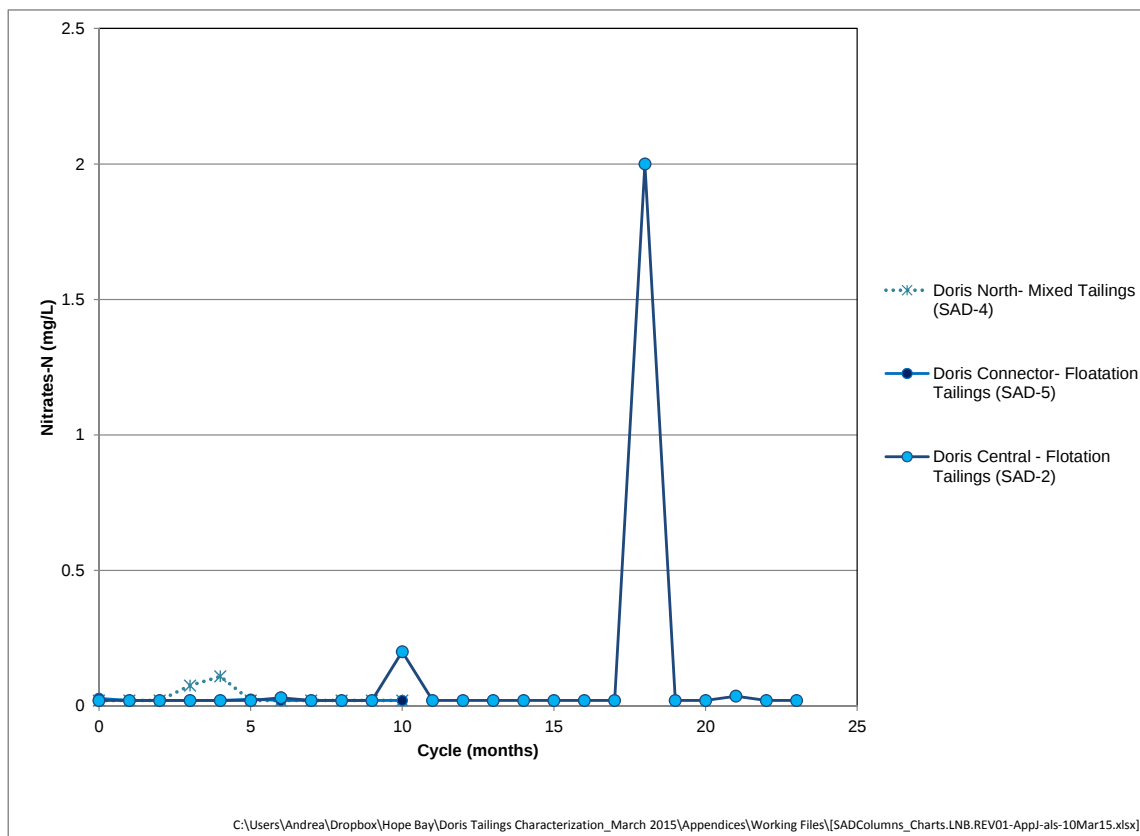
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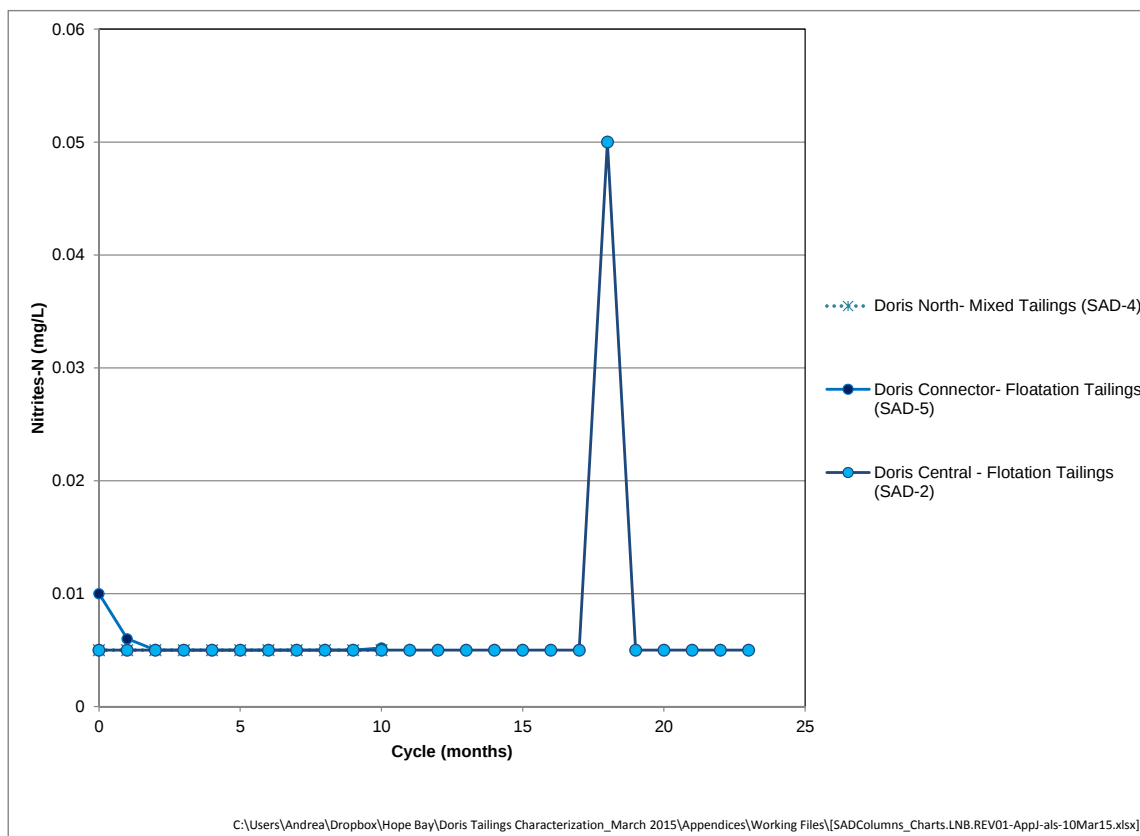
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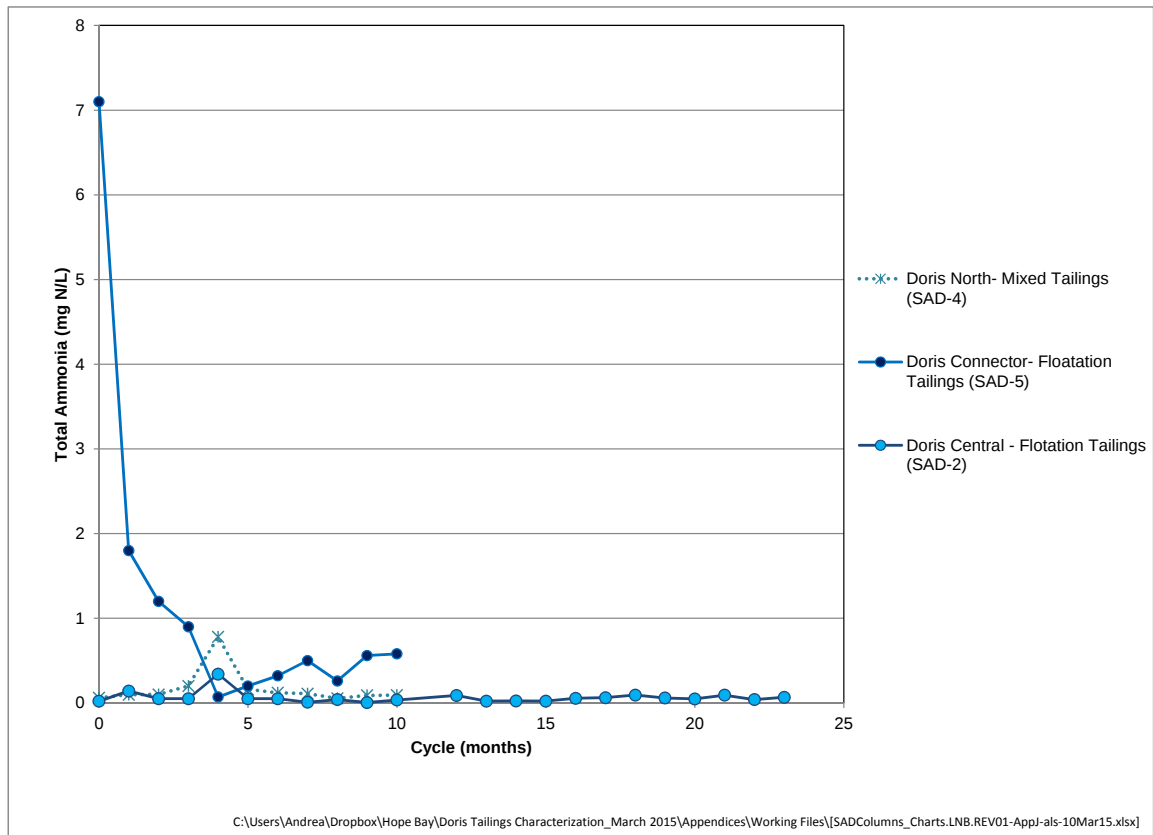
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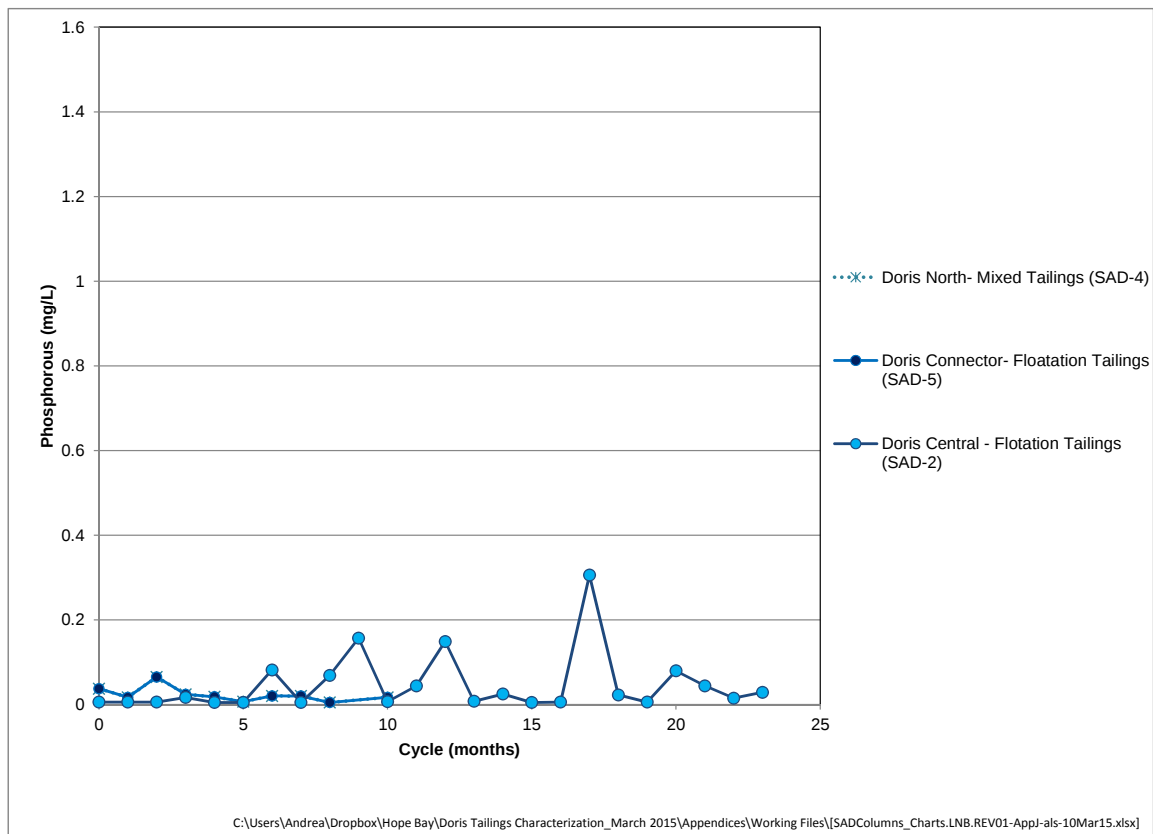
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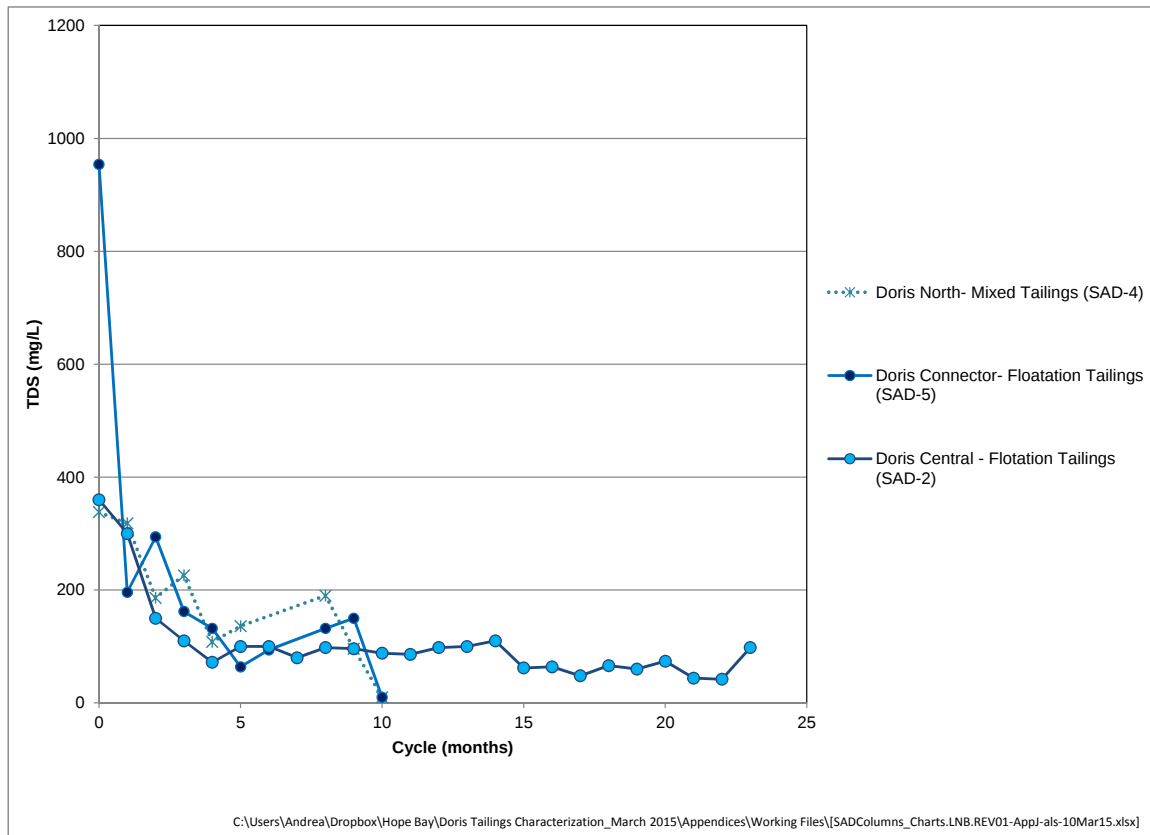
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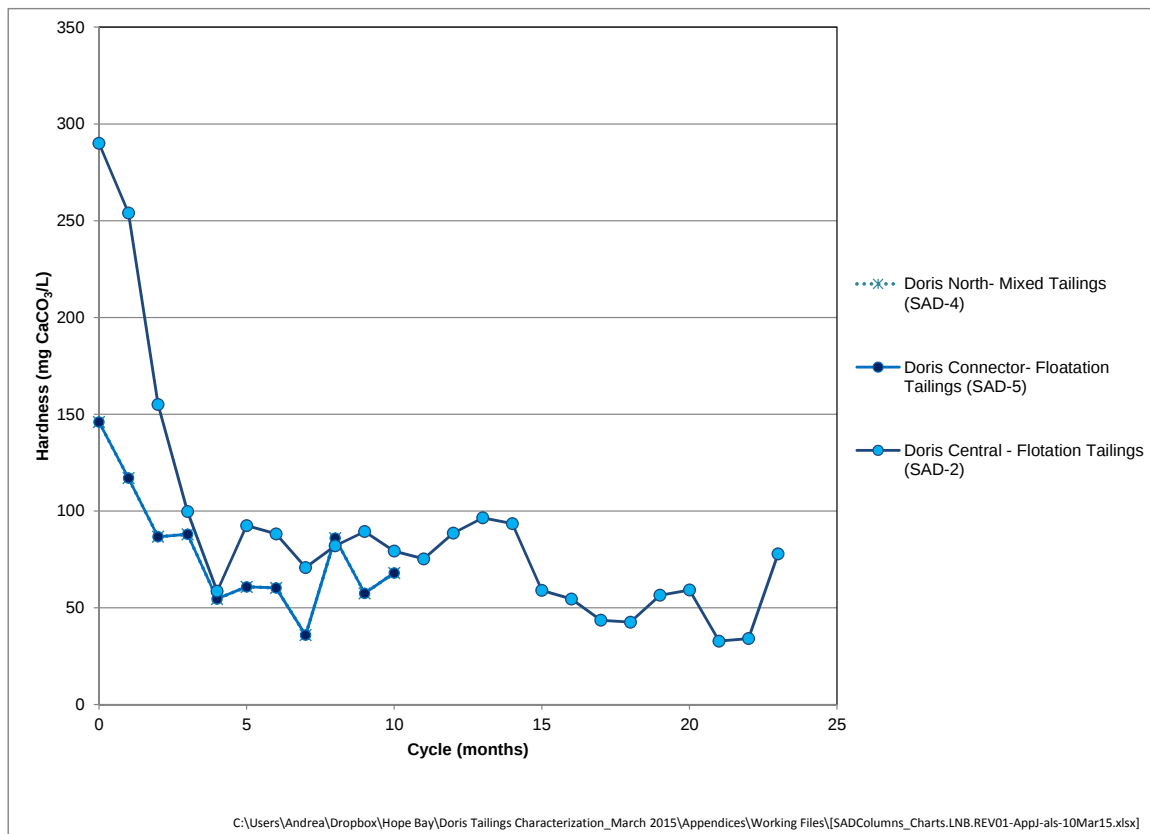
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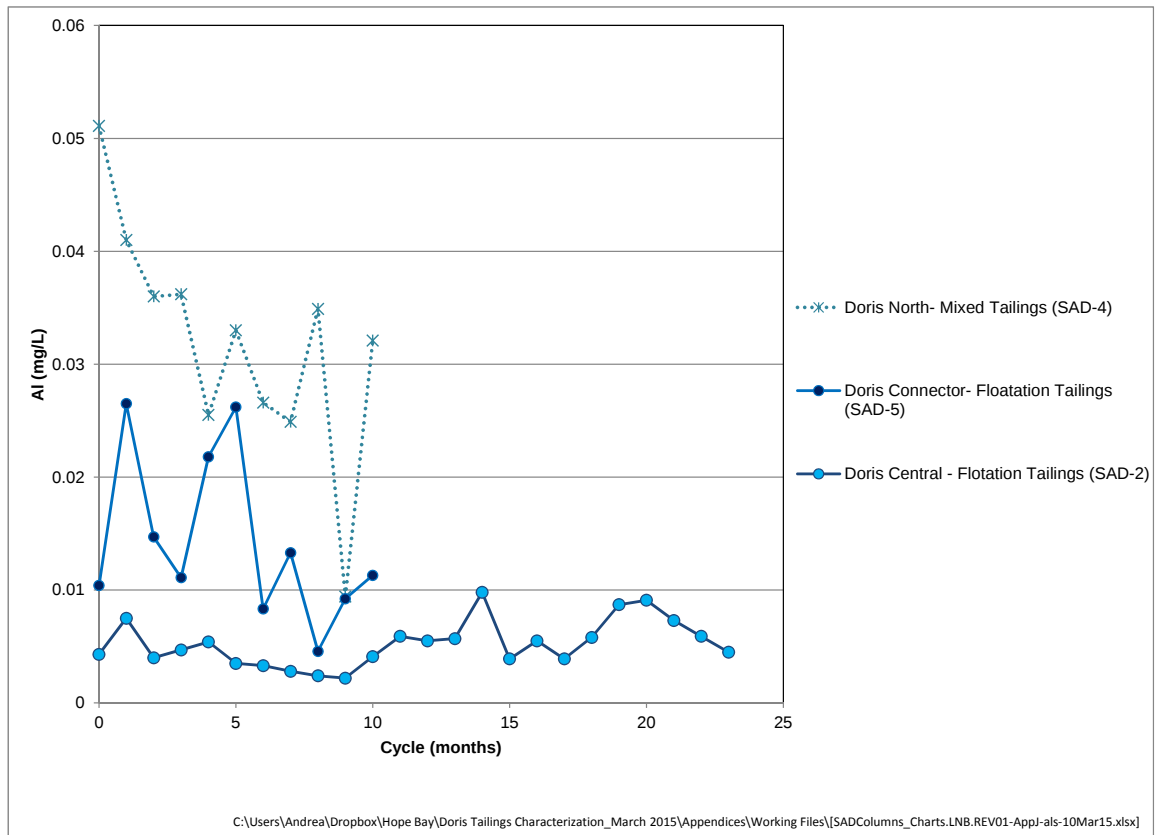
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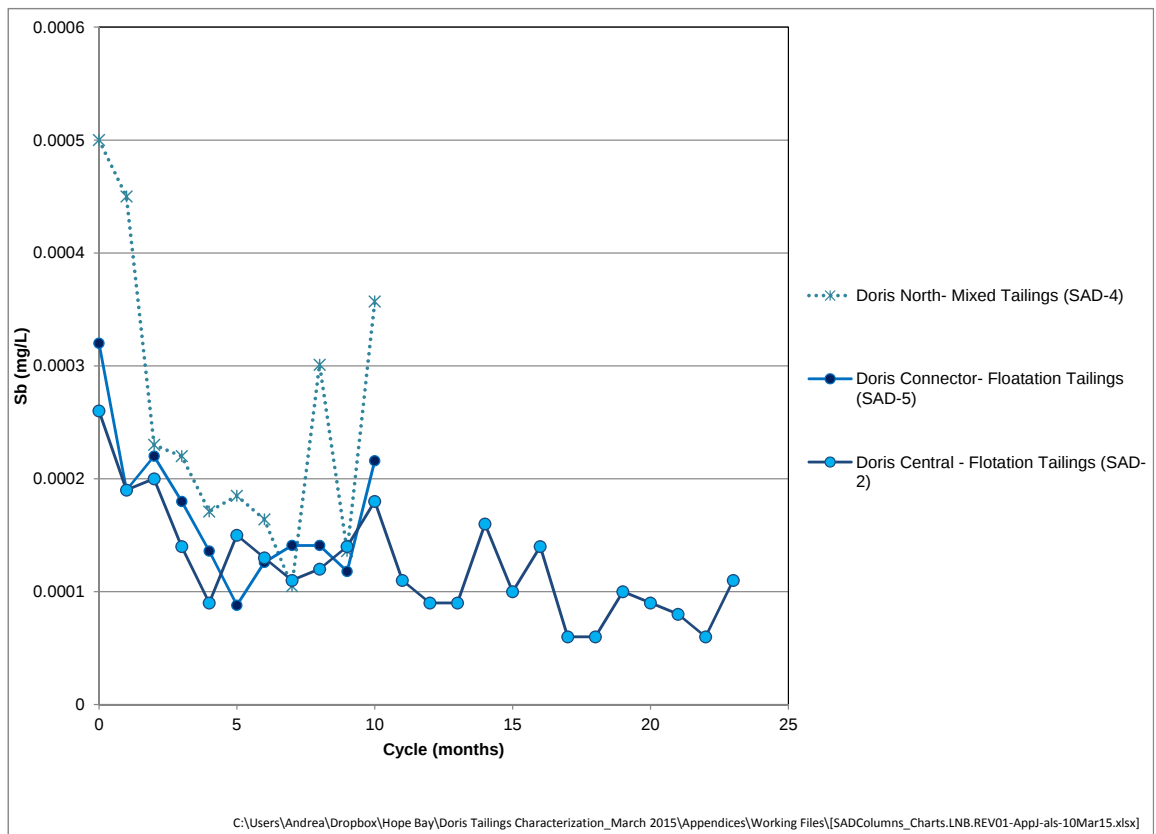
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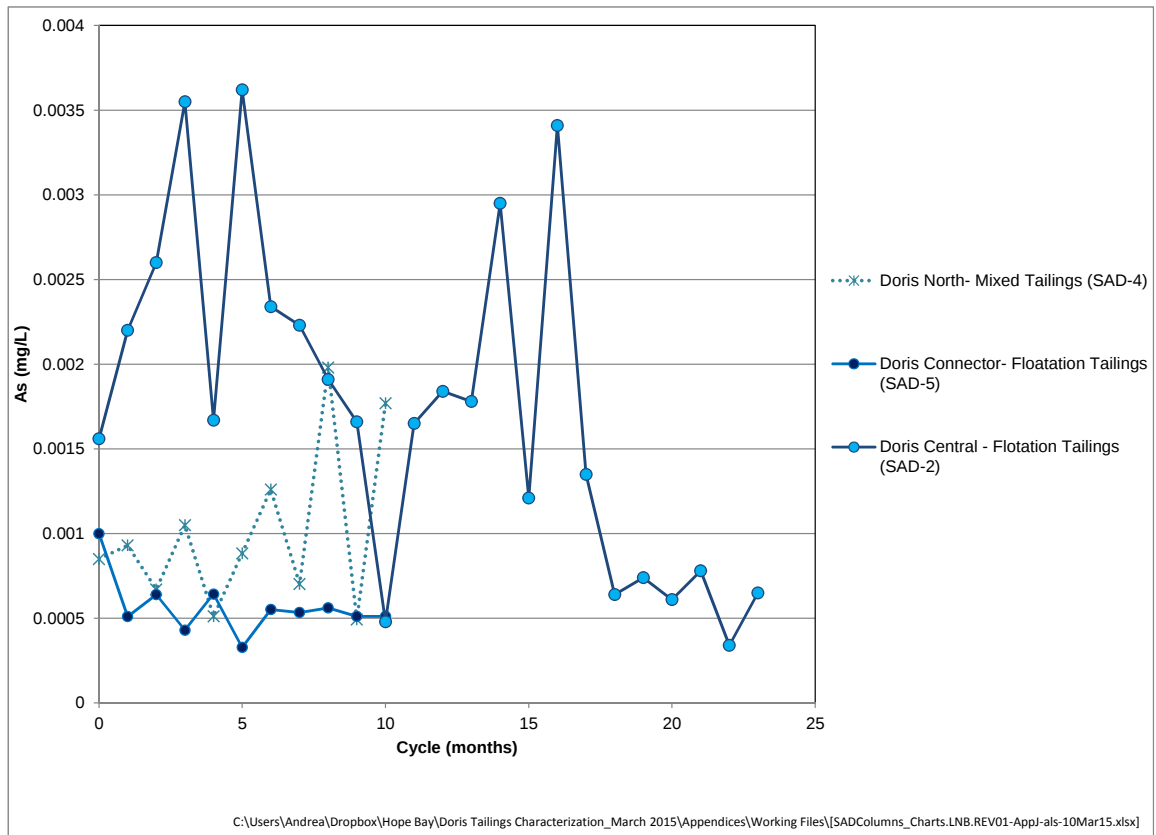
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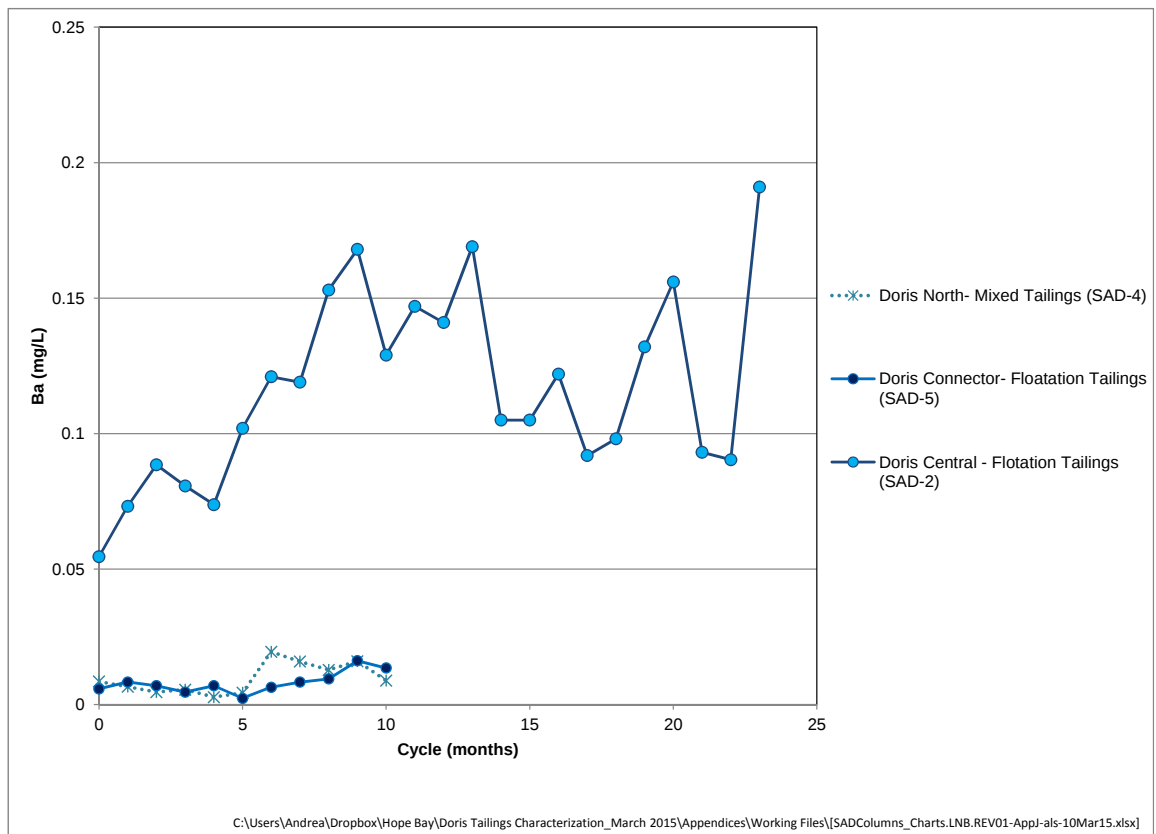
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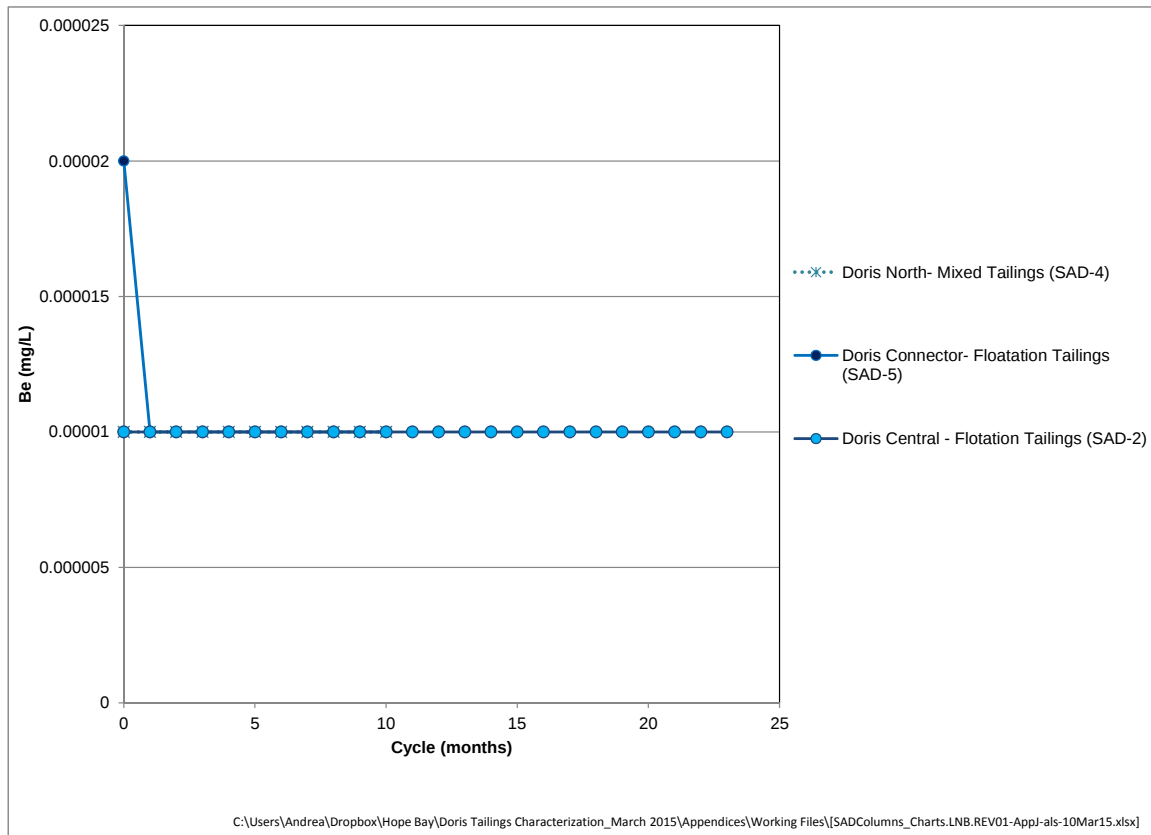
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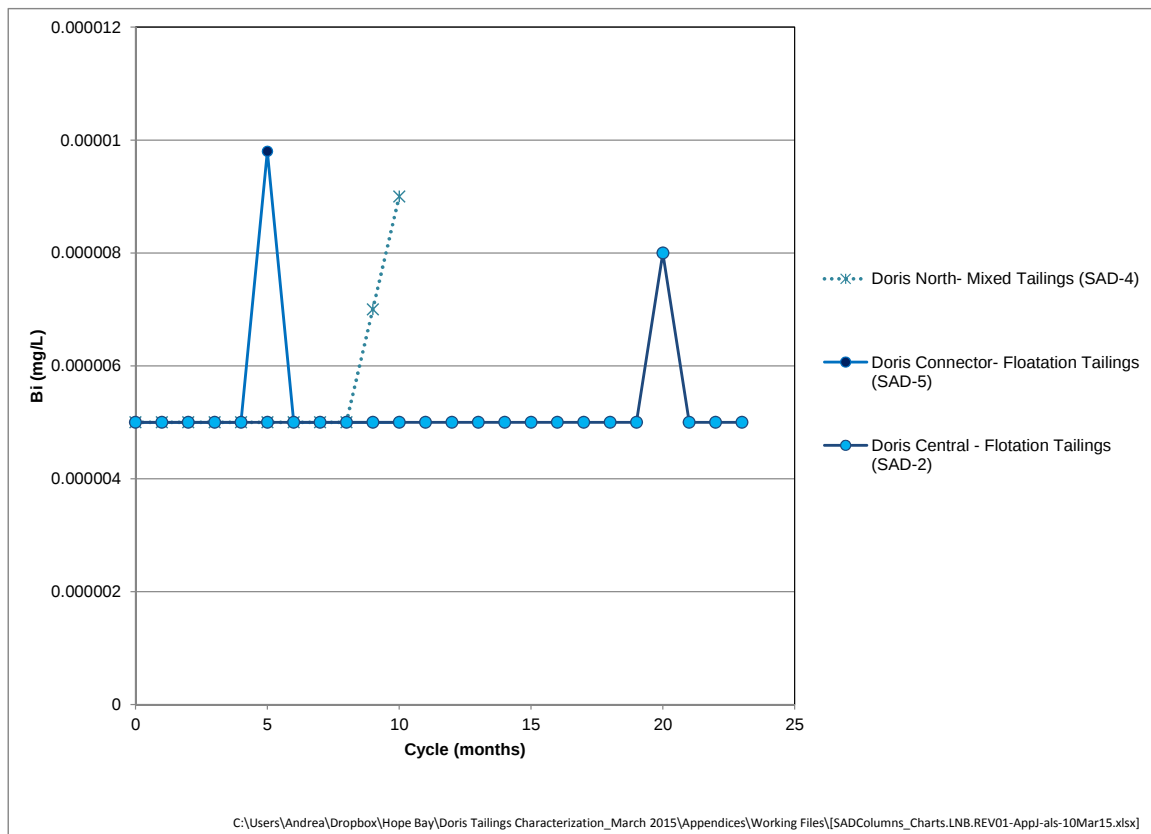
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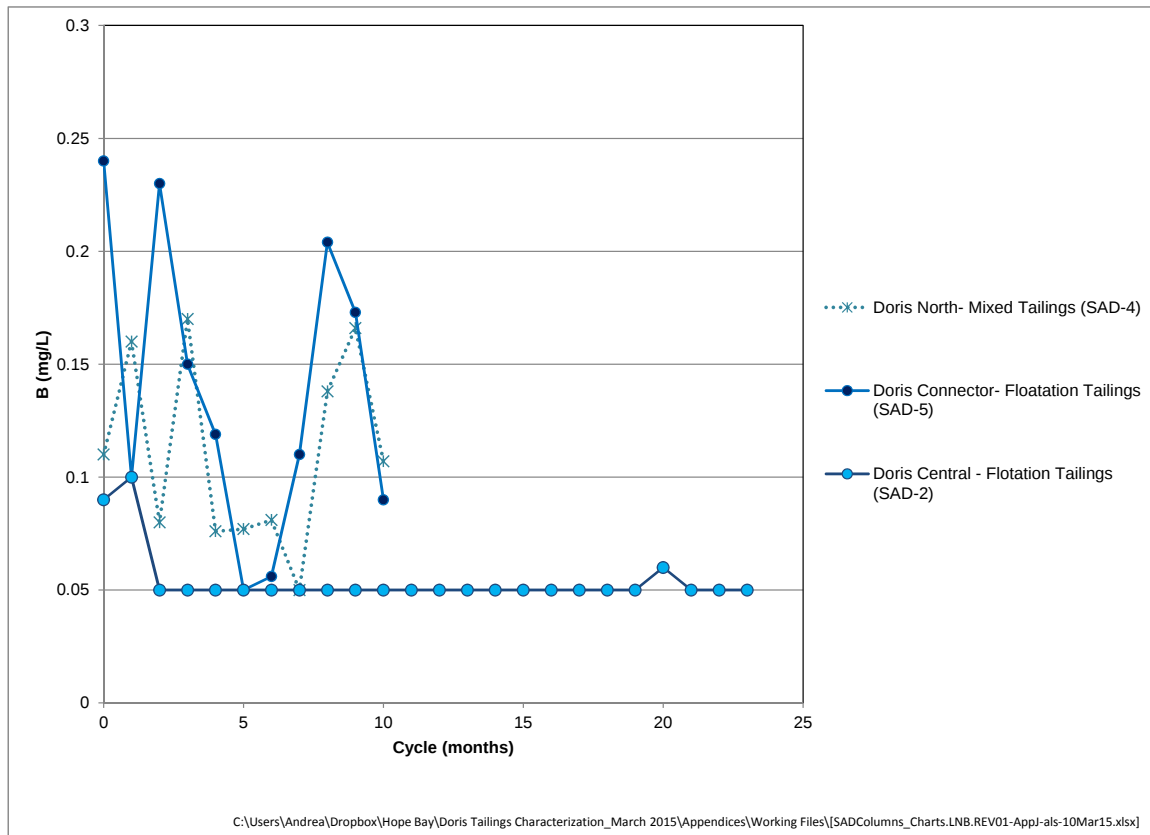
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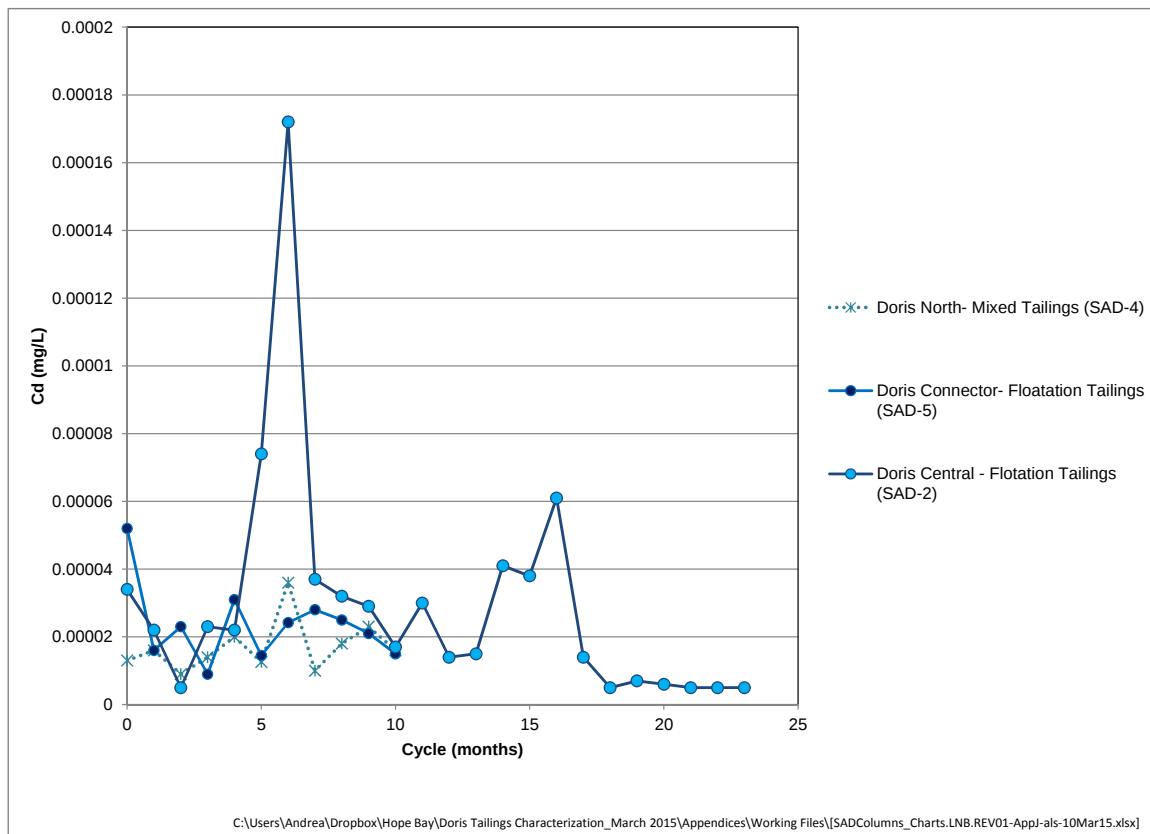
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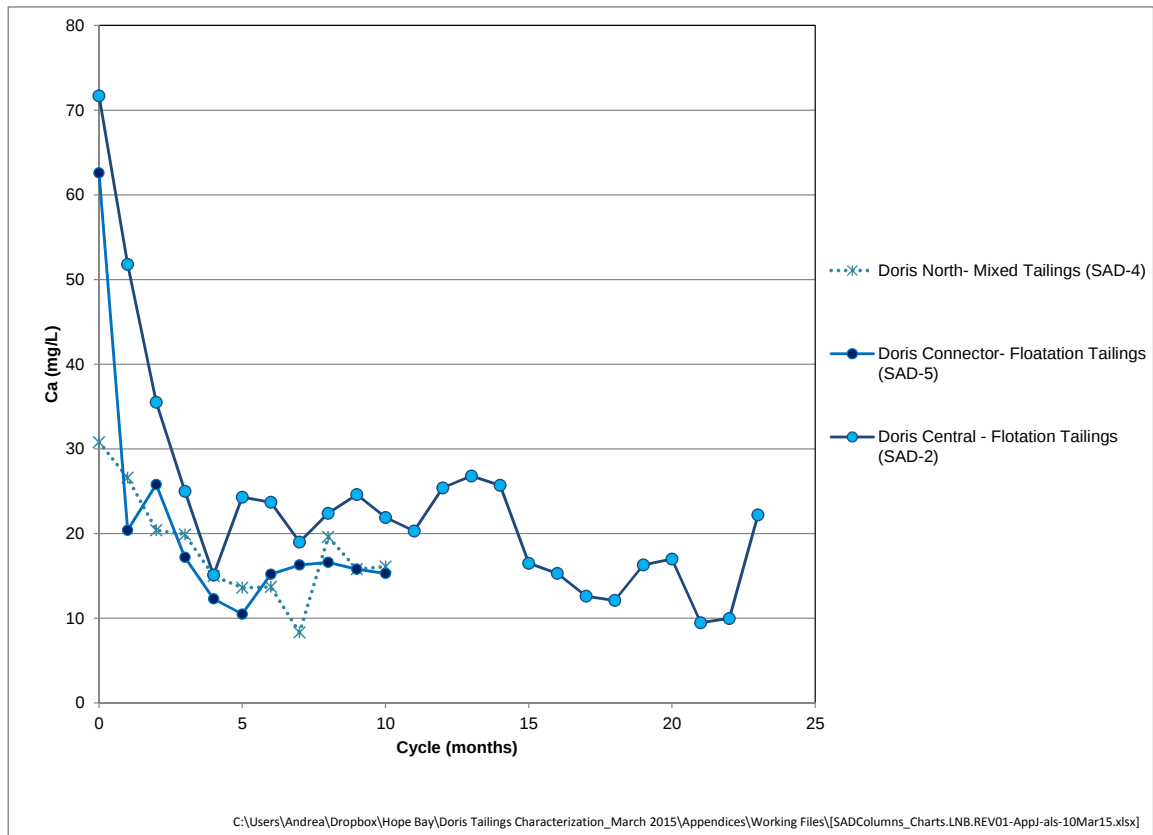
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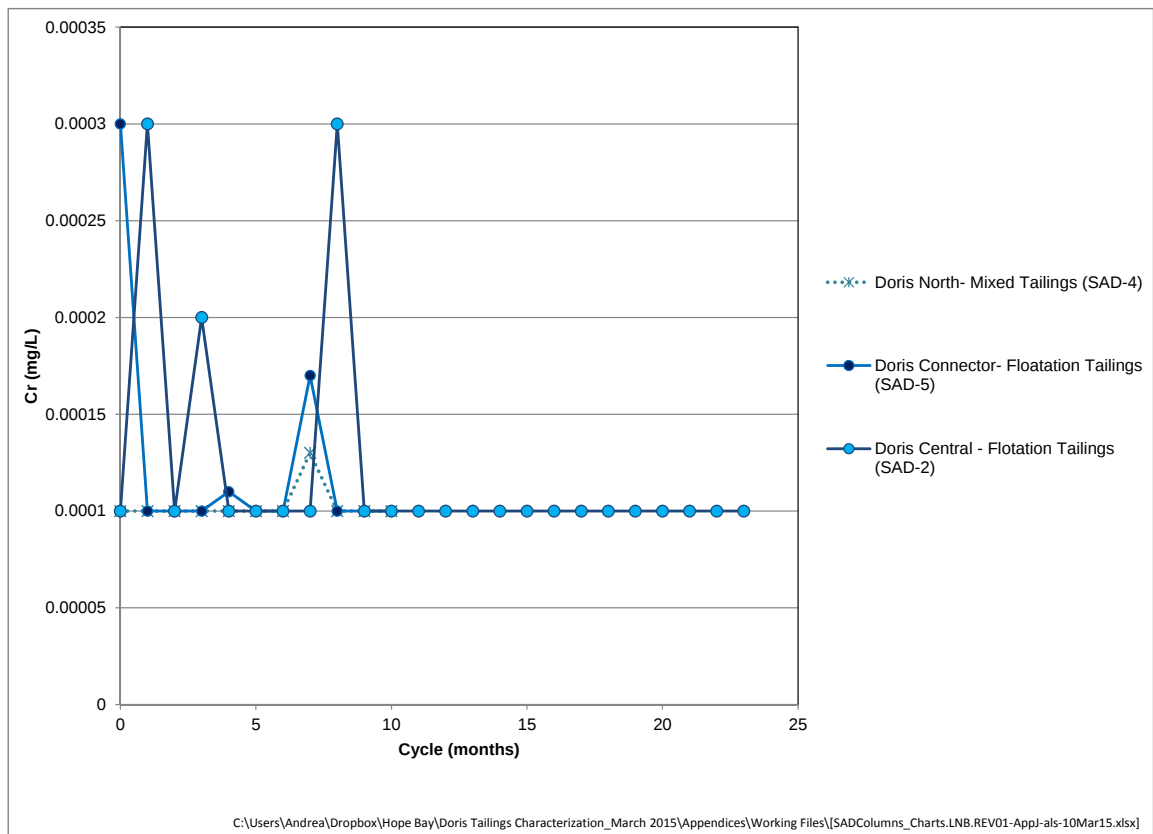
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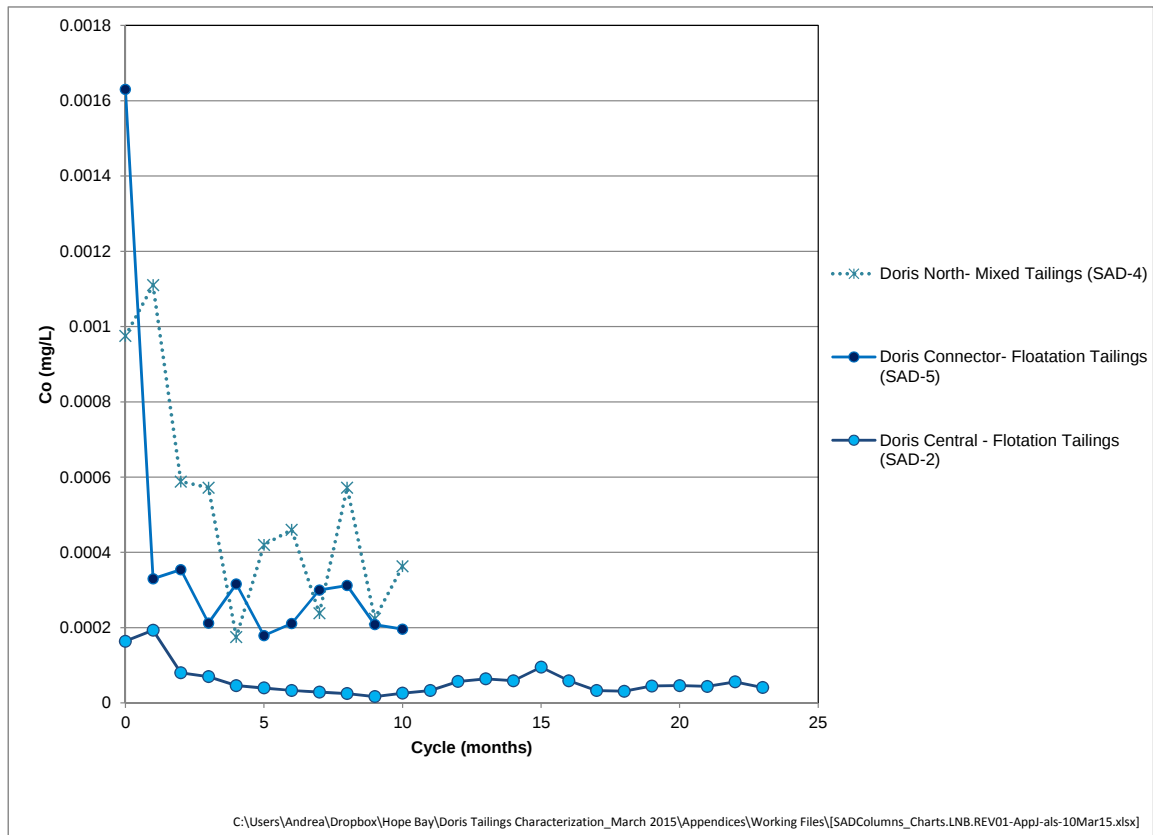
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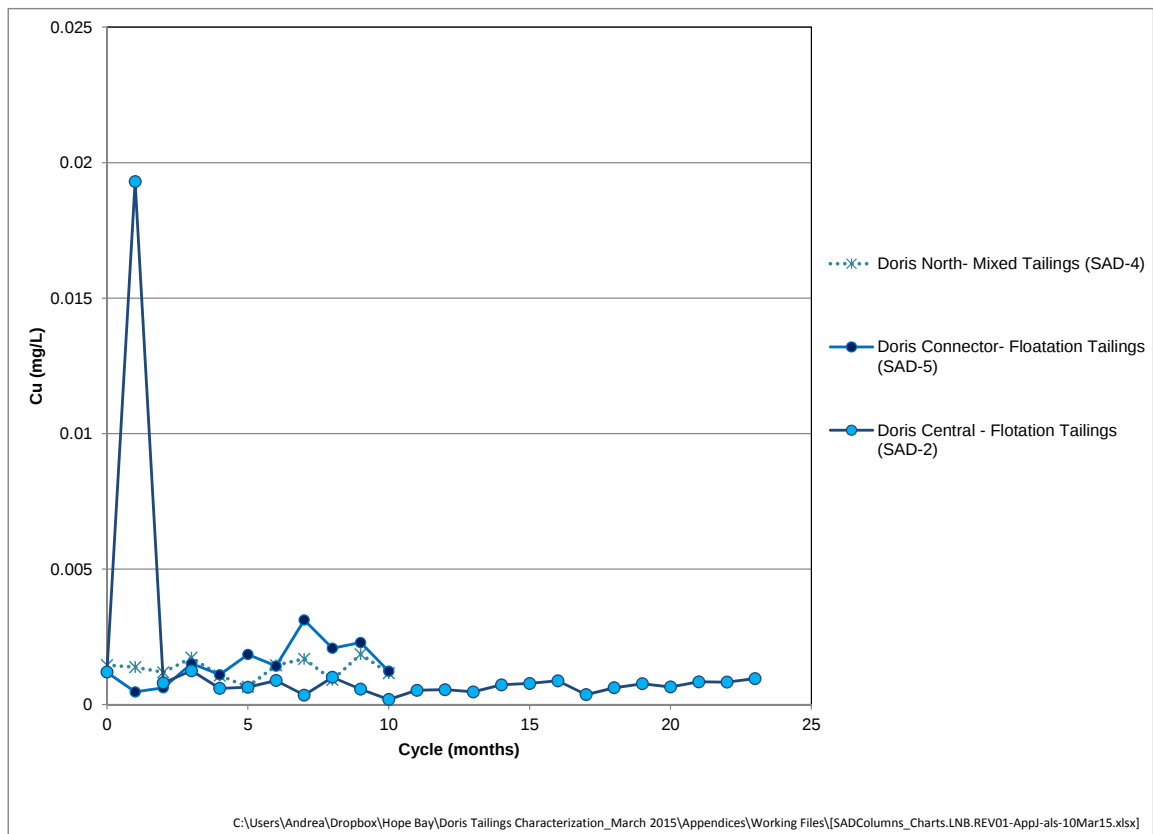
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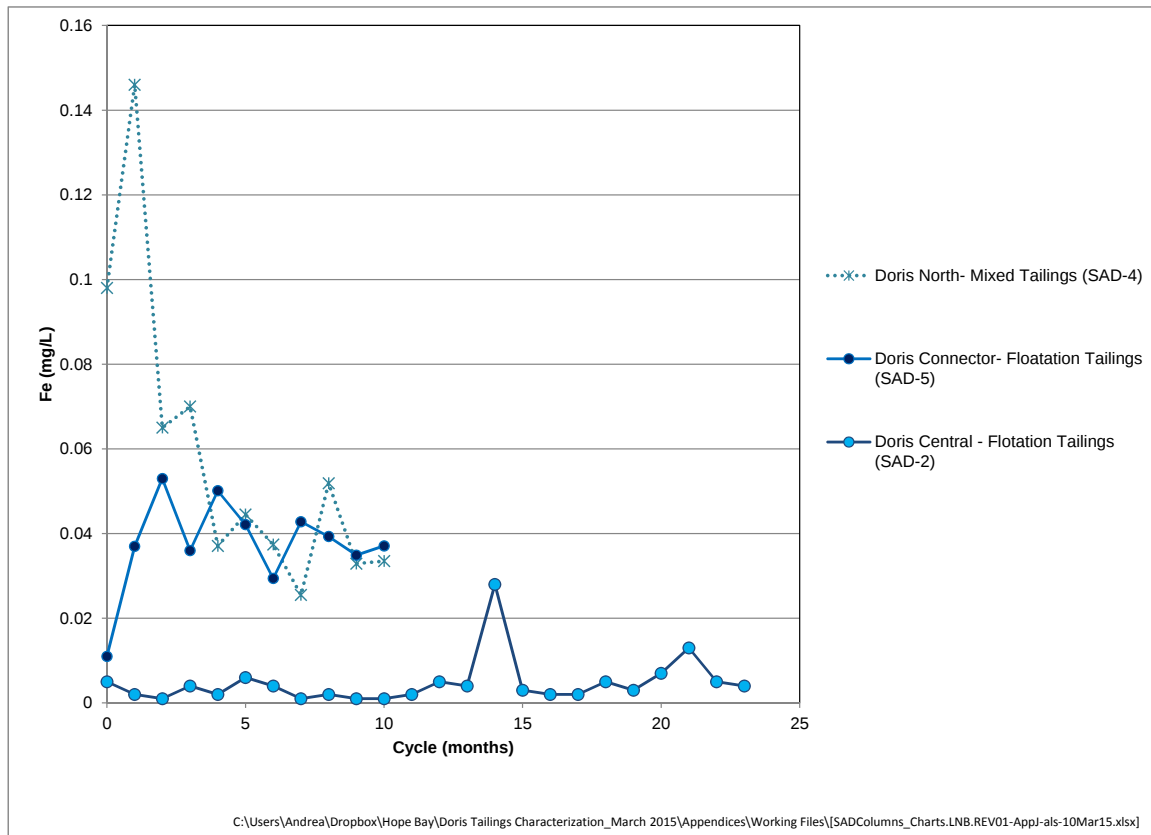
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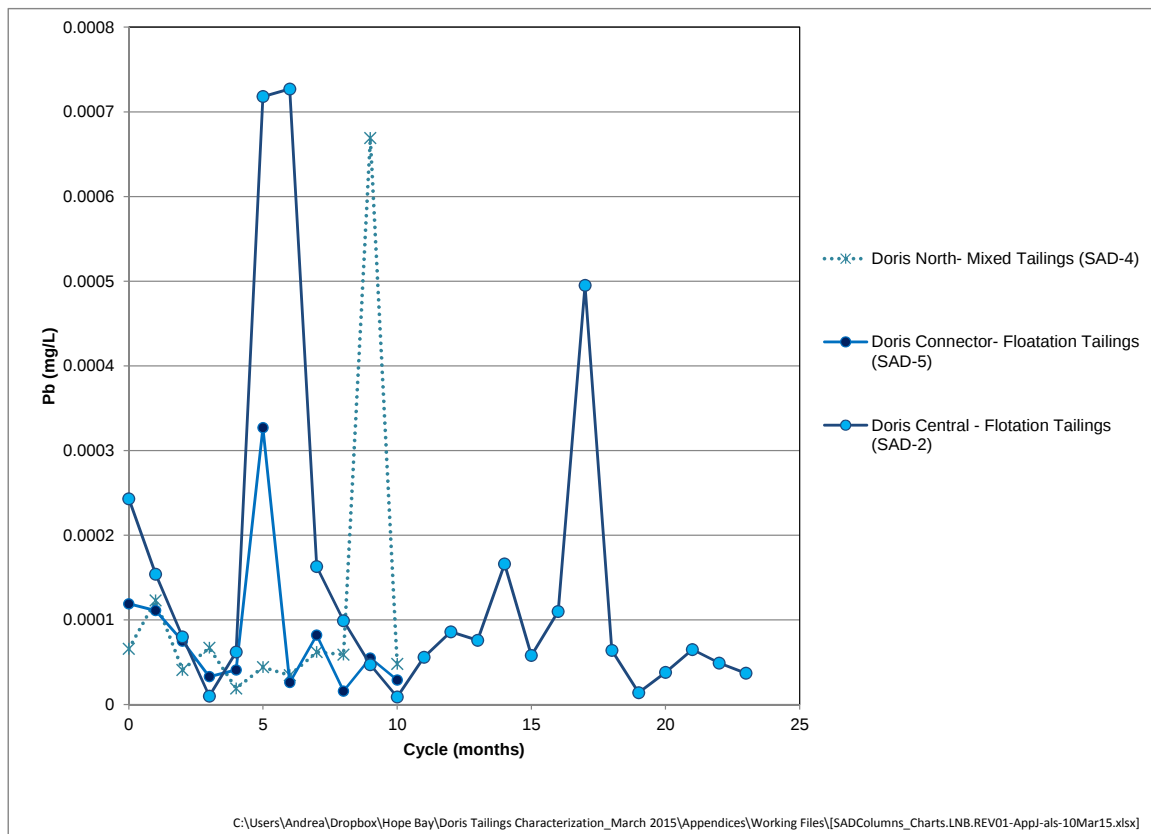
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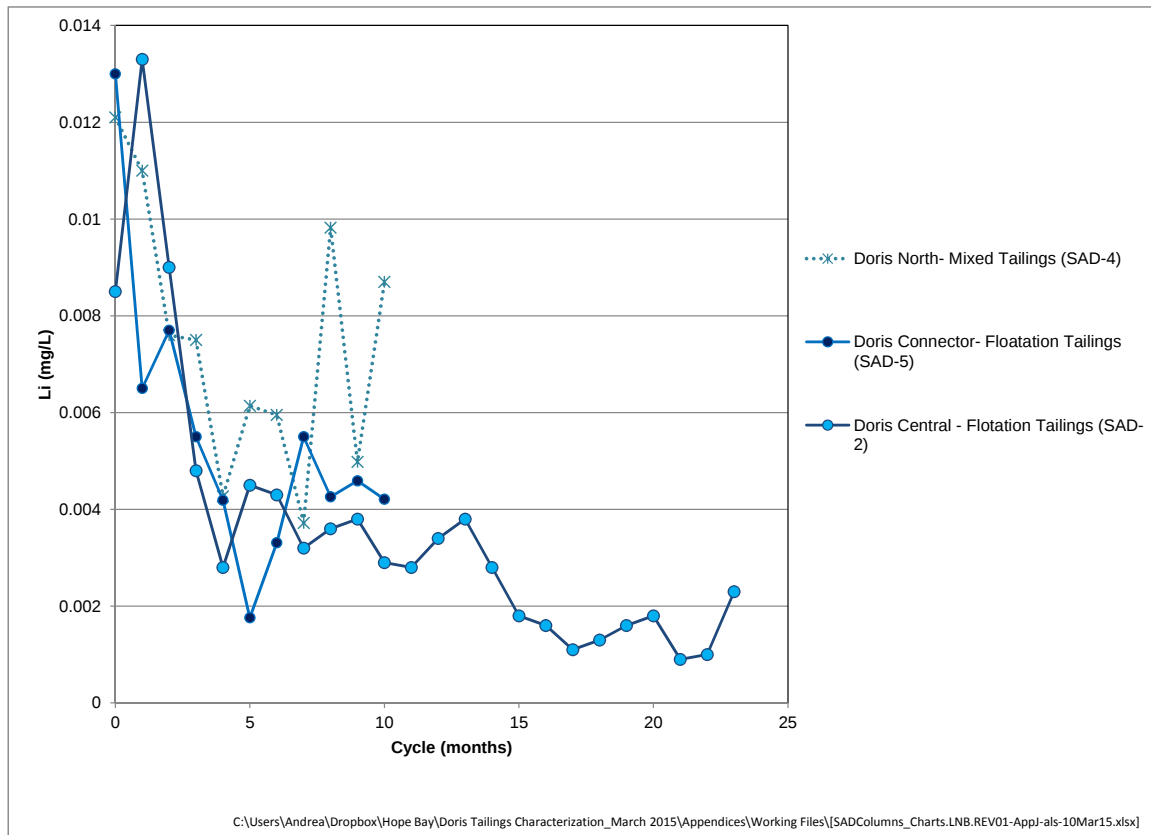
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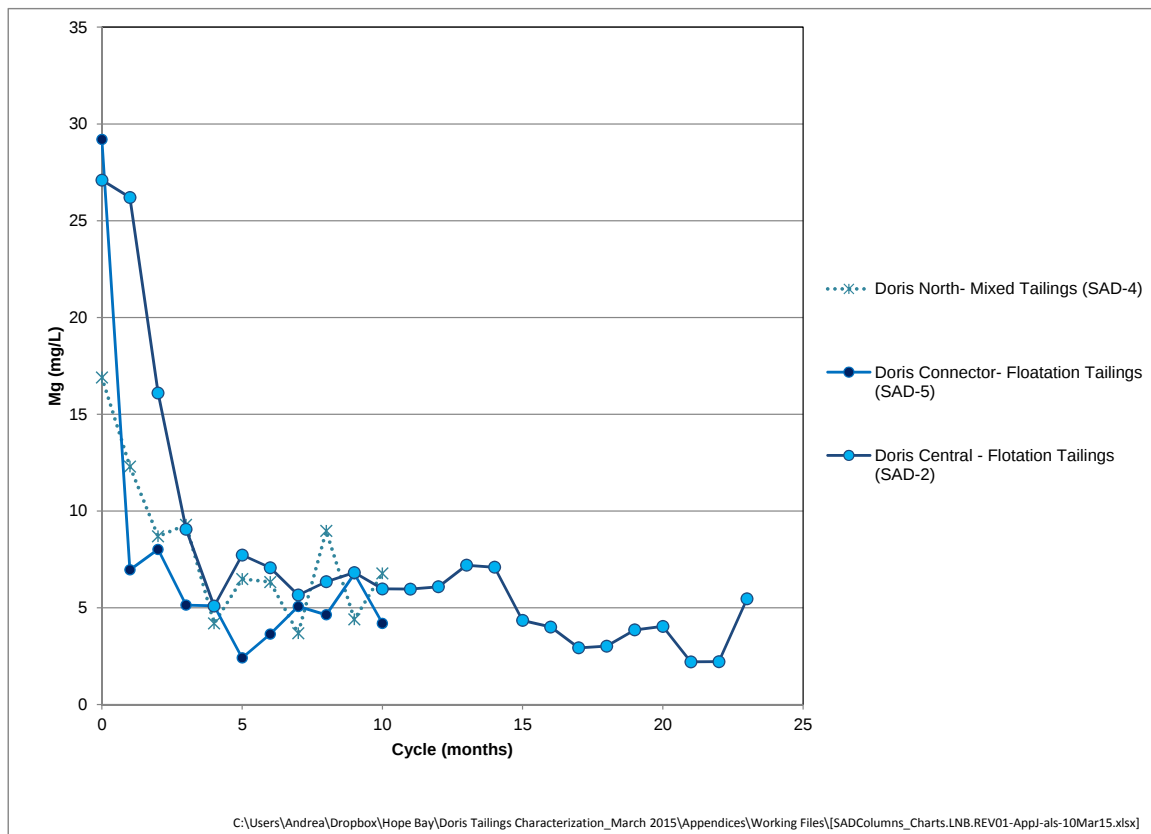
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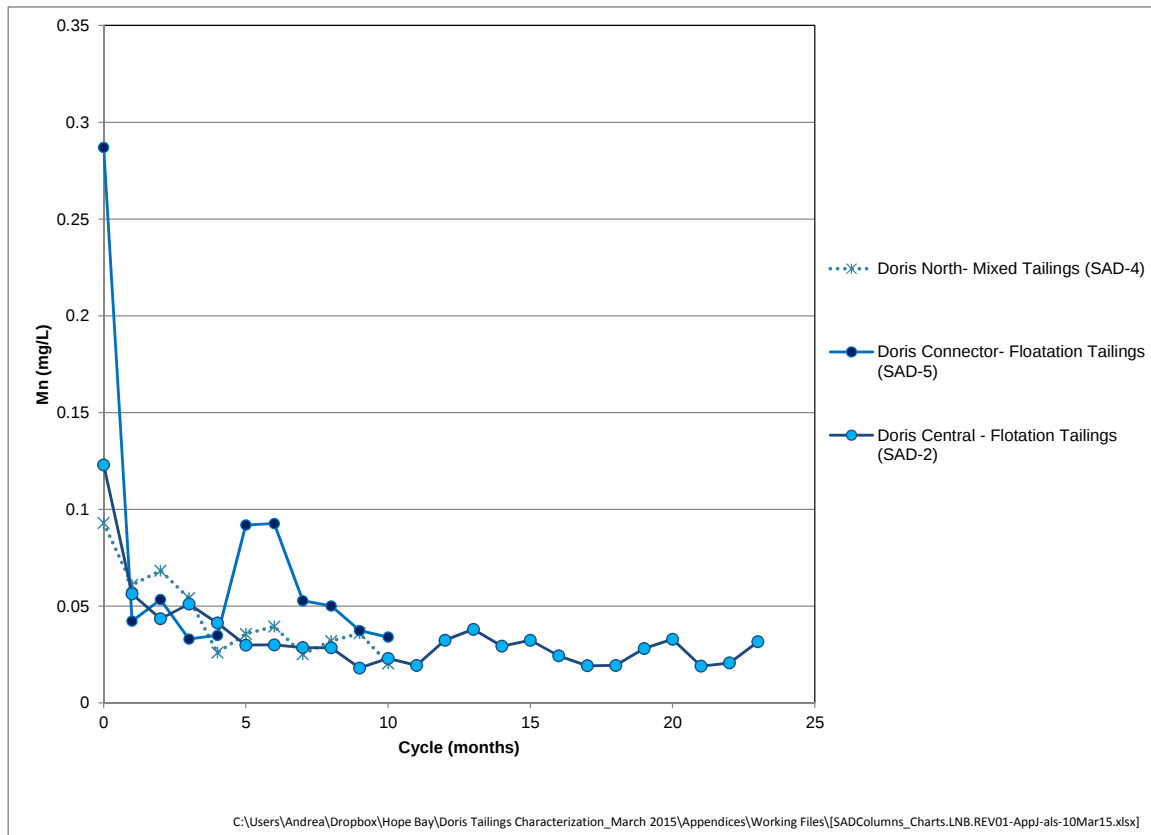
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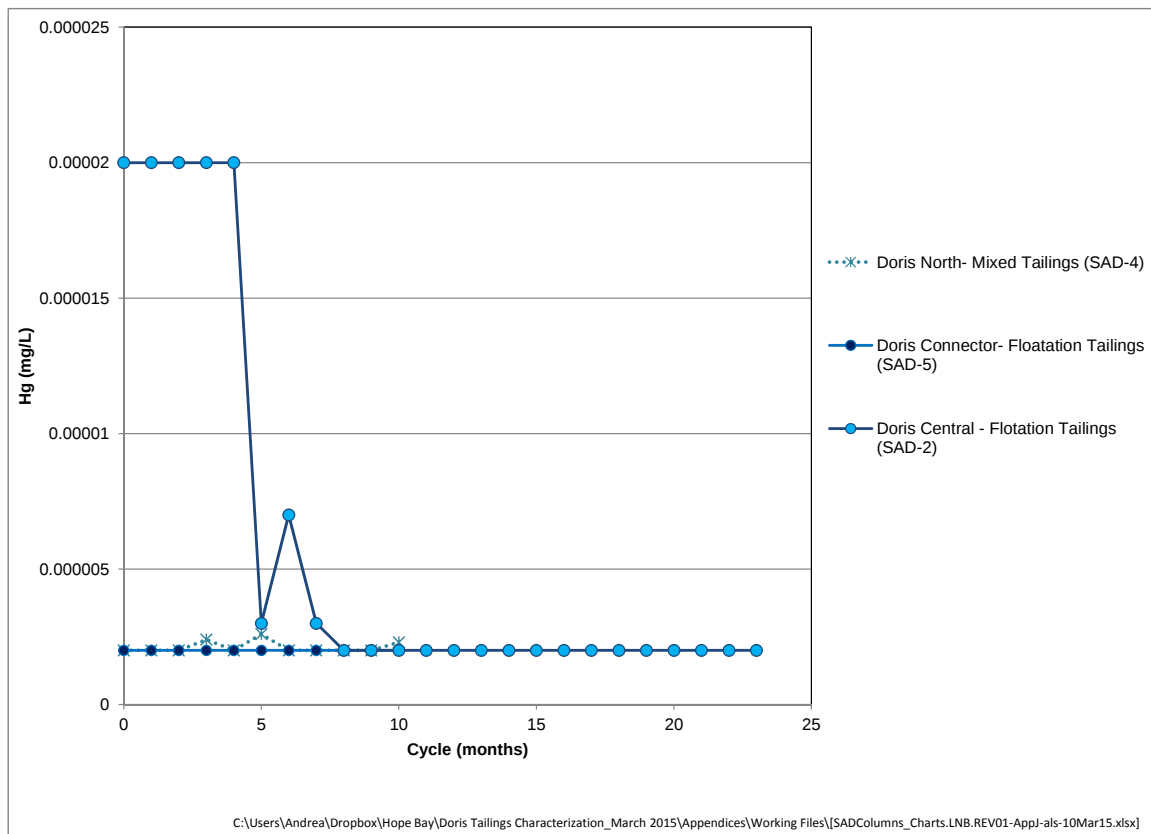
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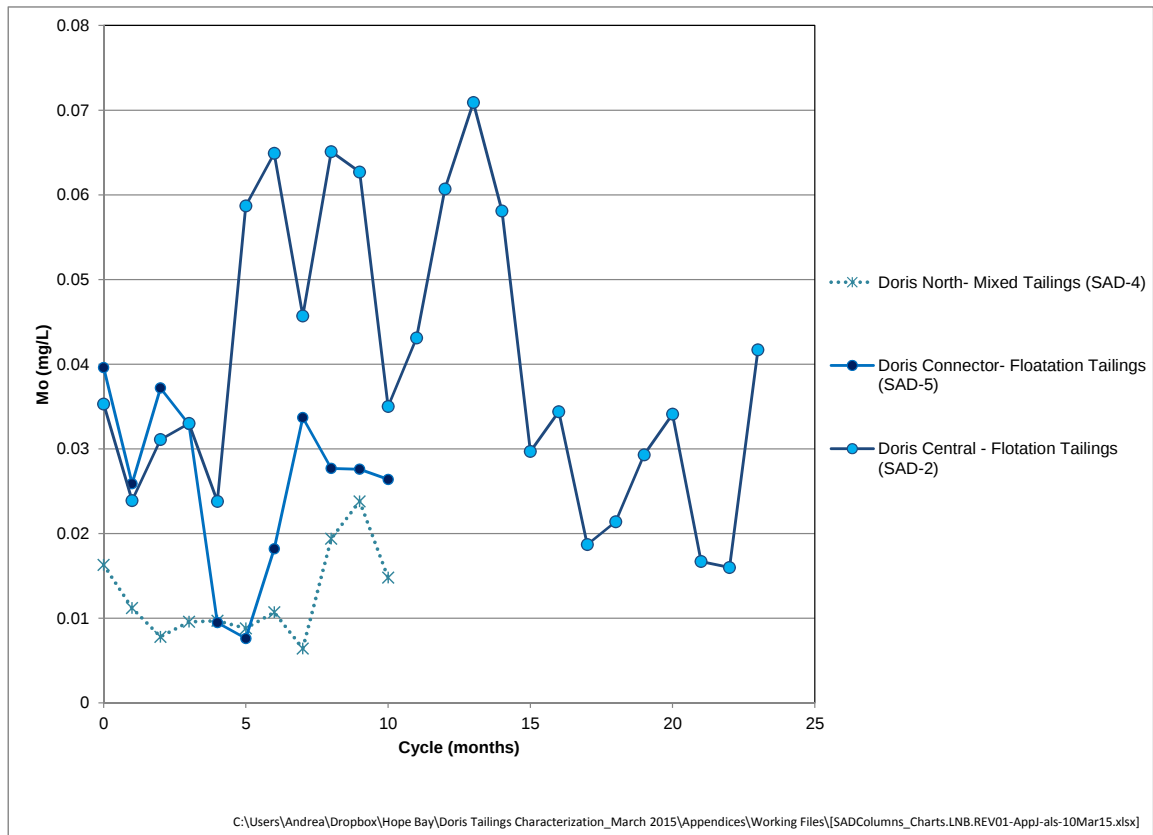
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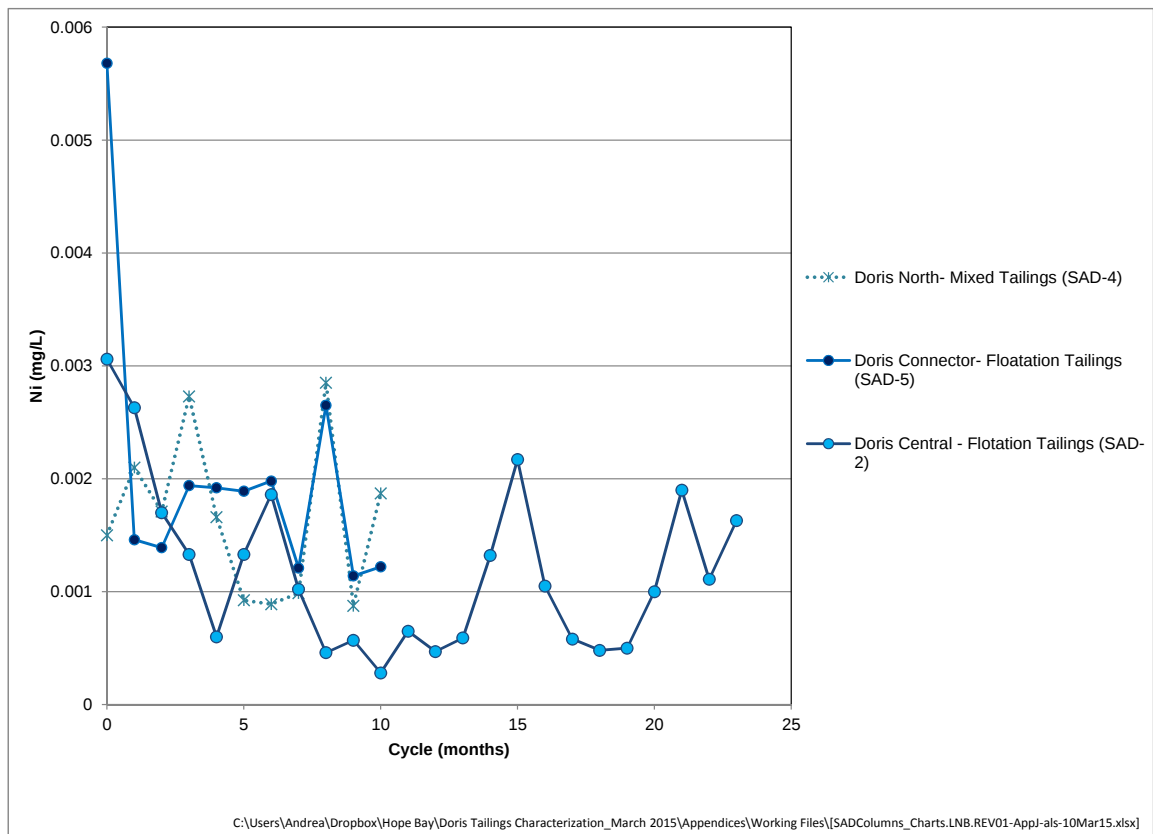
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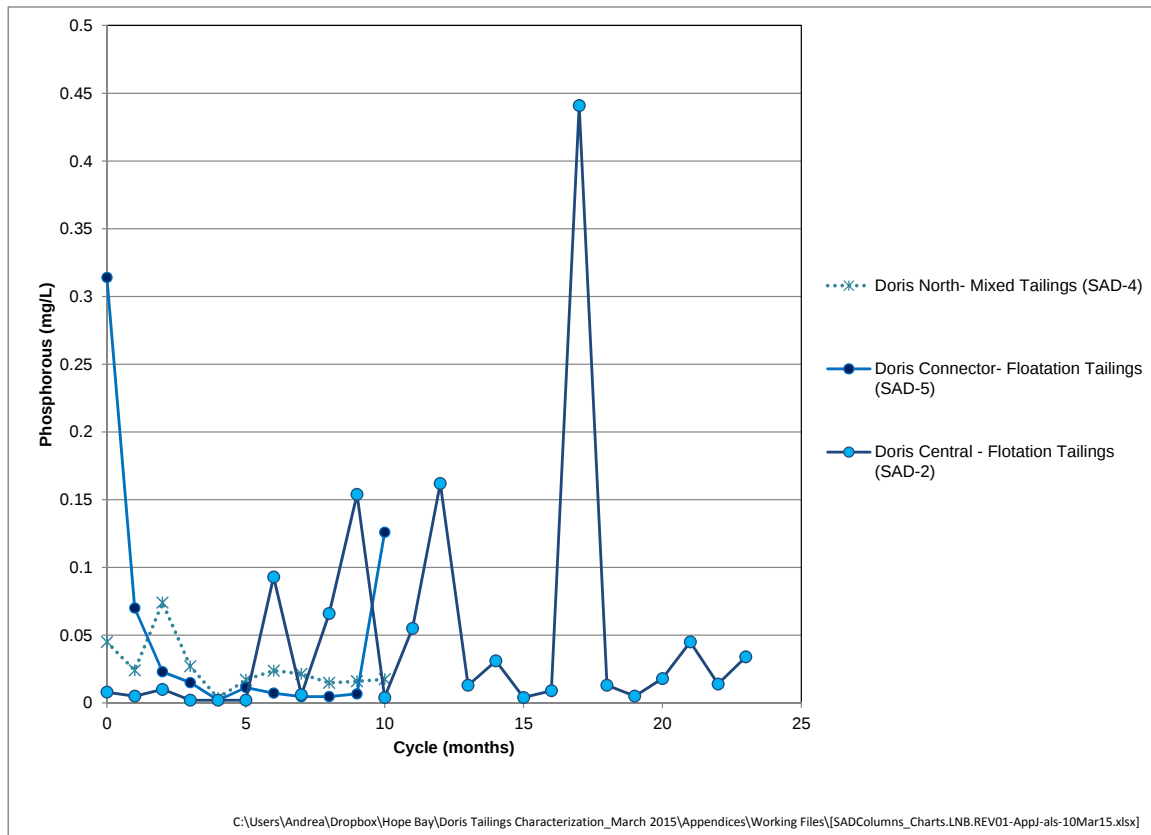
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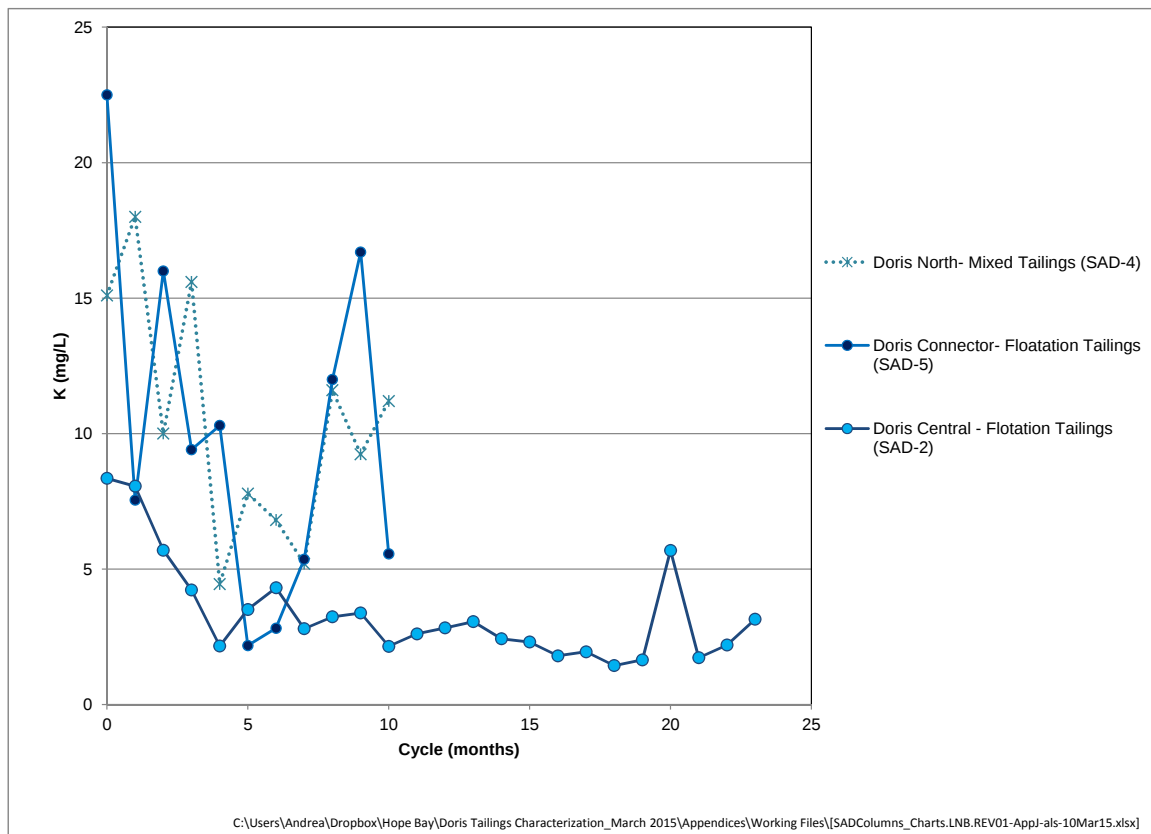
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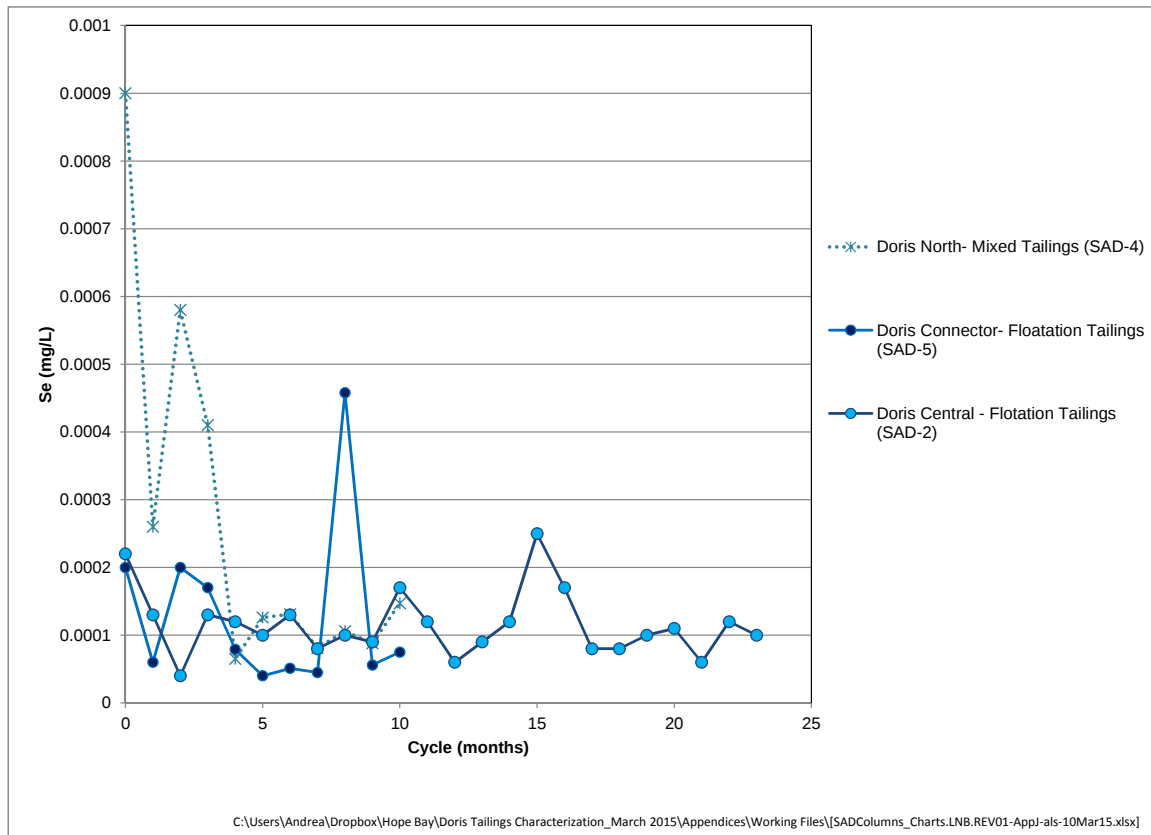
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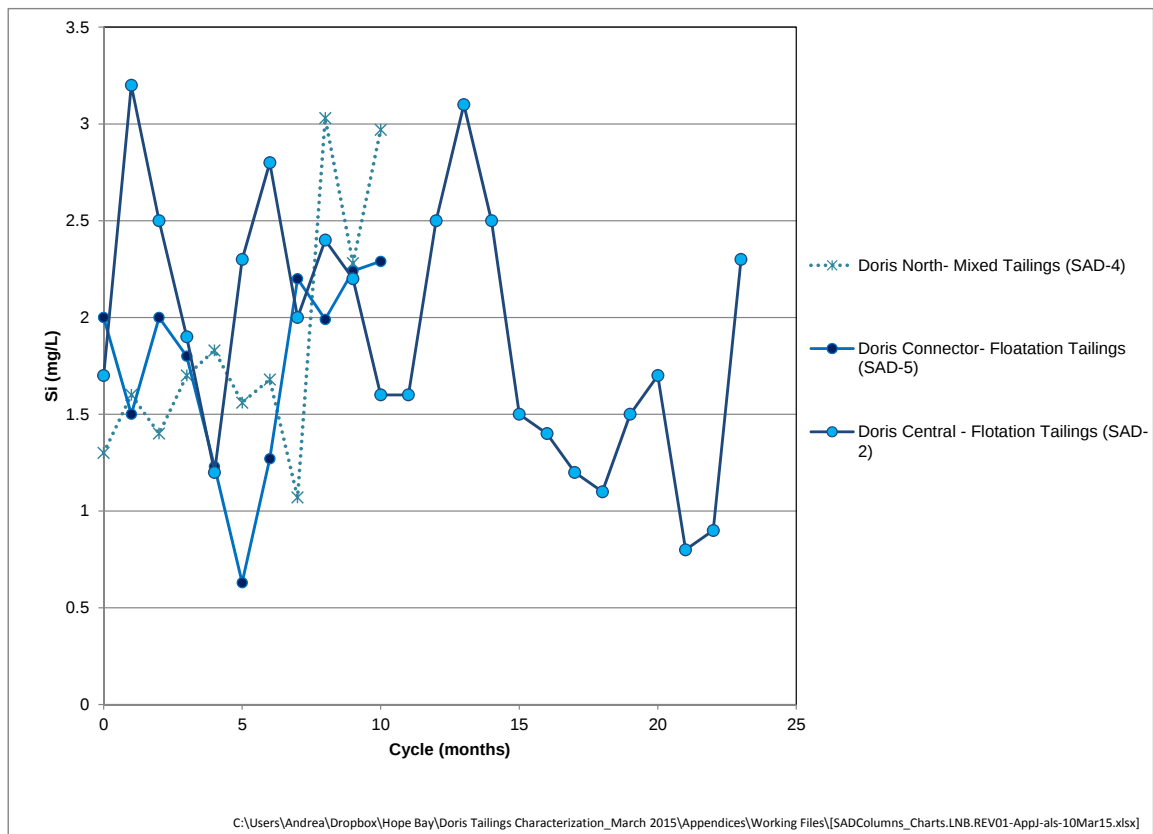
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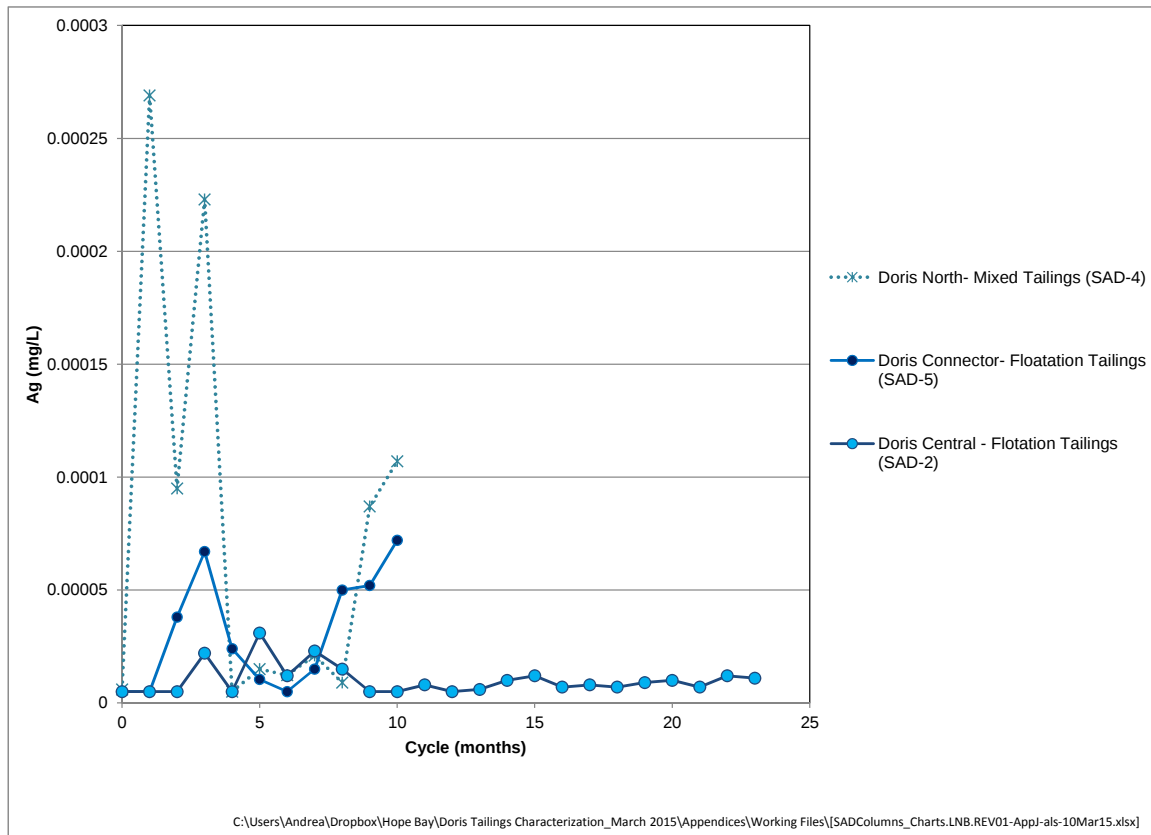
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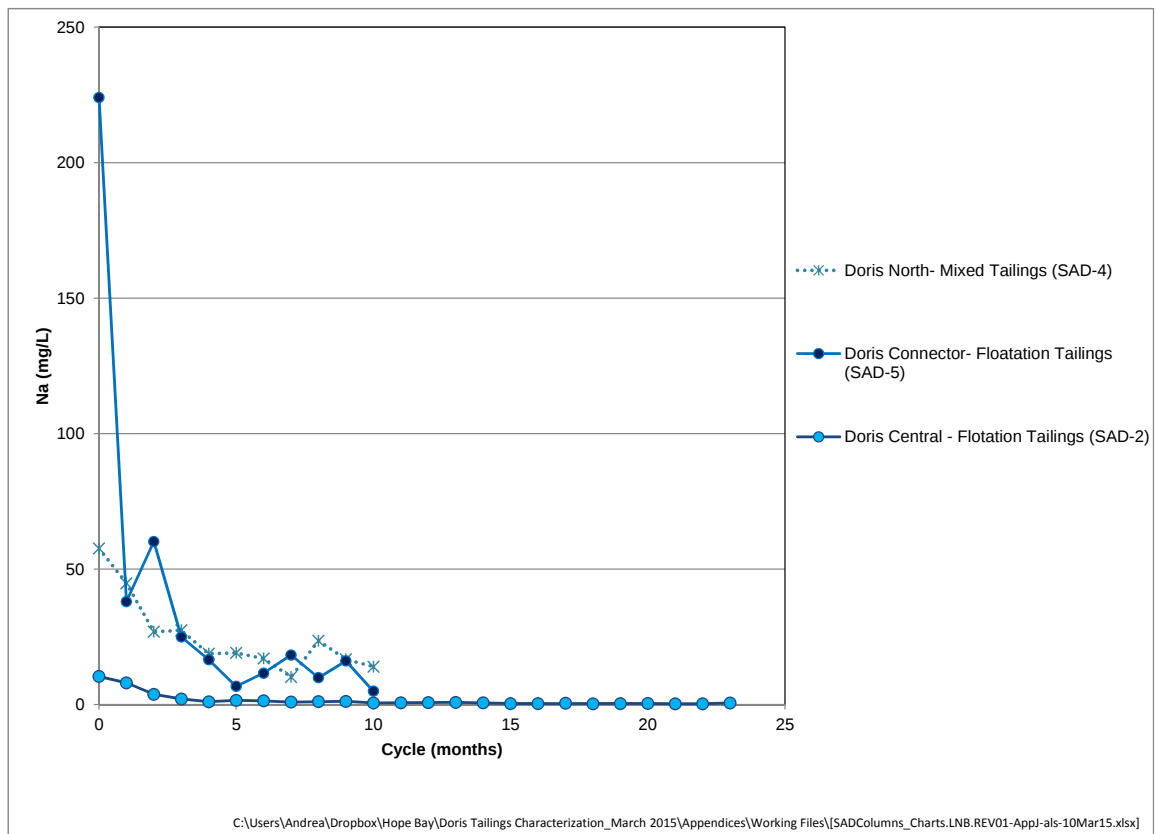
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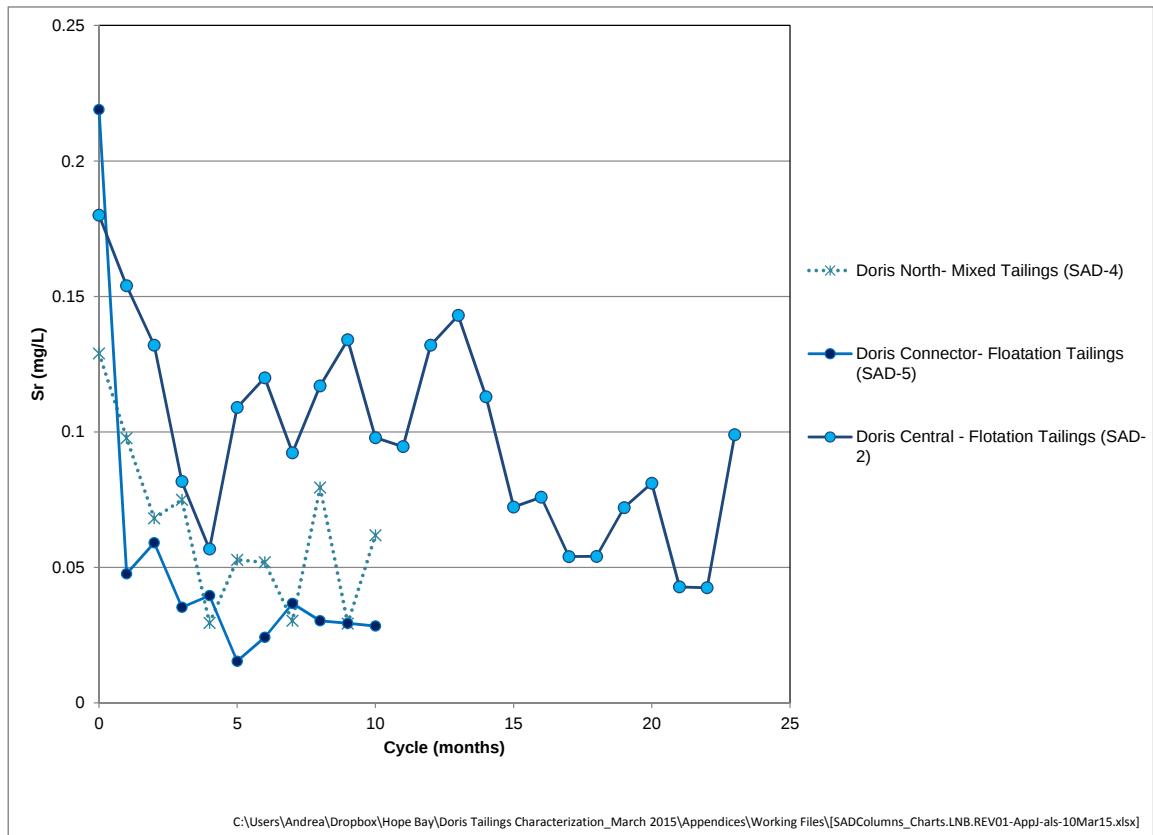
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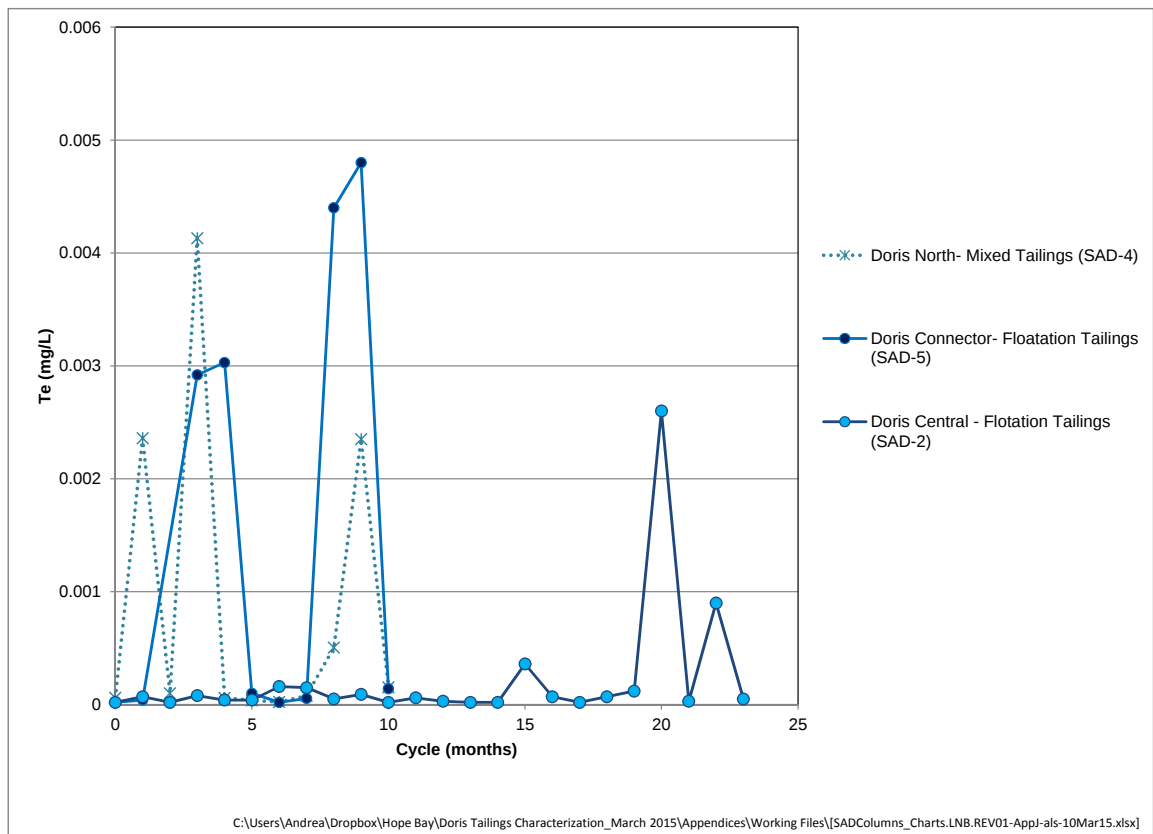
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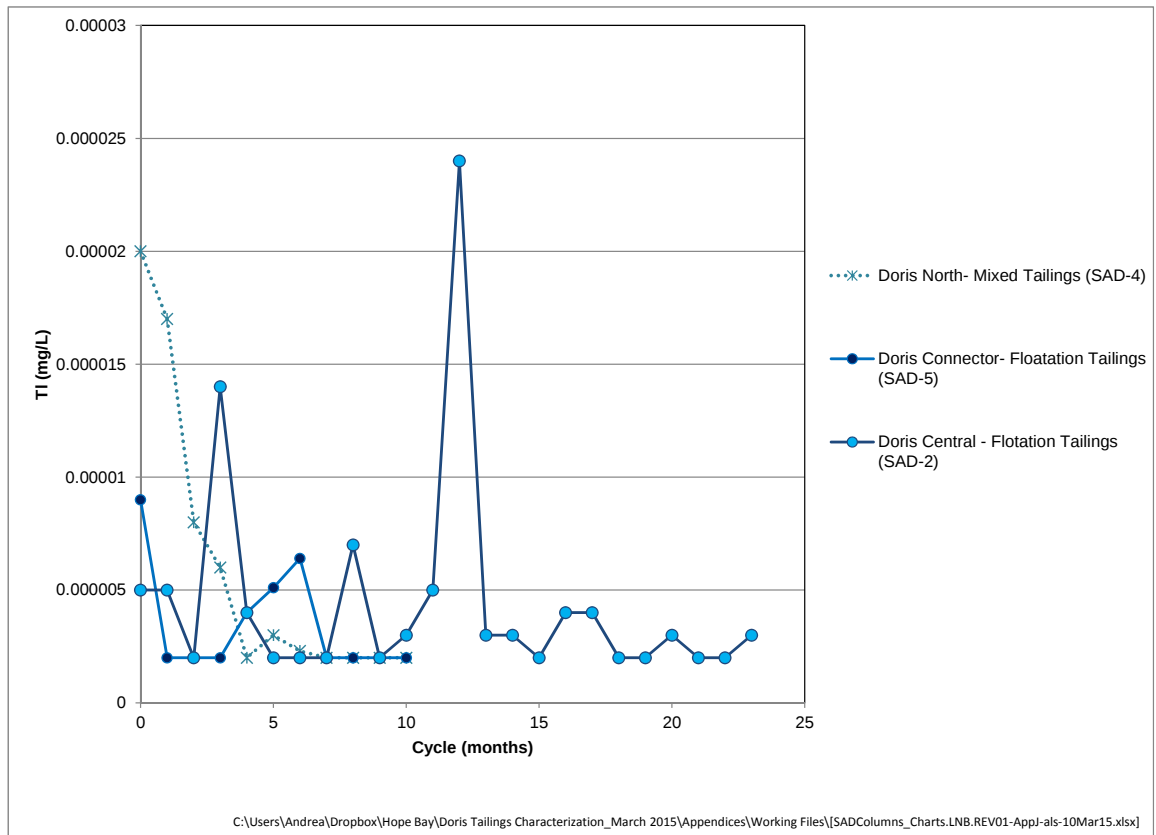
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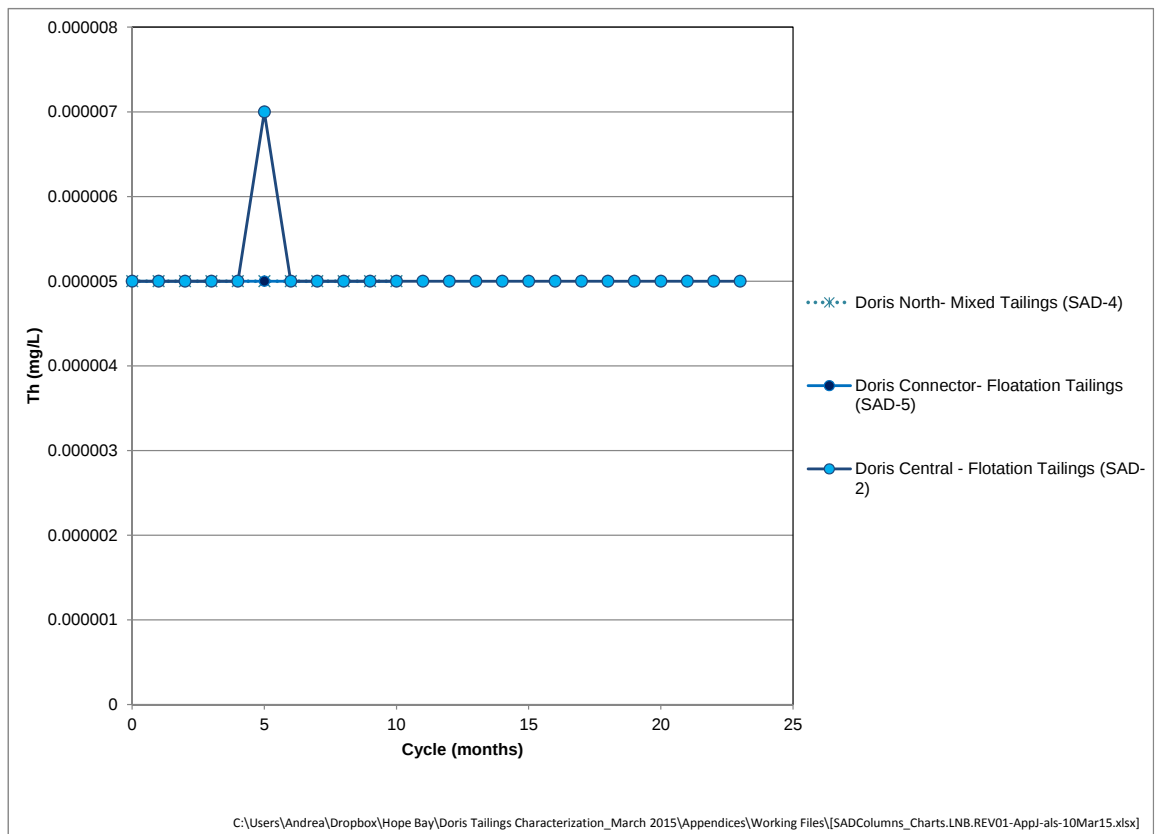
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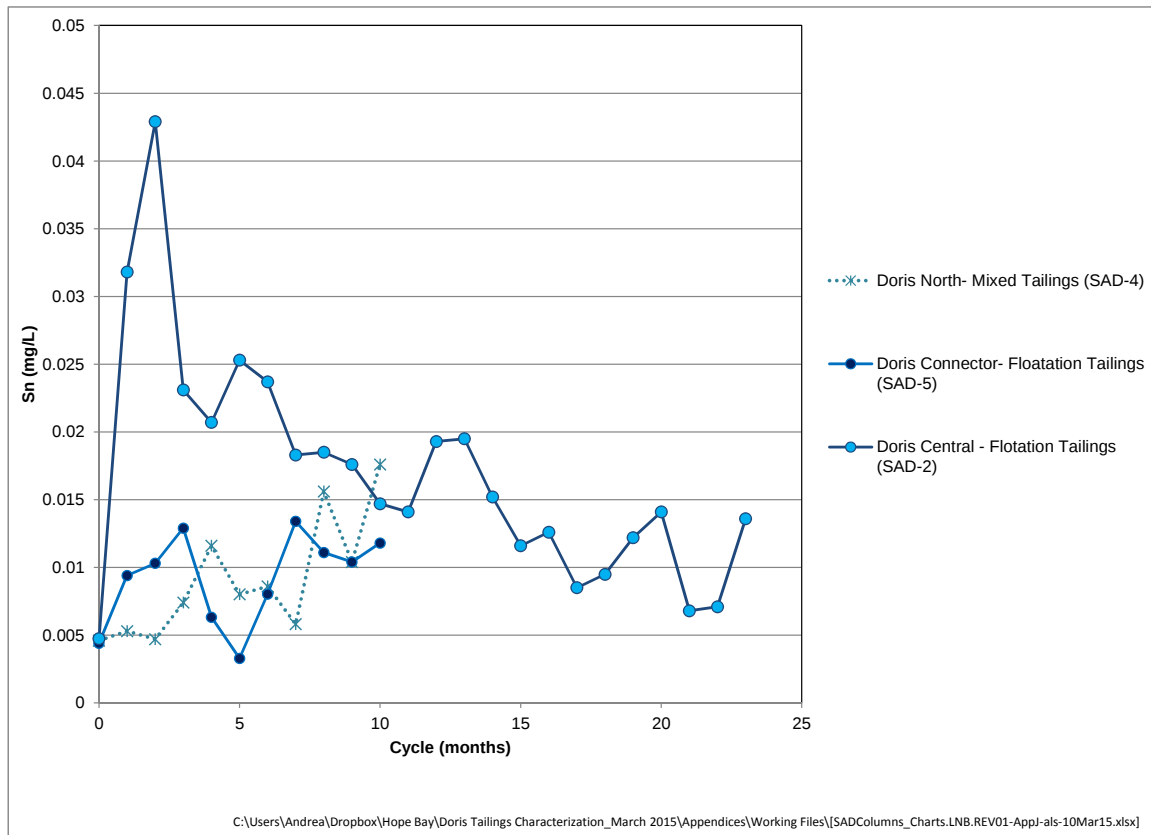
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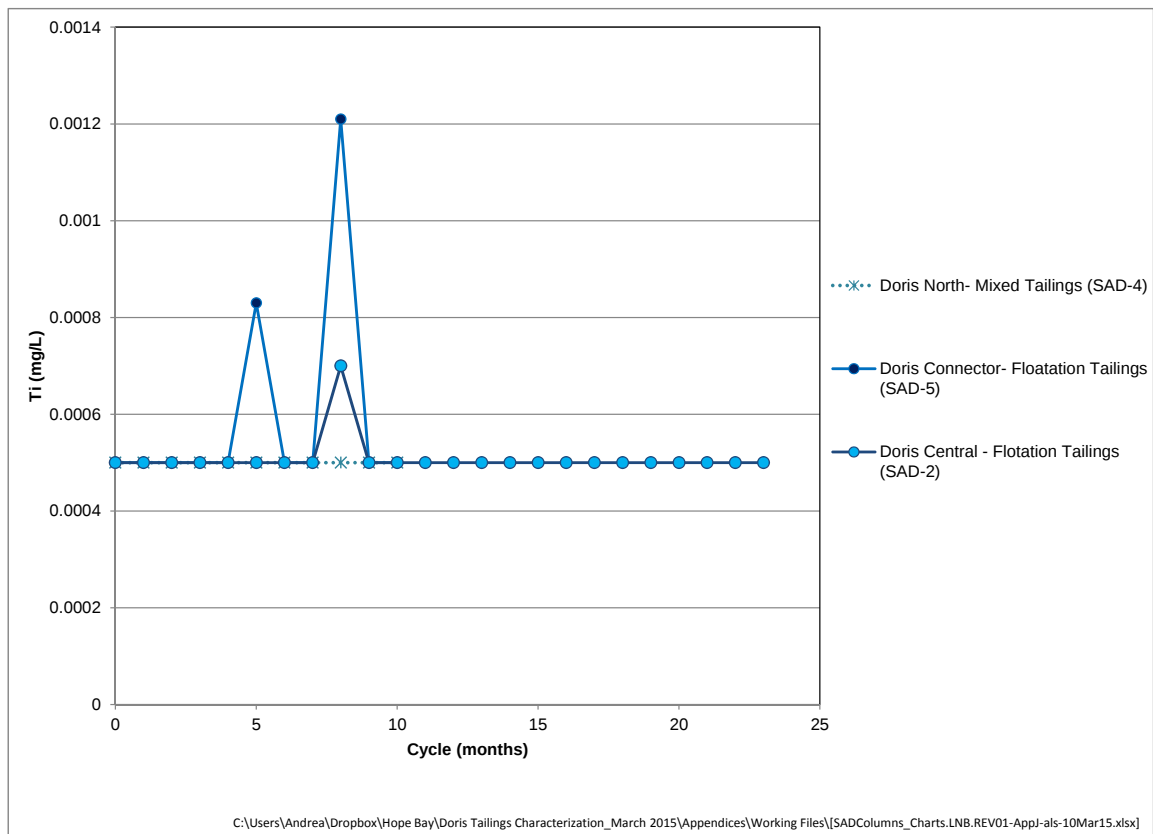
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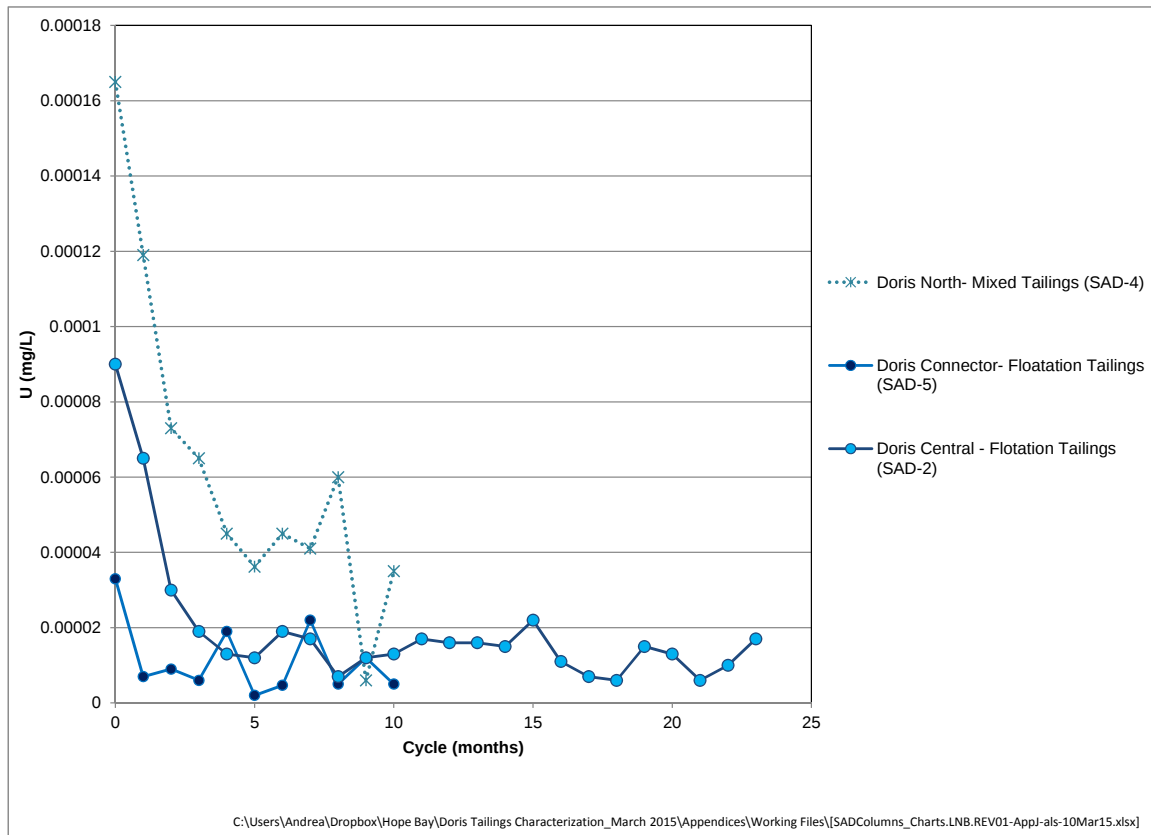
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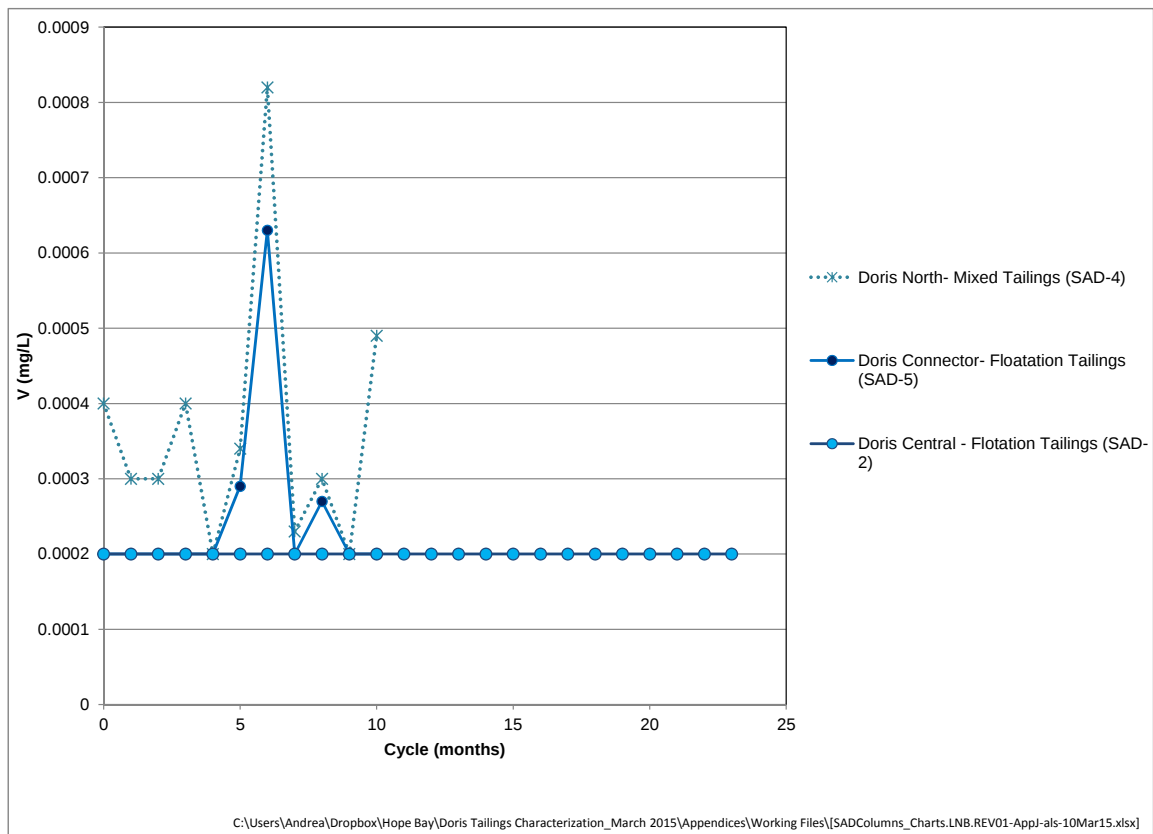
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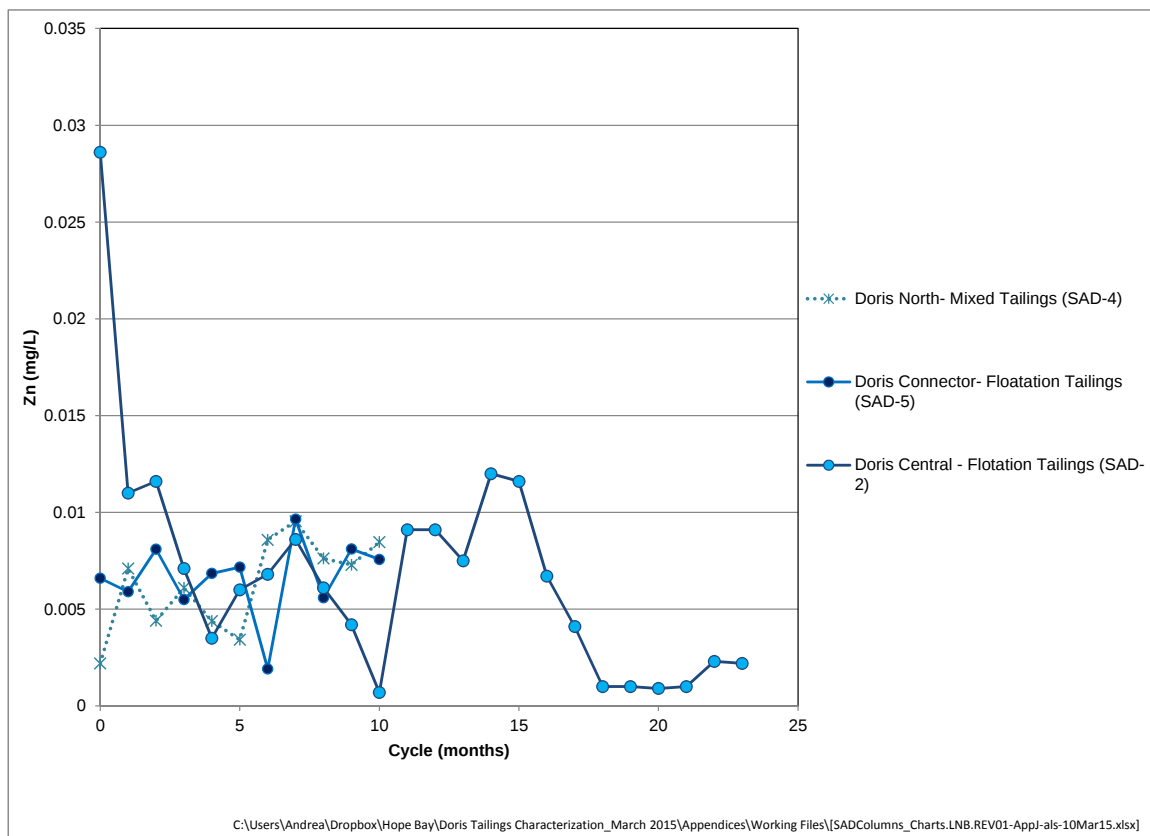
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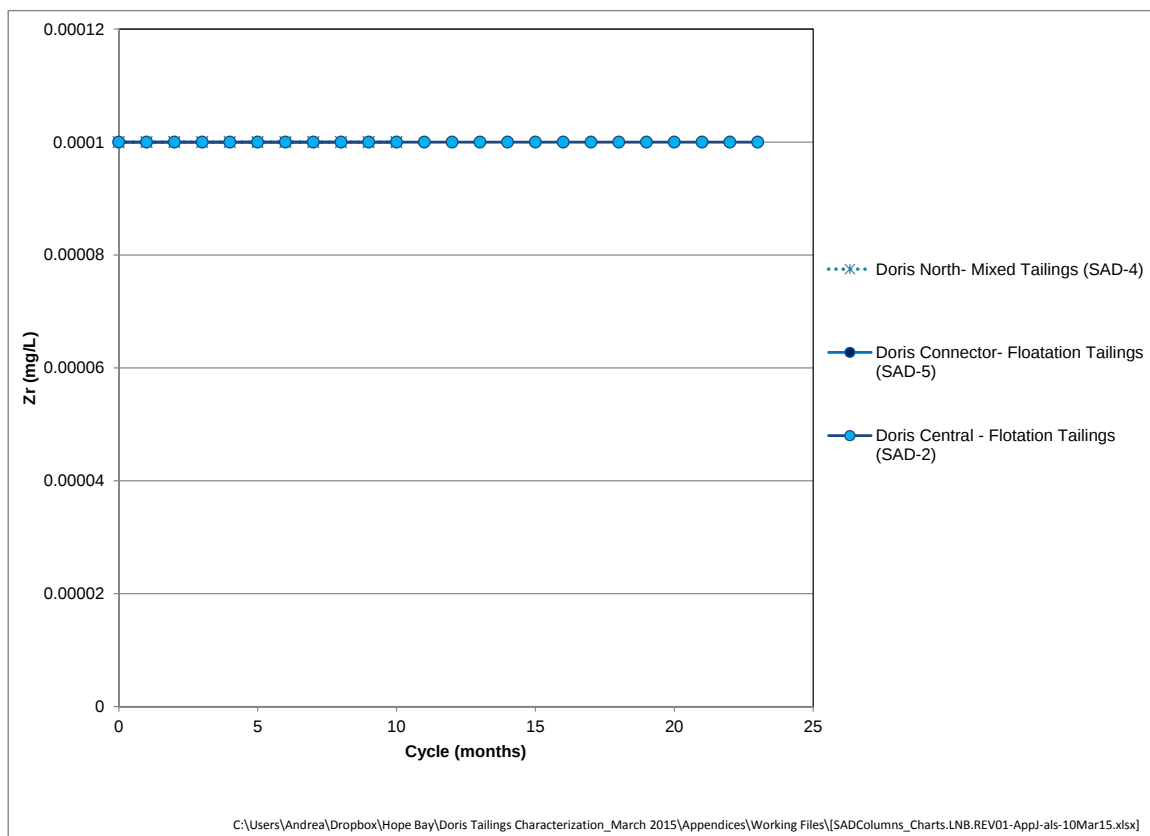
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Appendix K – Process Water Data

Appendix K. Doris Tailings Process Water Data , Hope Bay.

Parameter		Unit	CCME	Doris Central flotation tailings	Doris Connector flotation tailings	Doris North flotation tailings	Doris Central CND residue	Doris North DC02 CND residue	Doris North Doris North CND residue
		Final pH	6.5-9	8.4	8.12	8.38	8.52	8.6	8.6
Alkalinity				107	180	164	160	-	-
Sulphate	SO4	mg/L		47.8	69.5	43	530	-	-
Fluorine	F	mg/L		0.45	0.25	0.45	-	-	-
Total Cyanide		mg/L		-	0.06	<i>0.01</i>	98.3	2.33	3.78
WAD Cyanide		mg/L		-	0.14	<i>0.01</i>	8.41	-	-
Thiocyanate		mg/L		-	-	<i>1</i>	-	132	216
Nitrate	NO3	mg/L	2.9	<i>0.02</i>	<i>0.01</i>	<i>0.01</i>	<i>0.6</i>	-	-
Nitrite	NO2	mg/L	0.06	0.1	<i>0.01</i>	<i>0.01</i>	<i>0.5</i>	-	-
NH ₃ .NH ₄		mg/L		<i>1</i>	<i>0.01</i>	-	1.3	-	-
Ammonia as N	NH3	mg/L	0.41	-	-	<i>0.01</i>	-	1.05	2.89
Aluminium	Al	mg/L	0.1	<i>0.05</i>	<i>0.05</i>	0.17	<i>0.01</i>	0.058	0.02
Silver	Ag	mg/L	0.0001	0.00036	<i>0.00005</i>	<i>0.00005</i>	0.105	0.0055	0.0155
Arsenic	As	mg/L	0.005	0.0024	0.0018	0.006	<i>0.02</i>	0.0068	0.002
Boron	B	mg/L		-	-	0.24	<i>0.02</i>	0.178	0.065
Barium	Ba	mg/L		0.21	0.0053	0.0073	0.011	0.070	0.15
Beryllium	Be	mg/L		<i>0.0001</i>	0.0001	0.00025	<i>0.002</i>	<i>0.001</i>	<i>0.001</i>
Bismuth	Bi	mg/L		-	-	-	0.009	<i>0.001</i>	<i>0.001</i>
Calcium	Ca	mg/L		35.3	27.1	16	0.65	162	706
Cadmium	Cd	mg/L	0.000017	0.00035	<i>0.00002</i>	0.00008	0.0014	<i>0.0001</i>	<i>0.0001</i>
Cobalt	Co	mg/L		-	-	0.0002	0.0142	0.069	0.056
Chromium	Cr	mg/L	0.001	0.0035	0.0027	0.0028	<i>0.05</i>	0.00625	0.005
Copper	Cu	mg/L	0.002*	0.0183	0.0019	0.0025	0.071	0.46	0.079
Iron	Fe	mg/L	0.3	4.88	0.78	<i>0.05</i>	0.22	0.99	0.73
Mercury	Hg	mg/L	0.000026	<i>0.0001</i>	<i>0.0001</i>	<i>0.0001</i>	0.0001	0.0001	0.0001
Potassium	K	mg/L		8.38	22.2	32	0.51	41.28	29.59
Lithium	Li	mg/L		-	-	0.022	<i>0.002</i>	0.013	0.012
Magnesium	Mg	mg/L		14.7	16	8.4	0.339	18.75	20.02
Manganese	Mn	mg/L		0.17	0.064	0.015	0.01	0.063	0.032
Molybdenum	Mo	mg/L	0.073	0.12866	0.107	0.0098	0.015	0.071	0.082
Sodium	Na	mg/L		19	114	159	-	-	-
Nickel	Ni	mg/L	0.025*	0.00446	0.0039	0.0014	0.03	0.009	0.07
Phosphorus	P	mg/L	0.1	0.12	1.39	1.03	<i>0.01</i>	-	-
Lead	Pb	mg/L	0.001*	0.0027	0.0002	<i>0.0001</i>	<i>0.002</i>	0.002	0.0025
Antimony	Sb	mg/L		0.00093	0.00038	0.00125	<i>0.002</i>	0.03425	0.1305
Selenium	Se	mg/L	0.001	0.0008	0.0034	0.004	<i>0.1</i>	<i>0.01</i>	<i>0.01</i>
Tin	Sn	mg/L		-	-	<0.050	0.018	0.00125	<i>0.001</i>
Strontium	Sr	mg/L		0.207	0.093	0.088	0.0032	0.671	0.626
Thorium	Th	mg/L		-	-	-	-	<i>0.001</i>	<i>0.001</i>
Titanium	Ti	mg/L		-	-	<i>0.05</i>	0.01	<i>0.01</i>	<i>0.01</i>
Thallium	Tl	mg/L	0.0008	<i>0.00003</i>	<i>0.00003</i>	<i>0.00003</i>	0.003	<i>0.001</i>	<i>0.001</i>
Uranium	U	mg/L		-	0.0001	0.0001	0.0022	<i>0.001</i>	<i>0.001</i>
Vanadium	V	mg/L		-	-	0.0015	<i>0.003</i>	<i>0.01</i>	<i>0.01</i>
Zinc	Zn	mg/L	0.03	0.028	0.0098	0.04	<i>0.1</i>	0.026	0.04

*CCME guideline is hardness dependent, minimum guideline shown

red italics = value less than laboratory detection limit. Detection limit shown.

Appendix L – Raw Data, Aging Tests

Doris Central Flotation
Aging Tests

Week	Month	SRK ID (vlookup)	LIMS	Temp Upon Receipt °C	Immediates (unfiltered)			Filtered Samples										OH mg/L	Cl mg/L
					pH units	EC uS/cm	EMF mV	EMF Reference mV	E _H mV	DO mg/L	pH units	Alkalinity j/L as CaC	Conductivity uS/cm	HCO ₃ j/L as CaC	Carbonate j/L as CaC	TDS mg/L			
OXIC AGING TEST																			
0	0	DC_F_Time 0	-	-	-	-	-	-	459	-	8.4	107	-	-	-	254	-	21.04	
1	0.25	DC_F_Oxic 1wk	-	-	-	-	-	-	-	-	8.11	108	-	-	-	299	-	19.12	
2	0.5	DC_F_Oxic 2wk	-	-	-	-	-	-	528	-	8.19	109	-	-	-	305	-	19.02	
4	1	DC_F_Oxic 4wk	-	-	-	-	-	-	549	-	8.32	136	-	-	-	333	-	19.29	
8	2	DC_F_Oxic 8 week	-	-	-	-	-	-	576	-	8.61	136	-	-	-	396	-	20.21	
ANOXIC AGING TEST																			
0	0	DC_F_Time 0	-	-	-	-	-	-	459	-	8.4	107	-	-	-	254	-	21.04	
4	1	DC_F_Anox 1mo	-	-	-	-	-	-	214.7	-	8.44	110	-	-	-	250	-	20.47	
8	2	DC_F_Anox 2mo	-	-	-	-	-	-	395	-	8.57	112	-	-	-	249	-	19.23	
16	4	DC_F_Anox 4 mo	-	-	-	-	-	-	-	-	8.36	60	-	-	-	245	-	114	
32	8	DC_F_Anox 8mo	-	-	-	-	-	-	283	-	8.64	111	-	-	-	245	-	19	

Data red and italicized are
below the detection limit

Doris Central Flotation
Aging Tests

Week	Month	F mg/L	SO ₄ mg/L	NO ₂ as N mg/L	NO ₃ as N mg/L	NH ₃ +NH ₄ as N mg/L	TOC mg/L	TIC mg/L	C mg/L	Tot. Reactive P mg/L	CN(T) mg/L	CN _{WAD} mg/L	CNO mg/L	CNS mg/L	CN(F) mg/L	(S2O3)2- mg/L	Hg ug/L	Hardness ȳ/L as CaC	Ra 226 Bq/L	Ag ug/L
OXIC AGING TEST																				
0	0	0.45	47.8	0.02	0.1	1	-	-	-	-	-	-	0.01	0.1	-	-	0.1	149	-	0.36
1	0.25	0.39	65	0.02	0.05	1	-	-	-	-	-	-	0.01	0.1	-	-	0.1	184	-	0.05
2	0.5	0.35	78.7	0.02	0.05	1	-	-	-	-	-	-	0.01	0.1	-	-	0.1	211	-	0.05
4	1	0.34	98	0.02	0.05	1	-	-	-	-	-	-	0.01	0.1	-	-	0.1	208	-	0.05
8	2	0.38	141.7	0.02	0.05	1	2	-	32	-	-	-	0.01	-	-	-	0.1	247	-	0.05
ANOXIC AGING TEST																				
0	0	0.45	47.8	0.02	0.1	1	-	-	-	-	-	-	0.01	0.1	-	-	0.1	149	-	0.36
4	1	0.51	46.4	0.02	0.05	1	-	-	-	-	-	-	0.01	-	-	-	0.1	133	-	0.05
8	2	0.47	46.9	0.02	0.05	1	1	-	28	-	-	-	0.01	0.1	-	-	0.1	133	-	0.05
16	4	0.25	38	0.08	0.07	1	6	-	14	-	-	-	0.01	0.1	-	-	0.1	104	-	0.05
32	8	0.41	39.5	0.02	0.05	1	1	-	26	-	-	-	0.01	0.1	-	-	0.1	125	-	0.05

Data red and italicized are
below the detection limit

Doris Central Flotation
Aging Tests

Week	Month	Al mg/L	As ug/L	Ba ug/L	Be ug/L	B mg/L	Bi mg/L	Ca mg/L	Cd ug/L	Co mg/L	Cr ug/L	Cu ug/L	Fe mg/L	K mg/L	Li mg/L	Mg mg/L	Mn mg/L	Mo ug/L	Na mg/L	Ni ug/L	P mg/L
OXIC AGING TEST																					
0	0	0.05	2.4	205.26	0.1	-	-	35.3	0.35	-	3.5	18.3	4.88	8.38	-	14.7	0.166	128.66	19	4.46	0.12
1	0.25	0.05	1.4	114.38	0.1	-	-	43.4	0.42	-	0.2	1	0.066	7.87	-	18.5	0.058	166.42	18.1	2.86	0.05
2	0.5	0.05	1.5	69.2	0.1	-	-	46	0.38	-	0.4	2	0.633	8.11	-	23.4	0.062	141.21	18.3	2.81	0.05
4	1	0.05	1.1	52.08	0.1	-	-	40.1	0.34	-	0.2	1	0.07	8.34	-	26.3	0.018	126.27	18.8	2.03	0.05
8	2	0.05	1.2	31.77	0.1	-	-	41.4	0.02	-	10.2	1	0.05	8.47	-	35	0.014	106.41	20.1	1.54	0.08
ANOXIC AGING TEST																					
0	0	0.05	2.4	205.26	0.1	-	-	35.3	0.35	-	3.5	18.3	4.88	8.38	-	14.7	0.166	128.66	19	4.46	0.12
4	1	0.05	1.5	56.38	0.1	-	-	29.1	0.02	-	8.9	1	0.05	6.91	-	14.7	0.021	127.08	21	1.39	0.05
8	2	0.05	1.3	55.16	0.1	-	-	29.4	0.02	-	7.3	1	0.05	6.04	-	14.6	0.034	136.7	19	1.25	0.05
16	4	0.05	4.9	99.5	0.1	-	-	21	0.02	-	3.3	1.7	0.05	7.15	-	12.6	0.032	111.4	66.2	2.03	0.29
32	8	0.05	0.9	48	0.4	-	-	26	0.04	-	1.7	1	0.05	6.15	-	14.6	0.021	130	20.1	0.99	0.05

Data red and italicized are
below the detection limit

Doris Central Flotation
Aging Tests

Week	Month	Pb ug/L	Sb ug/L	Se ug/L	Si mg/L	Sn mg/L	Sr ug/L	Ti mg/L	Tl ug/L	U ug/L	V mg/L	W mg/L	Y mg/L	Zn mg/L
OXIC AGING TEST														
0	0	2.7	0.93	0.8	1.87	-	207	-	0.03	-	-	-	-	0.028
1	0.25	0.1	1.13	1.3	1.11	-	206	-	0.03	-	-	-	-	0.0019
2	0.5	0.1	0.63	1.8	1.13	-	191	-	0.03	-	-	-	-	0.0036
4	1	0.1	0.38	1.3	1.1	-	184	-	0.03	-	-	-	-	0.0031
8	2	0.1	0.79	1.4	1.21	-	179	-	0.03	-	-	-	-	0.0039
ANOXIC AGING TEST														
0	0	2.7	0.93	0.8	1.87	-	207	-	0.03	-	-	-	-	0.028
4	1	0.1	0.4	0.4	0.05	-	150	-	0.03	-	-	-	-	0.0019
8	2	0.1	0.48	0.5	0.96	-	157	-	0.03	-	-	-	-	0.002
16	4	0.1	0.49	16.5	0.47	-	92	-	0.03	-	-	-	-	0.0027
32	8	0.1	0.08	0.2	1.22	-	143	-	0.03	-	-	-	-	0.0056

Data red and italicized are
below the detection limit

Doris Central CN Destruct
Residue Aging Tests

Week	Month	Sample ID	LIMS	Temp Upon Receipt °C	Immediates (unfiltered)				Filtered Samples			
					pH units	EC uS/cm	EMF mV	EMF Reference mV	E _H mV	DO mg/L	pH units	Alkalinity ng/L as CaCO ₃
OXIC AGING TEST												
0	0	CND Filtrate	SEP10220	-	-	-	136	-	-	-	8.52	160
1	0.25	Sept 11/08 DC-A CND 1C+1D Oxic -1 Week	10395-SEP08	23	8.31	2580	113	206	319	-	7.37	373
2	0.5	Sept 18/08 DC-B CND 1C+1D Oxic - 2 Weeks	10548-SEP08	20	8.47	2460	101	206	307	-	8.29	205
4	1	Oct 2/08 DC-C CND 1C+1D Oxic - 4 weeks	10152-OCT08	21	8.47	2520	99	206	305	-	8.47	219
8	2	Oct 30/08 DC-D CND 1C+1D Oxic 8 Week	10913-OCT08	23	8.31	2680	117	206	323	-	8.48	217
ANOXIC AGING TEST												
0	0	CND Filtrate	SEP10220	-	-	-	136	-	-	-	8.52	160
4	1	Oct 8/08 DC-A CND 1C+1D Anoxic-1 month	10318-OCT08	7	8.66	2300	86.2	206	292.2	-	8.58	183
8	2	Nov 4/08 DC-B CND 1C+1D Anoxic-2 Month	10118-NOV08	15	8.51	2210	99.5	206	305.5	-	8.38	221
16	4	Jan 5-09 DC-C-CND 1C+ 1D Anoxic - 4 Month	11609-JAN09	14	8.23	2340	116.8	206	322.8	-	8.35	267
32	8	May 4/09 DC-D CND 1C+1D Anoxic - 8 month	11090-MAY09	-	8.22	2640	17.1	206	223.1	3.09	8.34	331

Data red and italicized are
below the detection limit

Doris Central CN Destruct
Residue Aging Tests

Week	Month	Conductivity uS/cm	HCO ₃ mg/L as CaCO ₃	Carbonate mg/L as CaCO ₃	TDS mg/L	OH mg/L as CaCO ₃	Cl mg/L	F mg/L	SO ₄ mg/L	NO ₂ as N mg/L	NO ₃ as N mg/L	NH3 as N mg/L	TOC mg/L	TIC mg/L	C mg/L	Reactiv mg/L	CN(T) mg/L	CN _{WAD} mg/L	CNO mg/L
OXIC AGING TEST																			
0	0	2230	140	20	1730	2	14	-	530	0.6	0.5	1.3	88.1	63.4	-	0.3	98.3	8.41	110
1	0.25	1770	373	2	1690	2	14	-	550	0.06	0.07	1.9	103	71.4	174	0.3	95.8	4.71	120
2	0.5	2350	205	2	1760	2	31	-	570	0.06	0.06	3.6	86.6	69.5	156	0.3	82.2	1.34	110
4	1	2560	214	5	1800	2	17	-	690	0.15	0.08	5	92.9	108	201	0.3	72.1	0.29	90
8	2	2650	206	11	1930	2	14	-	800	0.6	0.5	11.1	103	34	137	0.11	76.8	7.21	67
ANOXIC AGING TEST																			
0	0	2230	140	20	1730	2	14	-	530	0.6	0.5	1.3	88.1	63.4	-	0.3	98.3	8.41	110
4	1	1820	223	12	1560	2	15	-	530	0.06	0.36	1.9	88.7	81.9	171	0.3	65.4	0.38	76
8	2	2330	217	4	1650	2	15	-	650	0.06	0.1	3.8	78.5	91	170	0.09	87.9	0.16	82
16	4	2540	262	5	1710	2	15	-	780	0.06	0.09	9.8	93.7	49.3	143	0.09	46.9	0.23	57
32	8	2520	325	6	1960	2	14	-	890	0.06	0.18	15.9	64.3	86.9	151	0.03	1.89	0.22	20

Data red and italicized are
below the detection limit

Doris Central CN Destruct
Residue Aging Tests

Week	Month	CNS mg/L	CN(F) mg/L	(S2O3)2- mg/L	Hg mg/L	Hardness j/L as CaC	Ra 226 Bq/L	Ag mg/L	Al mg/L	As mg/L	Ba mg/L	Be mg/L	B mg/L	Bi mg/L	Ca mg/L	Cd mg/L	Co mg/L	Cr mg/L	Cu mg/L	Fe mg/L	K mg/L
OXIC AGING TEST																					
0	0	180	-	52	0.0001	3	-	0.105	0.01	0.02	0.011	0.002	0.02	0.009	0.65	0.0014	0.0142	0.05	0.071	0.22	0.51
1	0.25	190	4	-	0.0002	158	-	0.0247	0.02	0.017	0.0303	0.0002	0.057	0.0014	29.6	0.00033	0.172	0.005	4.37	28.2	26
2	0.5	190	2	-	0.0002	182	-	0.0043	0.01	0.009	1.7	0.0002	0.817	0.0001	31.5	0.00003	0.00049	0.005	0.005	28.3	23.5
4	1	220	1	-	0.0001	208	-	0.00326	0.02	0.004	0.0168	0.00002	0.0579	0.00005	31.3	0.000165	0.183	0.0011	0.157	27.4	24.7
8	2	210	-	-	0.0001	292	-	0.0004	0.02	0.002	0.0241	0.0002	0.077	0.0014	44	0.00021	0.198	0.005	0.07	30.8	36.5
ANOXIC AGING TEST																					
0	0	180	-	52	0.0001	3	-	0.105	0.01	0.02	0.011	0.002	0.02	0.009	0.65	0.0014	0.0142	0.05	0.071	0.22	0.51
4	1	180	2	-	0.0001	167	-	0.0139	0.04	0.002	0.018	0.0002	0.056	0.0007	24.6	0.00026	0.185	0.01	0.545	22.6	25.5
8	2	190	-	-	0.0001	205	-	0.0156	0.01	0.011	0.0306	0.0031	0.084	0.0012	29.2	0.00086	0.192	0.011	0.046	21.3	27.7
16	4	220	-	-	0.0001	320	-	0.00001	0.01	0.0002	0.013	0.00006	0.0677	0.00001	42.9	0.000003	0.201	0.0027	0.0424	19	25.6
32	8	220	-	-	0.0001	390	-	0.0001	0.01	0.006	0.0123	0.0002	0.057	0.0001	53.8	0.00068	0.19	0.005	0.008	12.5	35.3

Data red and italicized are
below the detection limit

Doris Central CN Destruct
Residue Aging Tests

Week	Month	Li mg/L	Mg mg/L	Mn mg/L	Mo mg/L	Na mg/L	Ni mg/L	P mg/L	Pb mg/L	Sb mg/L	Se mg/L	Si mg/L	Sn mg/L	Sr mg/L	Ti mg/L	Tl mg/L	U mg/L	V mg/L	W mg/L
OXIC AGING TEST																			
0	0	0.002	0.339	0.01	0.015	-	0.03	0.01	0.002	0.002	0.1	0.03	0.018	0.0032	0.01	0.003	0.0022	0.003	0.036
1	0.25	0.002	20.5	0.0723	0.252	472	0.118	0.01	0.0007	0.0174	0.06	1.01	0.0006	0.106	0.001	0.00004	0.00116	0.0081	0.279
2	0.5	0.002	25.1	0.215	0.0366	649	0.006	0.01	0.0009	0.0018	0.01	0.9	0.0007	0.102	0.004	0.00004	0.00019	0.0026	0.0003
4	1	0.002	31.6	0.0397	0.31	625	0.0075	0.01	0.00002	0.0115	0.03	0.85	0.00046	0.105	0.0003	0.000005	0.000833	0.0013	0.056
8	2	0.002	44.2	0.0578	0.263	505	0.004	0.01	0.0011	0.0027	0.01	1.62	0.0011	0.13	0.001	0.00003	0.00097	0.0003	0.0119
ANOXIC AGING TEST																			
0	0	0.002	0.339	0.01	0.015	-	0.03	0.01	0.002	0.002	0.1	0.03	0.018	0.0032	0.01	0.003	0.0022	0.003	0.036
4	1	0.002	25.7	0.0728	0.224	432	0.039	0.01	0.0005	0.0628	0.01	1.03	0.0012	0.0824	0.005	0.00004	0.00121	0.0003	0.192
8	2	0.002	32	0.11	0.221	454	0.01	0.01	0.0124	0.0806	0.03	1.18	0.0173	0.0956	0.018	0.0122	0.00785	0.0091	0.108
16	4	0.002	51.8	0.174	0.232	442	0.0034	0.01	0.00002	0.0024	0.002	1.17	0.00742	0.12	0.0666	0.000002	0.00933	0.00003	0.0356
32	8	0.002	62.3	0.143	0.173	490	0.002	0.01	0.0005	0.0021	0.01	1.05	0.0007	0.124	0.007	0.00002	0.00116	0.0014	0.0046

Data red and italicized are
below the detection limit

Doris Central CN Destruct
Residue Aging Tests

Week	Month	Y mg/L	Zn mg/L
OXIC AGING TEST			
0	0	0.0014	<i>0.1</i>
1	0.25	0.00029	<i>0.01</i>
2	0.5	0.00009	0.11
4	1	<i>0.000005</i>	0.001
8	2	0.00001	<i>0.01</i>
ANOXIC AGING TEST			
0	0	0.0014	<i>0.1</i>
4	1	<i>0.00001</i>	<i>0.01</i>
8	2	0.0112	<i>0.01</i>
16	4	0.000004	0.021
32	8	0.00002	<i>0.01</i>

*Data red and italicized are
below the detection limit*

Doris Connector Flotation
Tailings Aging Tests

Week	Month	Sample ID	LIMS	Temp Upon Receipt °C	Immediates (unfiltered)					E _H mV	DO mg/L	pH units	Alkalinity ng/L as CaCO ₃
					pH units	EC uS/cm	EMF mV	EMF Reference mV					
OXIC AGING TEST													
0	0	-	-	-	-	-	-	-	-	-	-	8.12	180
1	0.25	-	-	-	-	-	-	-	-	-	-	8.12	211
2	0.5	-	-	-	-	-	-	-	-	-	-	8.31	202
4	1	-	-	-	-	-	-	-	-	-	-	8.45	200
8	2	-	-	-	-	-	-	-	-	-	-	8.32	233
ANOXIC AGING TEST													
0	0	-	-	-	-	-	-	-	-	-	-	8.12	180
4	1	-	-	-	-	-	-	-	-	-	-	8.15	193
8	2	-	-	-	-	-	-	-	-	-	-	7.96	177
16	4	-	-	-	-	-	-	-	-	-	-	7.97	179
32	8	-	-	-	-	-	-	-	-	-	-	-	-

Data red and italicized are
below the detection limit

Doris Connector Flotation
Tailings Aging Tests

Week	Month	Conductivity uS/cm	HCO ₃ mg/L as CaCO ₃	Carbonate mg/L as CaCO ₃	TDS mg/L	OH mg/L as CaCO ₃	Cl mg/L	F mg/L	SO ₄ mg/L	NO ₂ as N mg/L	NO ₃ as N mg/L	NH3 as N mg/L	TOC mg/L	TIC mg/L	C mg/L	Tot. Reactive P mg/L	CN(T) mg/L	CN _{WAD} mg/L
OXIC AGING TEST																		
0	0	-	-	-	474	-	110	0.25	69.5	0.01	0.01	0.01	-	-	-	-	0.06	0.14
1	0.25	-	-	-	503	-	108	0.1	73.2	0.01	0.01	0.01	31	-		47	-	-
2	0.5	-	-	-	514	-	110	0.21	83.7	0.01	0.01	0.09	12	-		45	-	-
4	1	-	-	-	538	-	114	0.24	97.3	0.03	0.02	0.01	22	-		43	-	-
8	2	-	-	-	574	-	121	0.21	154	0.01	0.32	0.07	10	-		46	-	-
ANOXIC AGING TEST																		
0	0	-	-	-	474	-	110	0.25	69.5	0.01	0.01	0.01	-	-	-	-	0.06	0.14
4	1	-	-	-	512	-	111	0.26	69	0.01	0.01	0.01	26	-		44	-	-
8	2	-	-	-	478	-	106	0.26	66	0.01	0.01	0.01	16	-		39	-	0.06
16	4	-	-	-	448	-	109	0.28	67	0.01	0.01	0.11	23	-		38	-	0.07
32	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Data red and italicized are
below the detection limit

Doris Connector Flotation
Tailings Aging Tests

Week	Month	Filtered Samples																			
		CNO mg/L	CNS mg/L	CN(F) mg/L	(S2O3)2- mg/L	Hg ug/L	Hardness j/L as CaC	Ra 226 Bq/L	Ag ug/L	Al mg/L	As ug/L	Ba ug/L	Be ug/L	B mg/L	Bi mg/L	Ca mg/L	Cd ug/L	Co mg/L	Cr ug/L	Cu ug/L	Fe mg/L
OXIC AGING TEST																					
0	0	0.01	0.1	0.01	0.01	0.1	-	-	0.05	0.05	1.8	5.3	0.1	-	-	27.1	0.02	-	2.7	1.9	0.78
1	0.25	0.01	0.1	-	0.01	0.014	-	-	0.16	0.05	1.6	1.8	0.1	-	-	29.5	0.02	-	3.5	2.7	0.05
2	0.5	0.01	0.1	-	0.01	0.1	-	-	0.05	0.05	2	2.11	0.4	-	-	27.7	0.02	-	6.1	2.9	0.05
4	1	0.01	0.1	-	0.01	0.1	-	-	0.07	0.05	1.9	1.2	0.6	-	-	25.6	-	-	3.5	3.4	0.05
8	2	0.01	0.1	-	0.01	0.014	-	-	0.07	0.05	3.1	2.4	0.5	-	-	23.1	0.02	-	2.7	2.7	0.05
ANOXIC AGING TEST																					
0	0	0.01	0.1	0.01	0.01	0.1	-	-	0.05	0.05	1.8	5.3	0.1	-	-	27.1	0.02	-	2.7	1.9	0.78
4	1	0.01	0.1	-	0.01	0.002	-	-	0.3	0.05	1.5	1.5	0.5	-	-	30.8	0.1	-	4.3	2.4	0.05
8	2	0.01	0.1	0.01	0.01	0.1	-	-	0.05	0.05	1.5	1.3	0.1	-	-	25.5	0.02	-	5.7	1.8	0.093
16	4	0.01	1.71	0.01	0.01	0.1	-	-	0.05	0.05	1.3	1.2	0.1	-	-	23.9	0.02	-	1.7	2.3	0.127
32	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Data red and italicized are
below the detection limit

Doris Connector Flotation
Tailings Aging Tests

Week	Month	K mg/L	Li mg/L	Mg mg/L	Mn mg/L	Mo ug/L	Na mg/L	Ni ug/L	P mg/L	Pb ug/L	Sb ug/L	Se ug/L	Si mg/L	Sn mg/L	Sr ug/L	Ti mg/L	Tl ug/L	U ug/L	V mg/L	W mg/L
OXIC AGING TEST																				
0	0	22.2	-	16	0.064	107	114	3.9	1.39	0.2	0.38	3.4	0.81	-	93	-	0.03	0.1	-	-
1	0.25	26.7	-	19	0.038	128	114	2.6	1.65	0.1	0.73	3.8	1.78	-	111	-	0.03	0.1	-	-
2	0.5	27.3	-	20.7	0.022	134	119	2.7	0.9	0.4	1.17	4.1	1.52	-	114	-	0.21	0.1	-	-
4	1	30.2	-	25.2	0.022	147	166	1.5	0.88	0.2	0.94	3.5	0.63	-	117	-	0.18	0.1	-	-
8	2	23.1	-	25	0.025	147	111	2.3	1.36	0.3	0.76	7.5	2.04	-	105	-	0.16	0.1	-	-
ANOXIC AGING TEST																				
0	0	22.2	-	16	0.064	107	114	3.9	1.39	0.2	0.38	3.4	0.81	-	93	-	0.03	0.1	-	-
4	1	22.2	-	18.4	0.05	117	140	2.2	0.97	0.1	0.48	3	0.05	-	115	-	0.15	0.1	-	-
8	2	22.6	-	16.5	0.033	128	120	1.9	1.32	0.1	0.36	3.8	2.16	-	102	-	0.03	0.1	-	-
16	4	20.2	-	16.3	0.016	129	116	1.2		0.1	0.29	3.1	2.49	-	84	-	0.03	0.1	-	-
32	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Data red and italicized are
below the detection limit

Doris Connector Flotation
Tailings Aging Tests

Week	Month	Y mg/L	Zn mg/L
OXIC AGING TEST			
0	0	-	0.0098
1	0.25	-	<i>0.002</i>
2	0.5	-	0.012
4	1	-	0.019
8	2	-	0.006
ANOXIC AGING TEST			
0	0	-	0.0098
4	1	-	0.039
8	2	-	0.031
16	4	-	0.082
32	8	-	-

*Data red and italicized are
below the detection limit*

Doris Connector Mixed
Tailings Aging Tests

Immediates (unfiltered)													
Week	Month	Sample ID	LIMS	Temp Upon Receipt °C	pH units	EC uS/cm	EMF mV	EMF Reference mV	E _H mV	DO mg/L	pH units	Alkalinity ng/L as CaCO ₃	
OXIC AGING TEST													
0	0	-	-	-	-	-	-	-	210	-	8.1	372	
1	0.25	-	-	-	-	-	-	-	-	-	8	228	
2	0.5	-	-	-	-	-	-	-	-	-	8.26	211	
4	1	-	-	-	-	-	-	-	-	-	8.16	187	
8	2	-	-	-	-	-	-	-	45	-	7.72	156	
ANOXIC AGING TEST													
0	0	-	-	-	-	-	-	-	210	-	8.1	372	
4	1	-	-	-	-	-	-	-	98	-	8.26	198	
8	2	-	-	-	-	-	-	-	112	-	7.92	186	
16	4	-	-	-	-	-	-	-	-	-	8.09	141	
32	8	-	-	-	-	-	-	-	-	-	8.61	145	

Data red and italicized are
below the detection limit

Doris Connector Mixed
Tailings Aging Tests

Week	Month	Conductivity uS/cm	HCO ₃ mg/L as CaCO ₃	Carbonate mg/L as CaCO ₃	TDS mg/L	OH mg/L as CaCO ₃	Cl mg/L	F mg/L	SO ₄ mg/L	NO ₂ as N mg/L	NO ₃ as N mg/L	NH3 as N mg/L	TOC mg/L	TIC mg/L	C mg/L	Tot. Reactive P mg/L	CN(T) mg/L	CN _{WAD} mg/L	CNO mg/L	
OXIC AGING TEST																				
0	0	-	-	-	2130	-	90	0.1	1102	0.01	0.92	4.7	-	-	-	-	1.6	0.01	57	
1	0.25	-	-	-	2030	-	94	0.15	1060	0.01	0.24	12.4	14	-		51	-	0.01	0.01	60
2	0.5	-	-	-	2150	-	104	0.17	1343	0.01	0.32	28.7	16	-		48	-	0.26	0.01	58.7
4	1	-	-	-	2260	-	102	0.16	1230	0.01	0.11	15.9	11	-		46	-	0.1	0.01	35.4
8	2	-	-	-	2290	-	112	3.3	1596	0.01	0.17	20	12	-		31	-	0.01	0.01	0.01
ANOXIC AGING TEST																				
0	0	-	-	-	2130	-	90	0.1	1102	0.01	0.92	4.7		-	-	-	1.6	0.01	57	
4	1	-	-	-	1960	-	94	0.14	1070	0.01	0.01	3.47	18	-		55	-	1.77	0.01	75
8	2	-	-	-	2060	-	104	0.57	1182	0.01	0.01	6.4	18	-		50	-	1.37	0.01	52.6
16	4	-	-	-	2000	-	99	0.18	1200	0.01	0.01	9	19	-		42	-	0.54	0.02	43.3
32	8	-	-	-	1850	-	100	0.16	1117	0.01	0.01	15.5	19	-		29	-	0.13	0.01	0.01

Data red and italicized are
below the detection limit

Doris Connector Mixed
Tailings Aging Tests

		Filtered Samples																			
Week	Month	CNS mg/L	CN(F) mg/L	(S2O3)2- mg/L	Hg ug/L	Hardness j/L as CaC	Ra 226 Bq/L	Ag ug/L	Al mg/L	As ug/L	Ba ug/L	Be ug/L	B mg/L	Bi mg/L	Ca mg/L	Cd ug/L	Co mg/L	Cr ug/L	Cu ug/L	Fe mg/L	K mg/L
OXIC AGING TEST																					
0	0	13.4	0.01	6.9	0.1	-	-	0.31	0.59	3	9.8	0.1	-	-	131	0.02	-	5.4	10.6	2.62	42.9
1	0.25	14.3	0.01	0.01	0.079	-	-	0.18	0.05	2.8	6.9	0.5	-	-	103	0.02	-	4.4	14.5	0.42	40.3
2	0.5	15.3	0.01	0.01	0.1	-	-	0.05	0.05	16.5	18.9	0.1	-	-	173	0.02	-	2.1	11.3	0.48	65.4
4	1	0.48	0.01	0.01	0.1	-	-	0.05	0.05	2.9	5.5	0.1	-	-	116	0.02	-	1.4	10.4	0.185	43.5
8	2	0.1	0.03	14	0.1	-	-	0.06	0.05	2.3	4.3	0.1	-	-	132	-	-	1	19.3	0.144	52.3
ANOXIC AGING TEST																					
0	0	13.4	0.01	6.9	0.1	-	-	0.31	0.59	3	9.8	0.1	-	-	131	0.02	-	5.4	10.6	2.62	42.9
4	1	13.9	0.01	0.01	0.1	-	-	0.21	0.05	2.4	6.4	0.1	-	-	127	0.02	-	4	11.8	1.37	35.4
8	2	13.8	0.04	26	0.1	-	-	0.05	0.05	2.2	5.15	0.1	-	-	106	-	-	2.3	13	0.963	41.1
16	4	15.6	0.01	0.01	0.1	-	-	-	0.05	2.1	4.3	0.2	-	-	109	-	-	0.3	8.1	0.55	52.5
32	8	14.3	0.01	0.01	0.1	-	-	1.67	0.05	0.3	4	1	-	-	15.4	-	-	2.6	10	0.05	20.4

Data red and italicized are
below the detection limit

Doris Connector Mixed
Tailings Aging Tests

Week	Month	Li mg/L	Mg mg/L	Mn mg/L	Mo ug/L	Na mg/L	Ni ug/L	P mg/L	Pb ug/L	Sb ug/L	Se ug/L	Si mg/L	Sn mg/L	Sr ug/L	Ti mg/L	Tl ug/L	U ug/L	V mg/L	W mg/L	Y mg/L
OXIC AGING TEST																				
0	0	-	35.3	0.135	122	565	9	1.2	0.3	1.5	4.6	3.1	-	298	-	0.03	0.42	-	-	-
1	0.25	-	38.6	0.136	139	548	10	0.88	0.3	1	5.8	2.34	-	377	-	0.27	0.17	-	-	-
2	0.5	-	64.9	0.197	144	841	6.1	0.64	0.1	1.1	4.5	2.8	-	656	-	2.32	0.14	-	-	-
4	1	-	57.2	0.142	156	633	5.9	1.02	0.1	0.85	5.5	2.09	-	433	-	0.03	0.1	-	-	-
8	2	-	71	0.111	98	603	5.1	0.98	0.1	0.2	6.3	5.2	-	446	-	0.03	0.1	-	-	-
ANOXIC AGING TEST																				
0	0	-	35.3	0.135	122	565	9	1.2	0.3	1.5	4.6	3.1	-	298	-	0.03	0.42	-	-	-
4	1	-	39.7	0.151	159	605	6.7	1.02	0.1	0.74	6.6	1.71	-	420	-	0.03	0.1	-	-	-
8	2	-	37.8	0.158	135	569	5.6	0.71	0.1	0.47	6	3.8	-	362	-	0.03	0.1	-	-	-
16	4	-	44.5	0.082	129	676	3.2	0.1	0.1	0.22	5.3	3.2	-	269	-	0.03	0.1	-	-	-
32	8	-	11.4	0.025	149	72	0.07	1.4	0.1	0.2	0.2	2.3	-	255	-	0.03	0.1	-	-	-

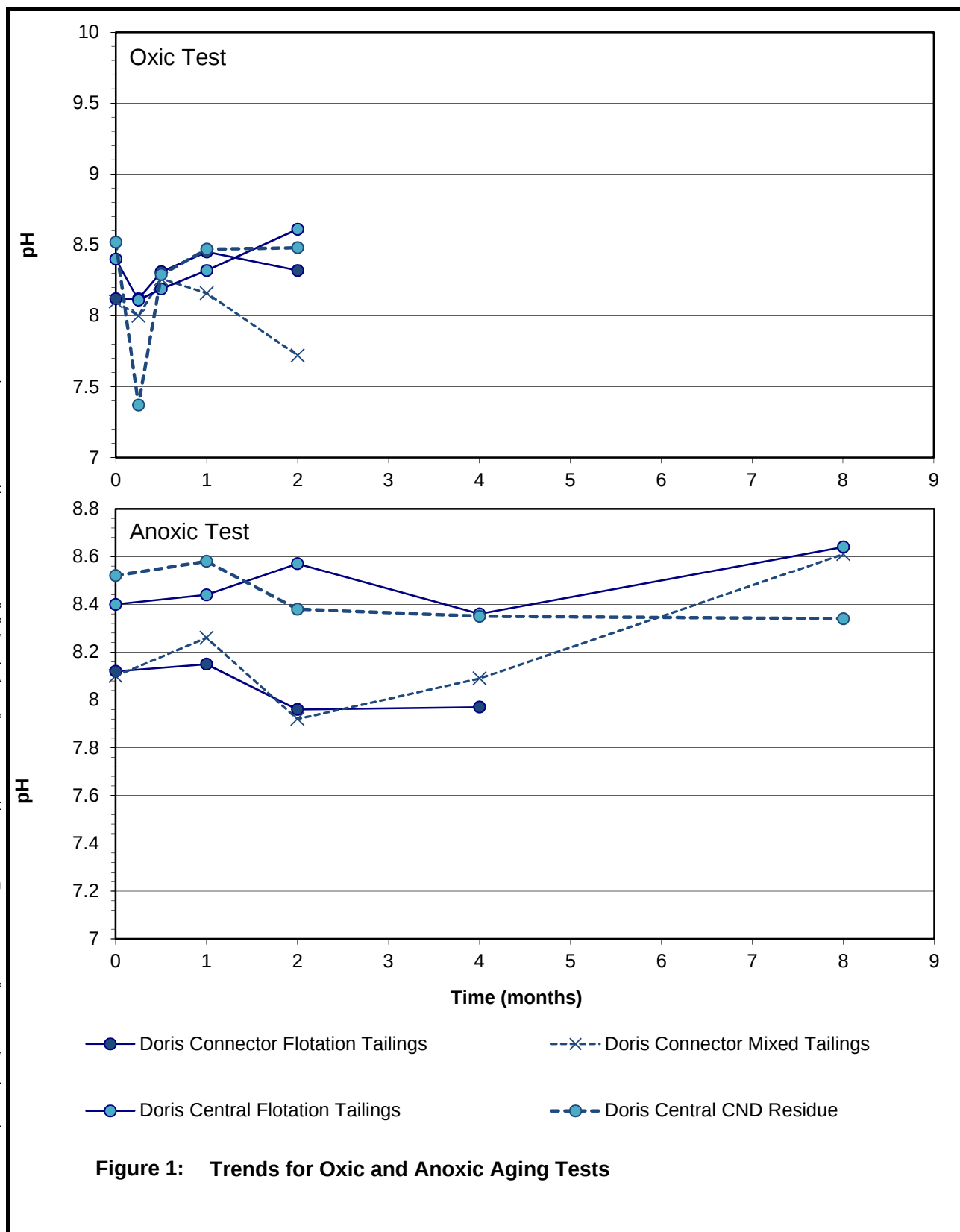
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Doris Connector Mixed
Tailings Aging Tests

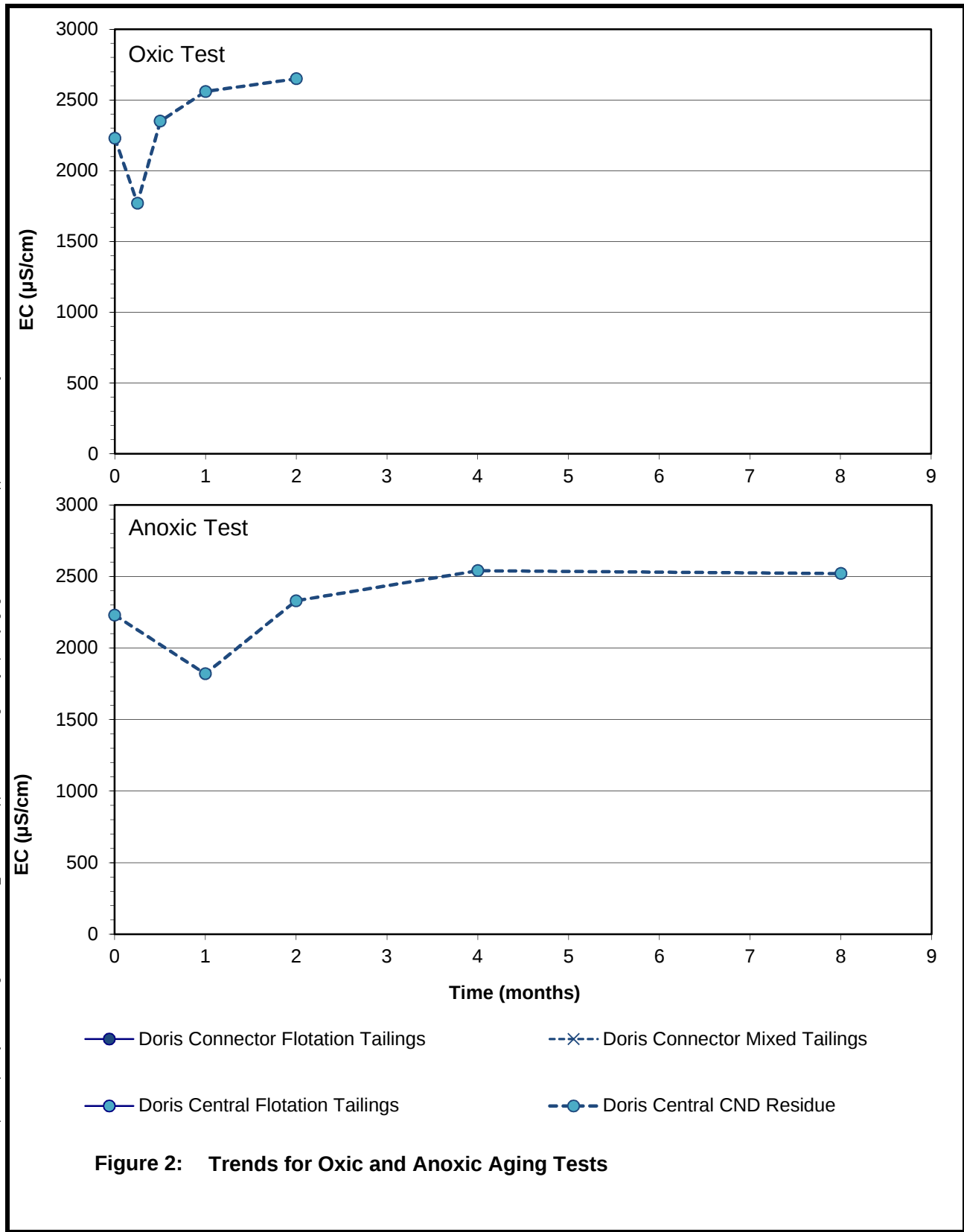
Week	Month	Zn mg/L
OXIC AGING TEST		
0	0	0.043
1	0.25	0.017
2	0.5	0.047
4	1	0.165
8	2	0.032
ANOXIC AGING TEST		
0	0	0.043
4	1	0.04
8	2	0.037
16	4	0.045
32	8	0.077

*Data red and italicized are
below the detection limit*

Appendix M – Figures, Aging Tests



SRK Consulting, 4/13/15



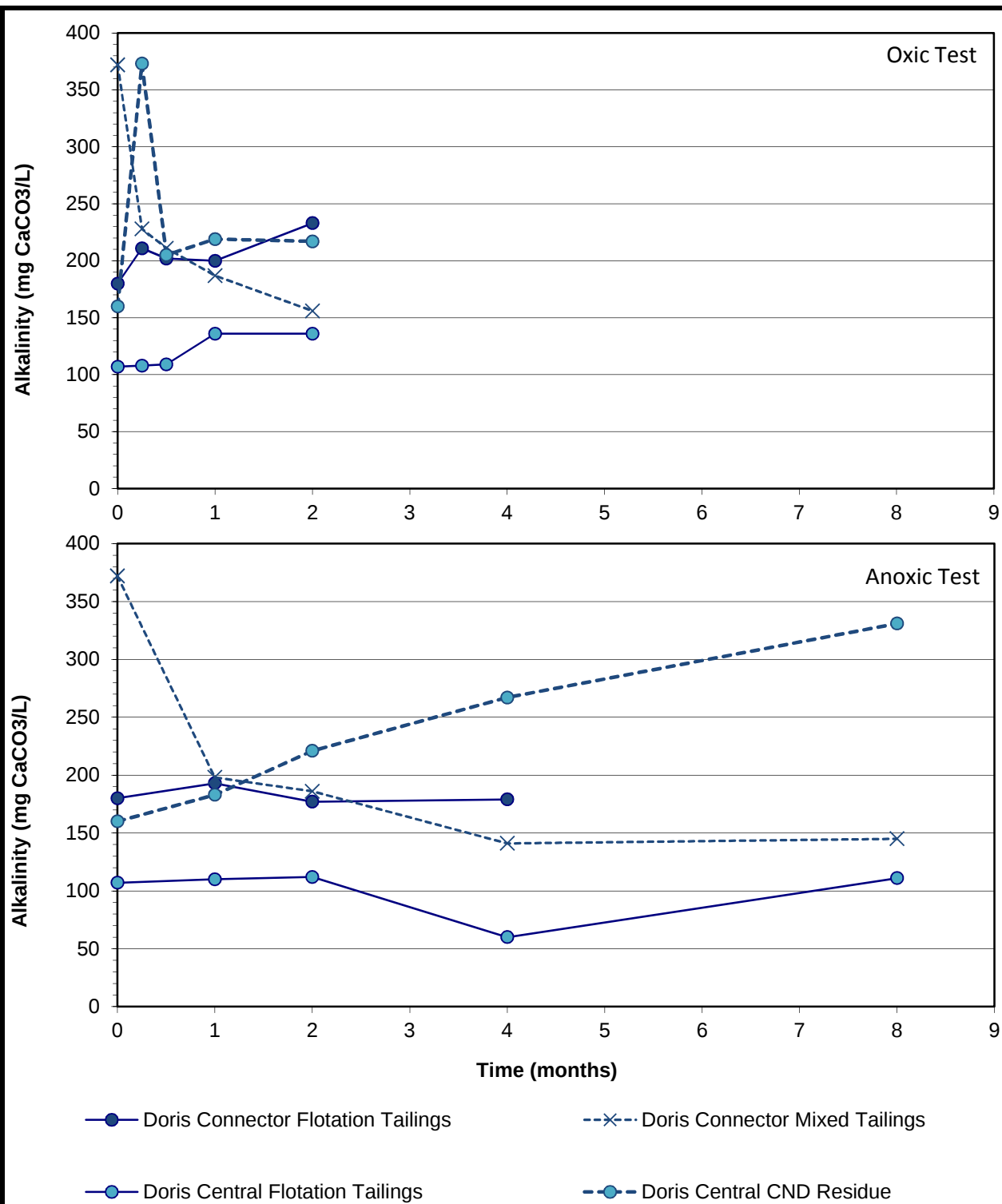


Figure 3: Trends for Oxidic and Anoxic Aging Tests

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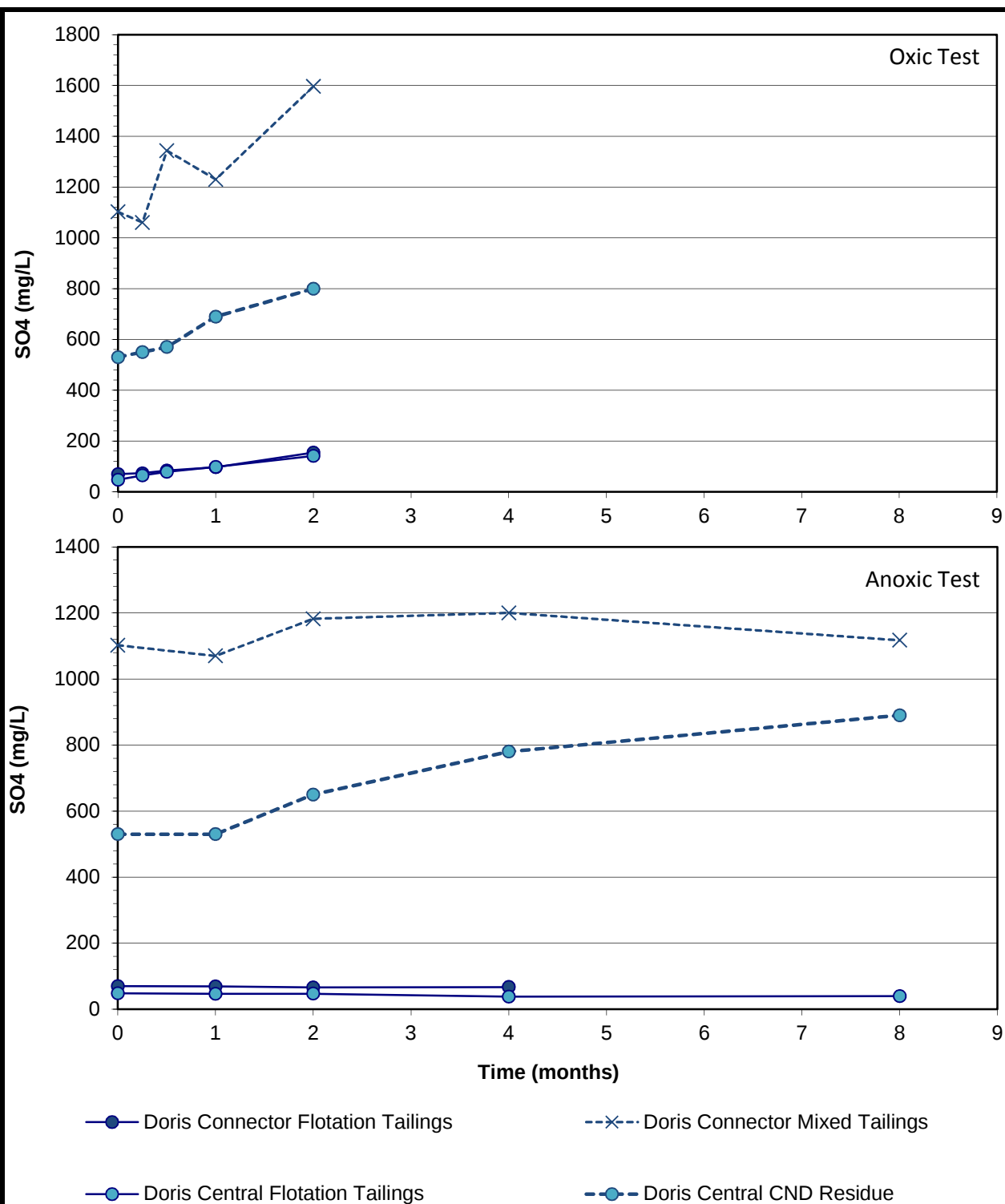
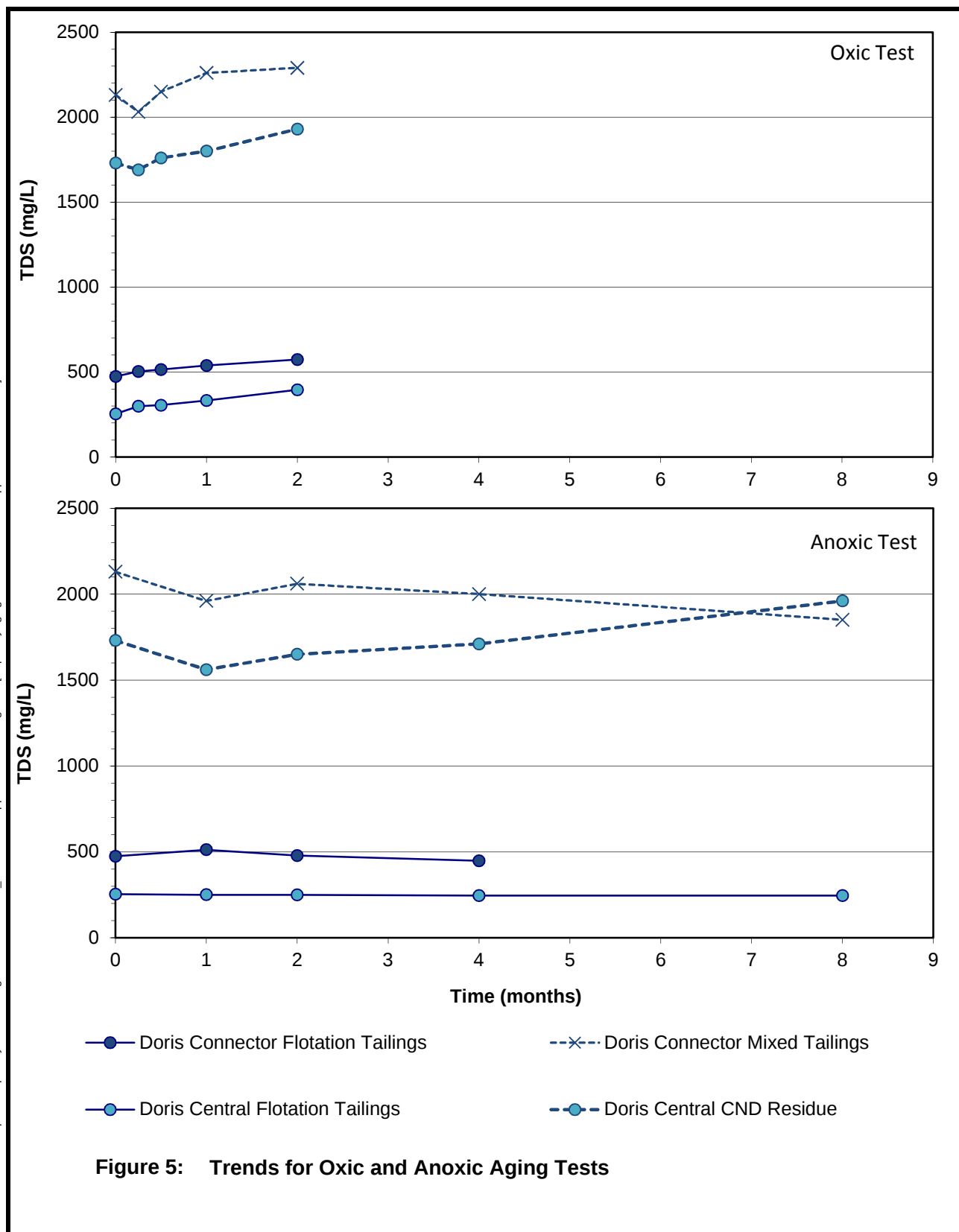
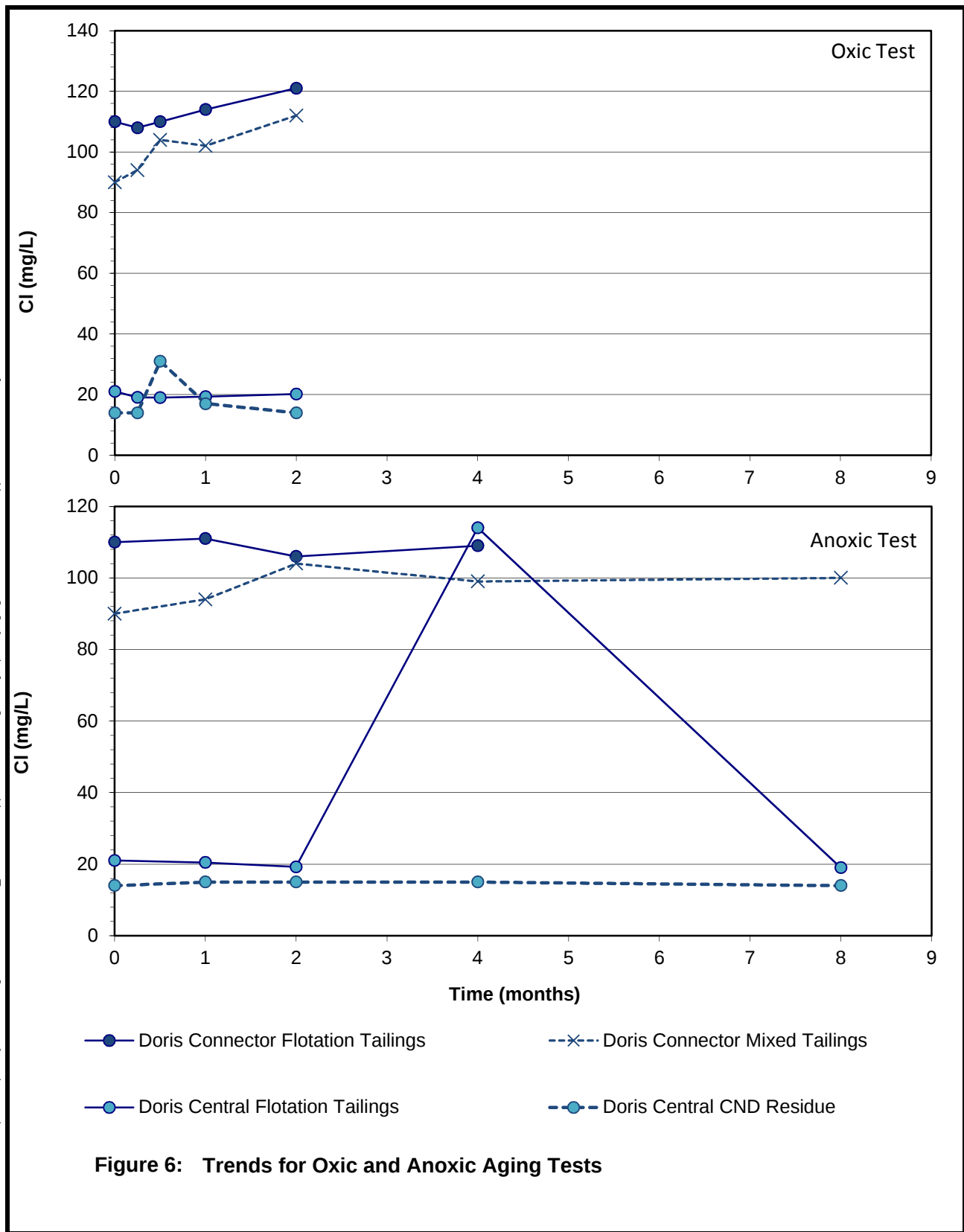


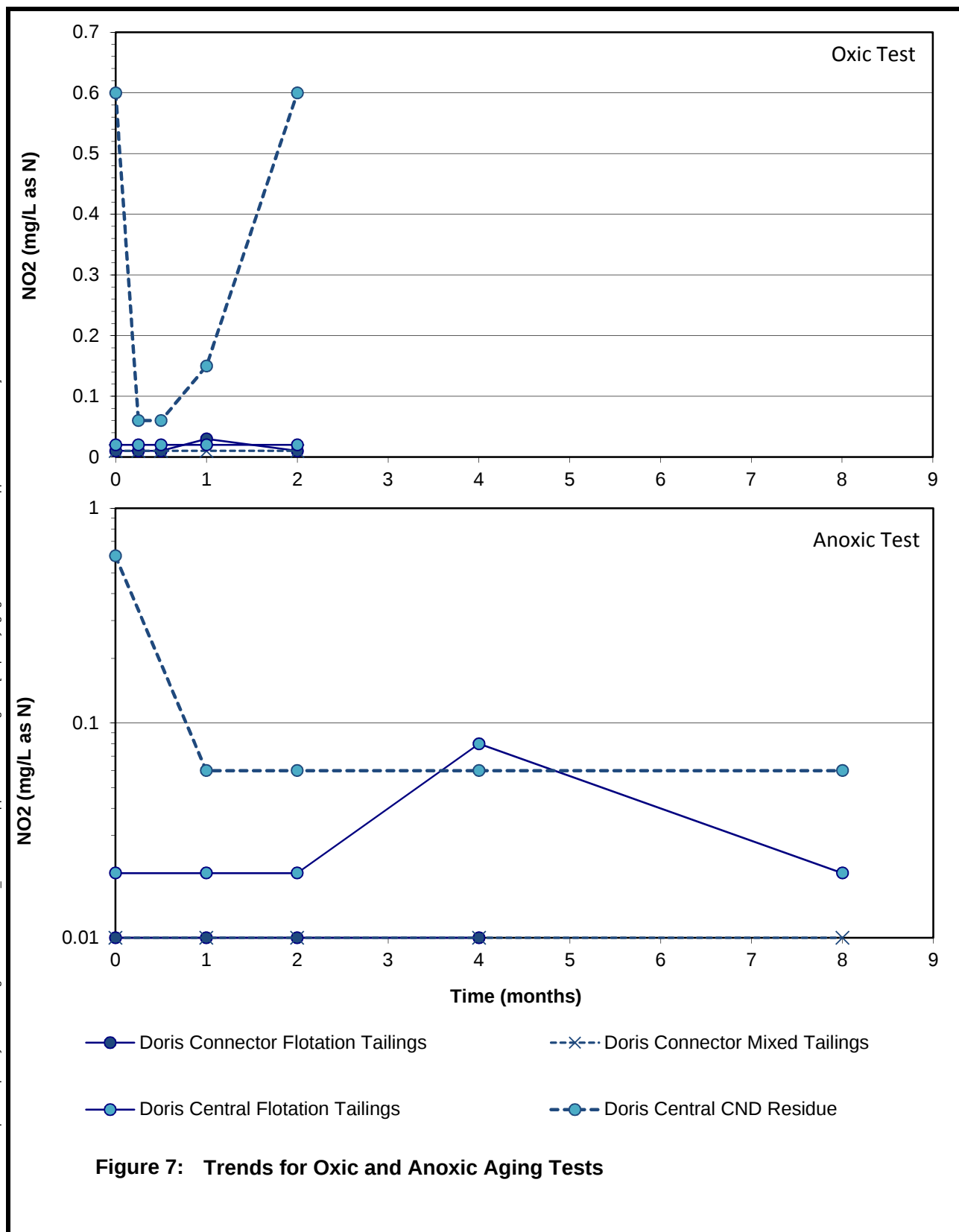
Figure 4: Trends for Oxidic and Anoxic Aging Tests



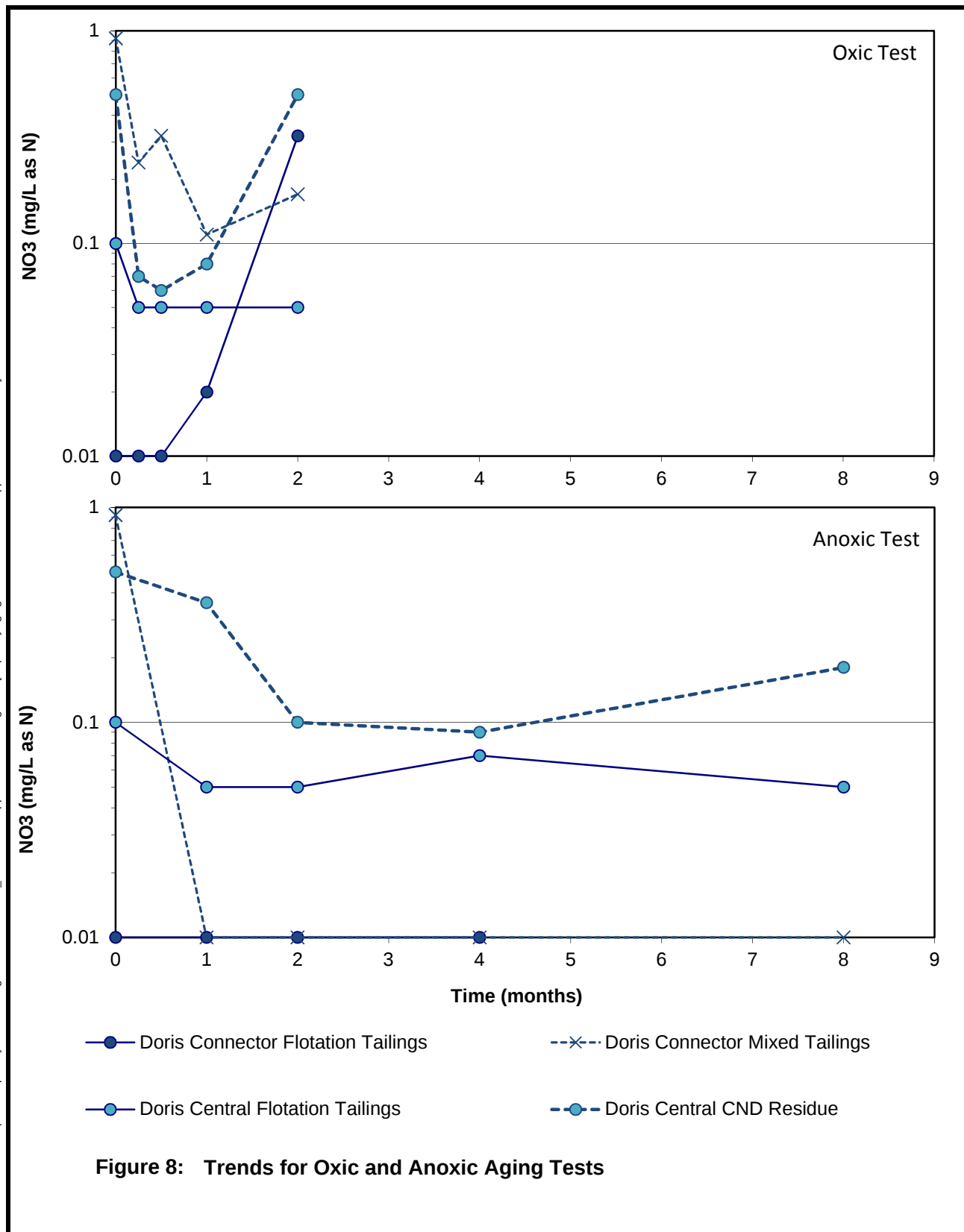
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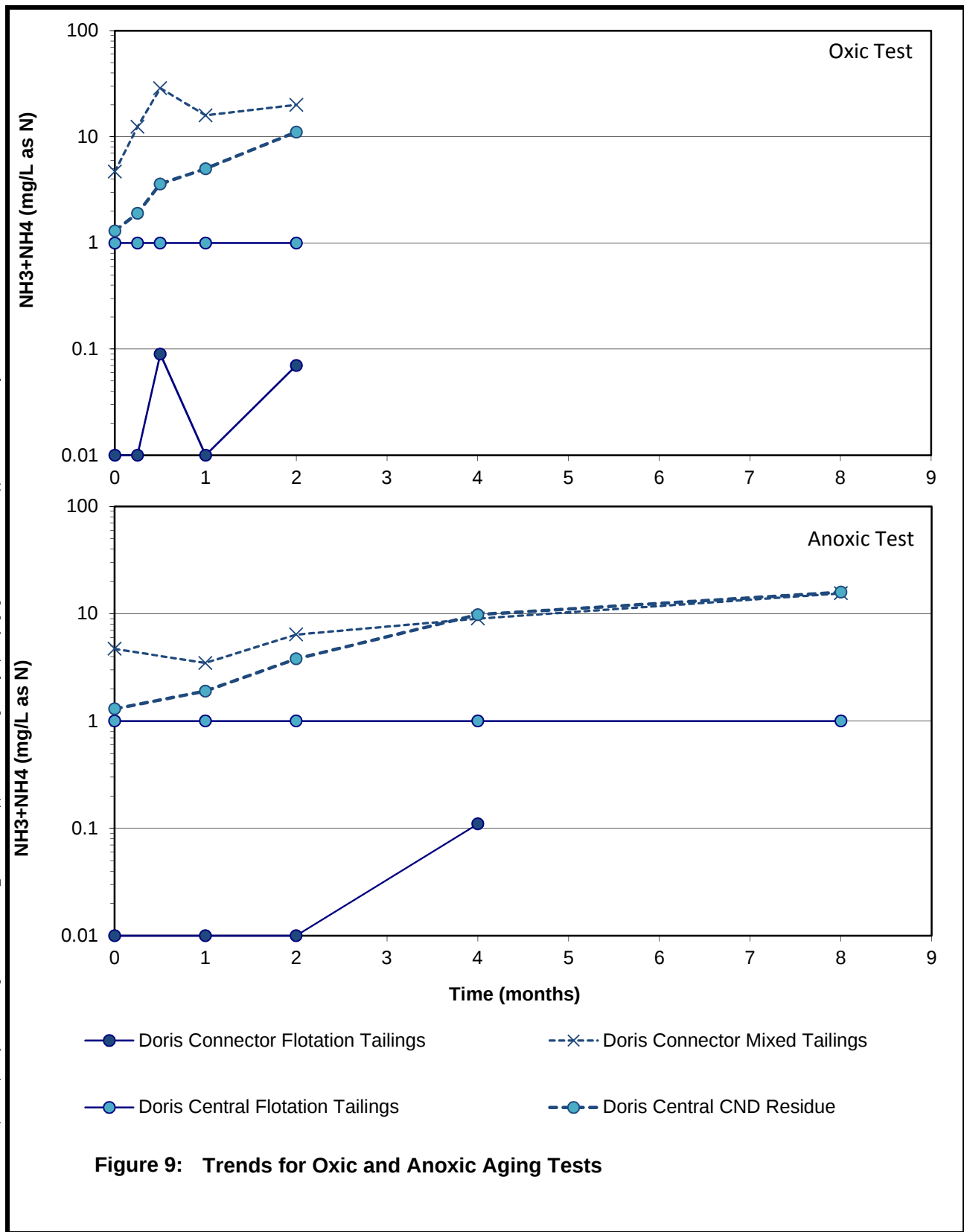
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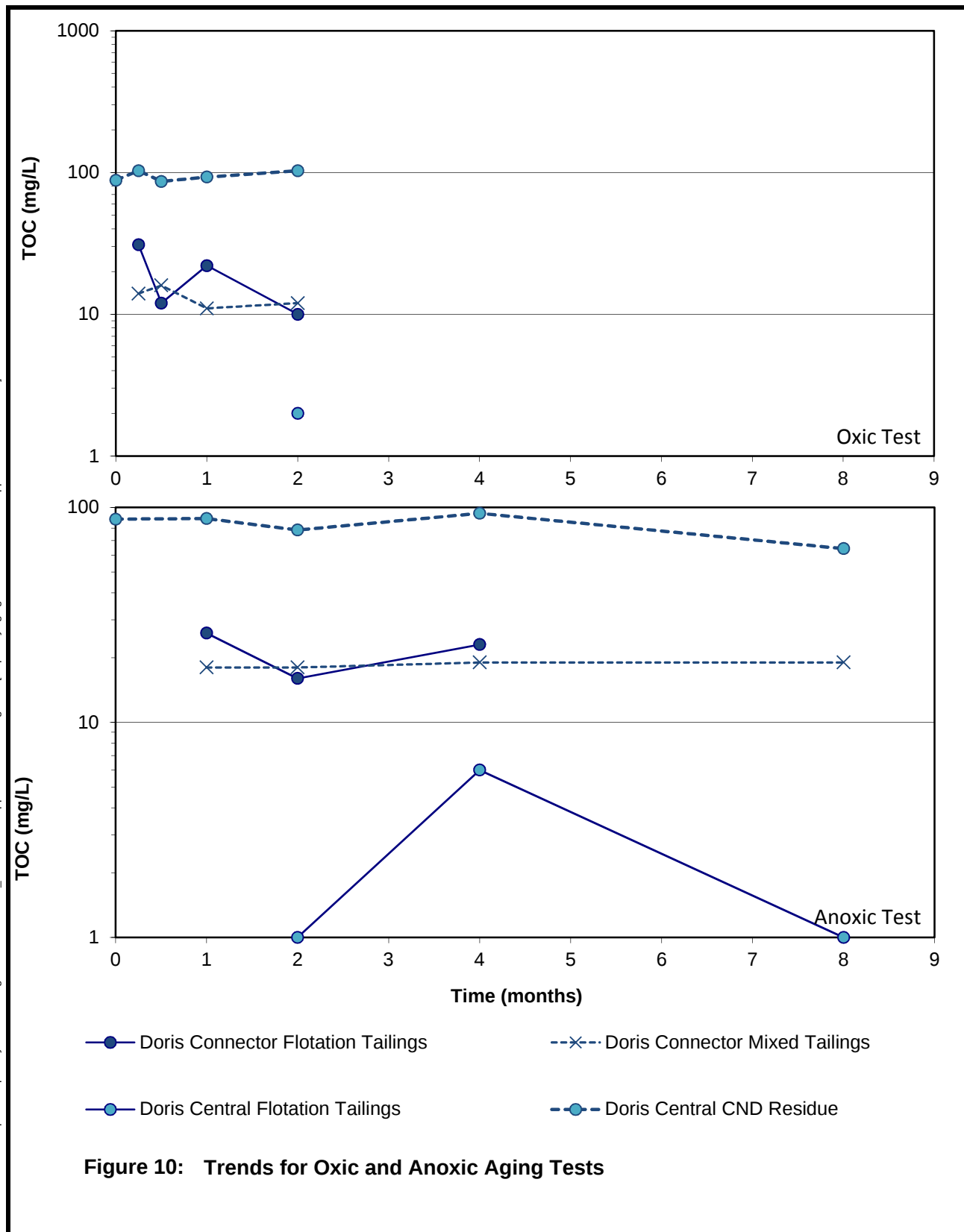


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SRK Consulting, 4/13/15





SRK Consulting, 4/13/15

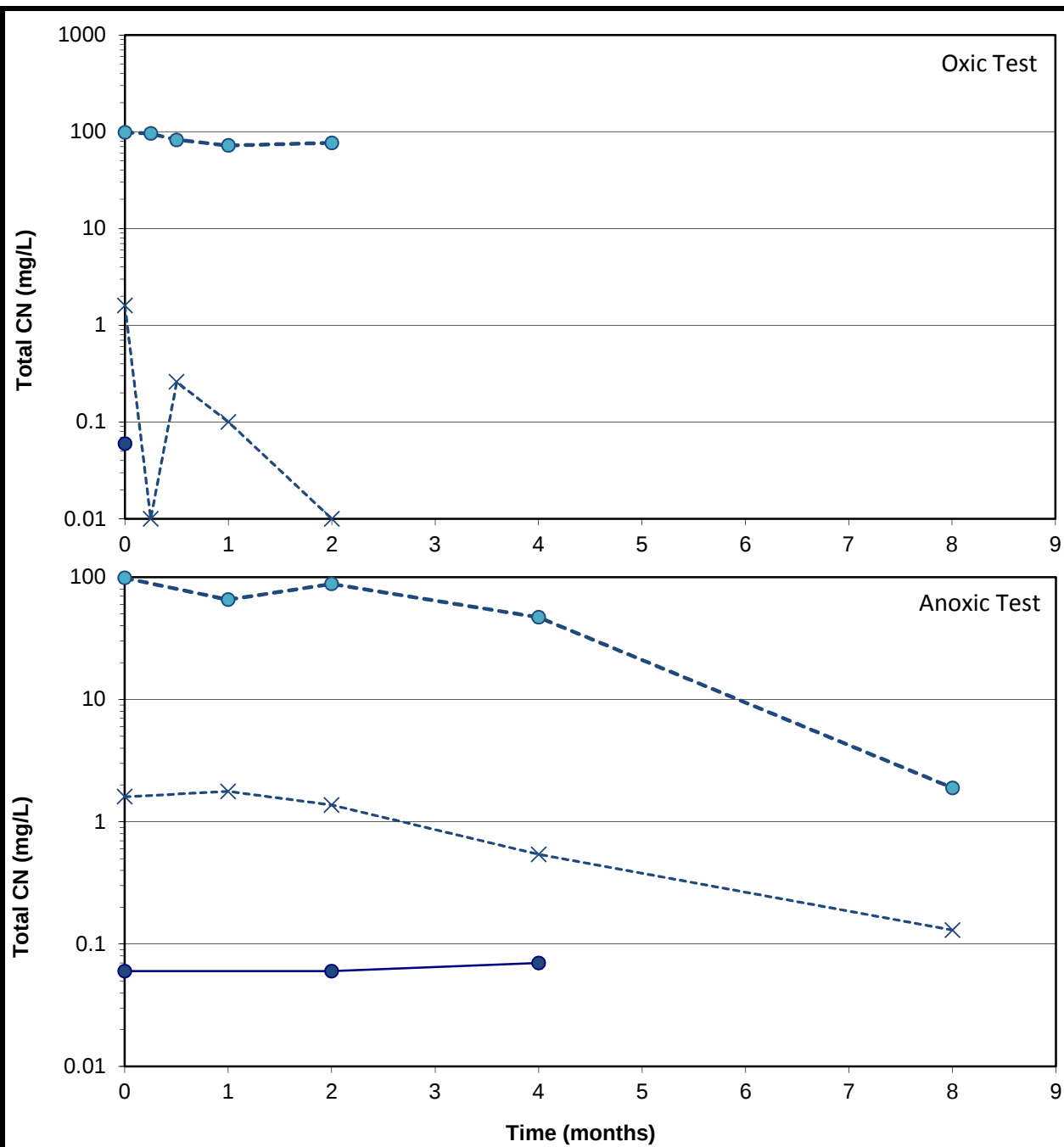
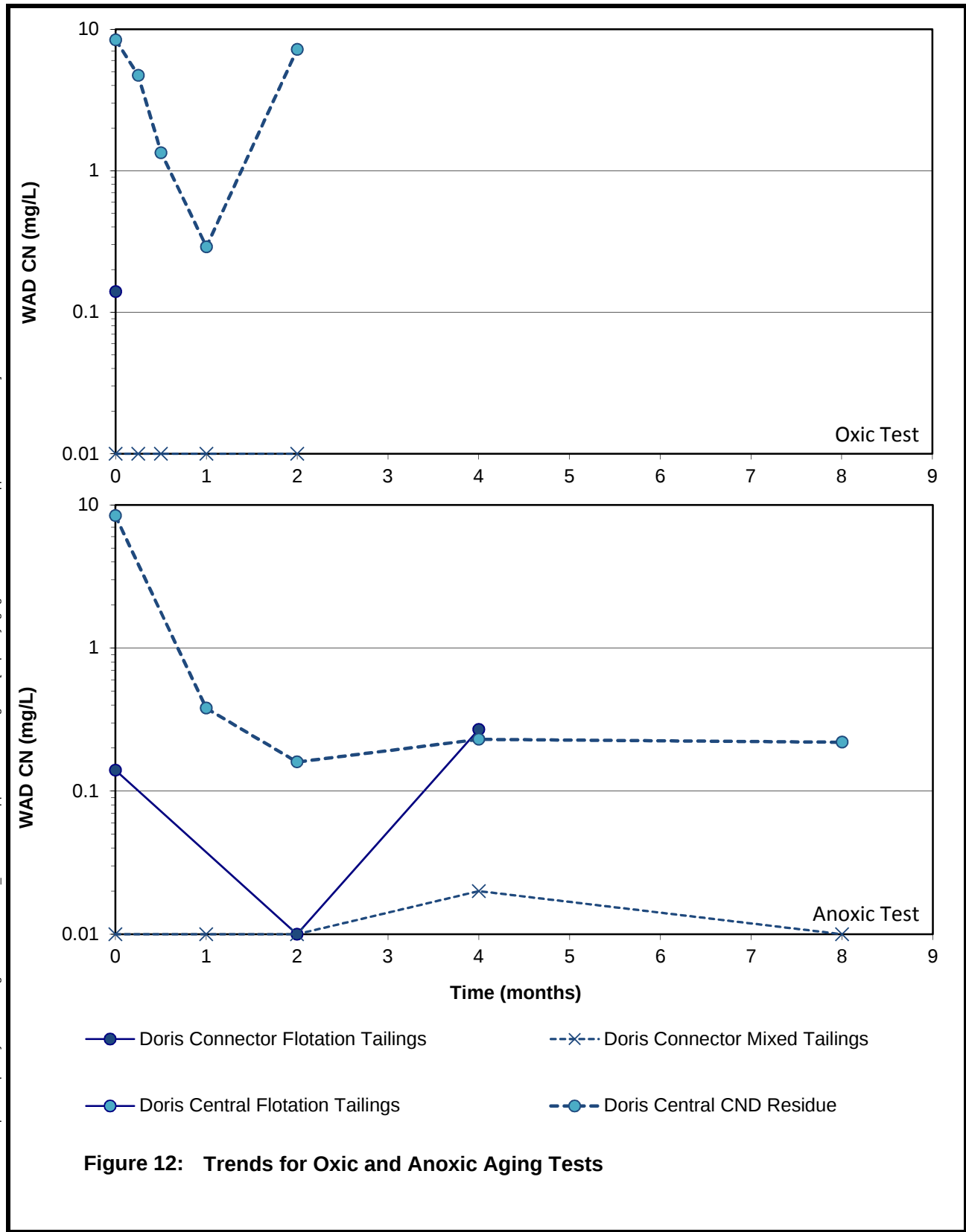
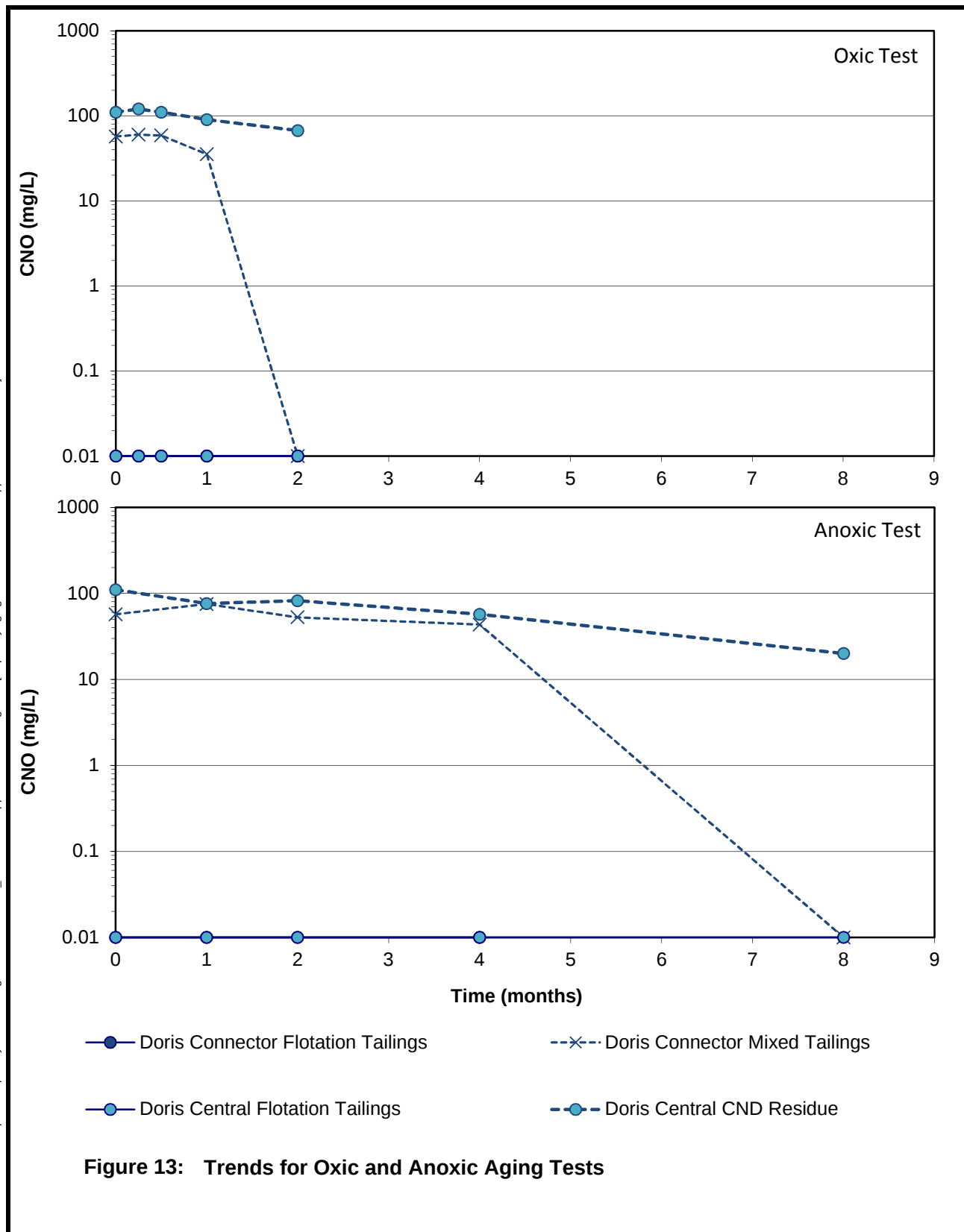


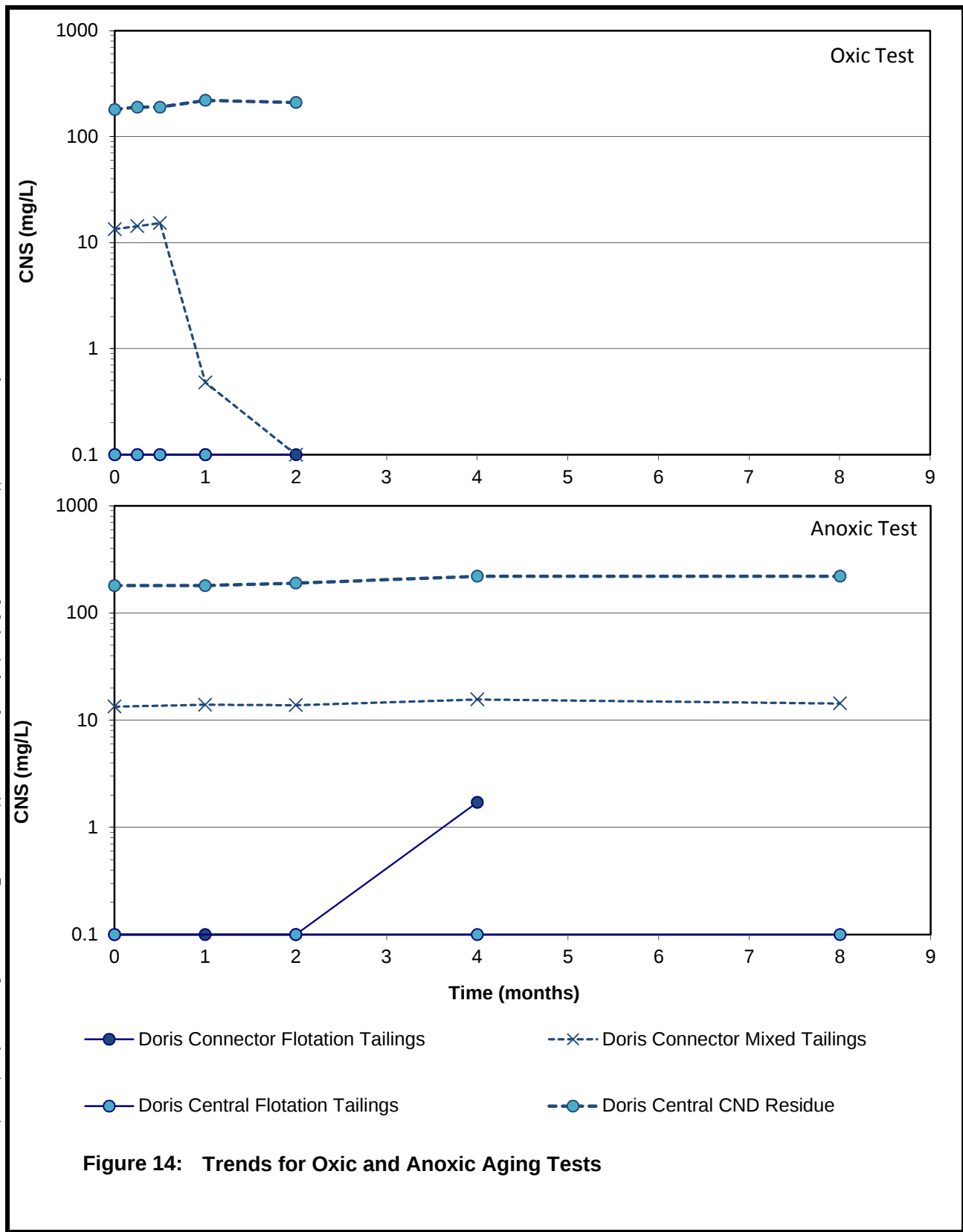
Figure 11: Trends for Oxic and Anoxic Aging Tests



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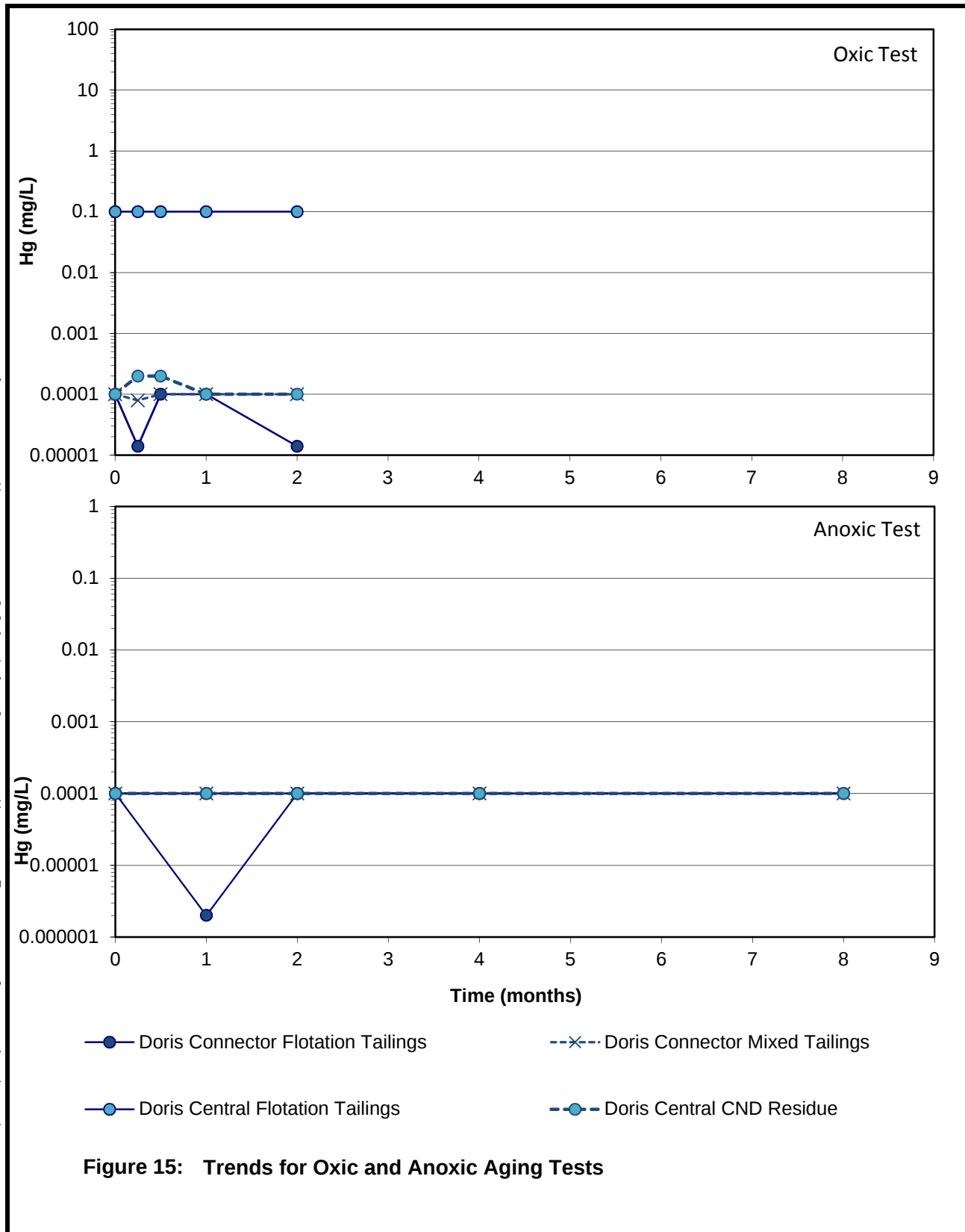


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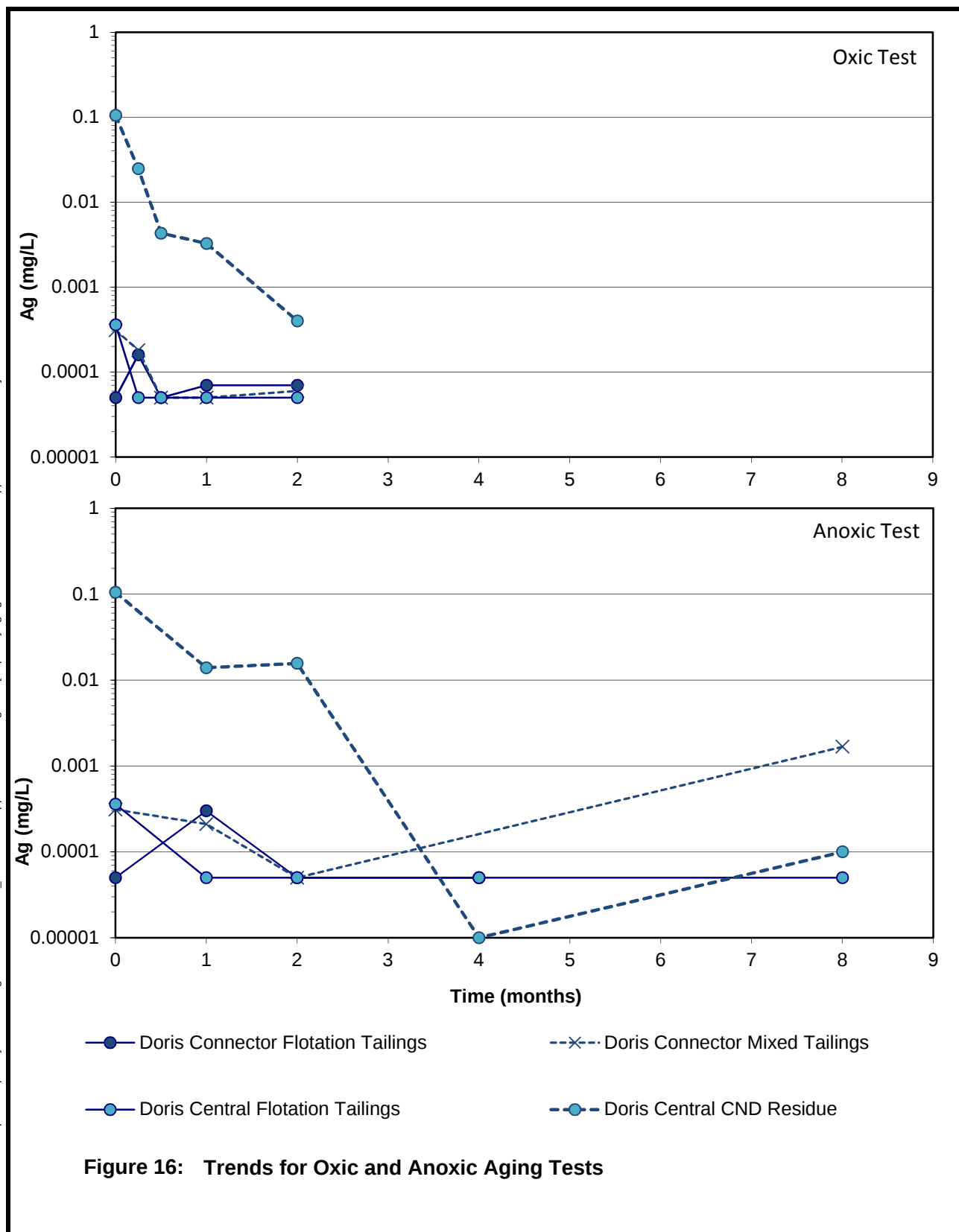


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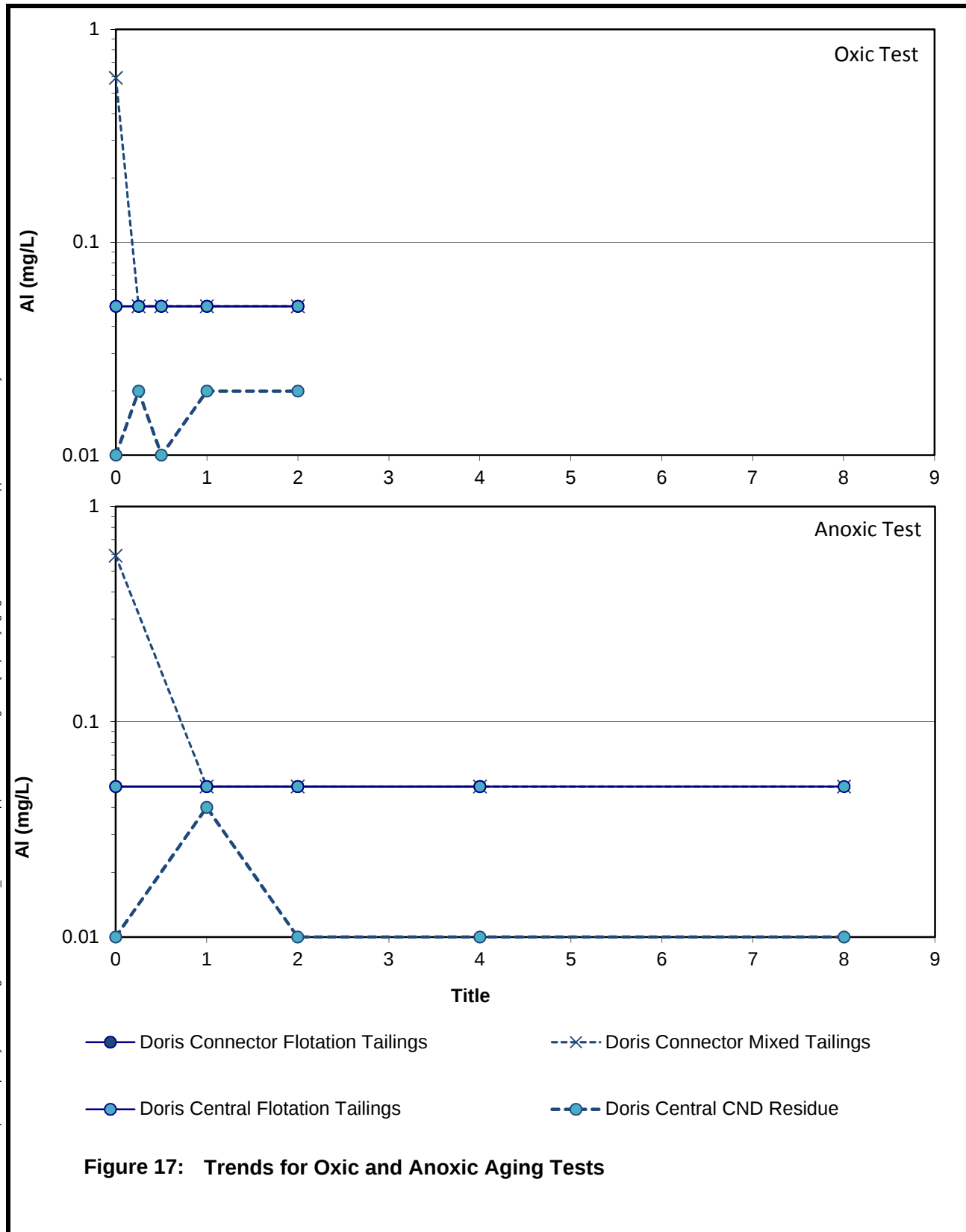
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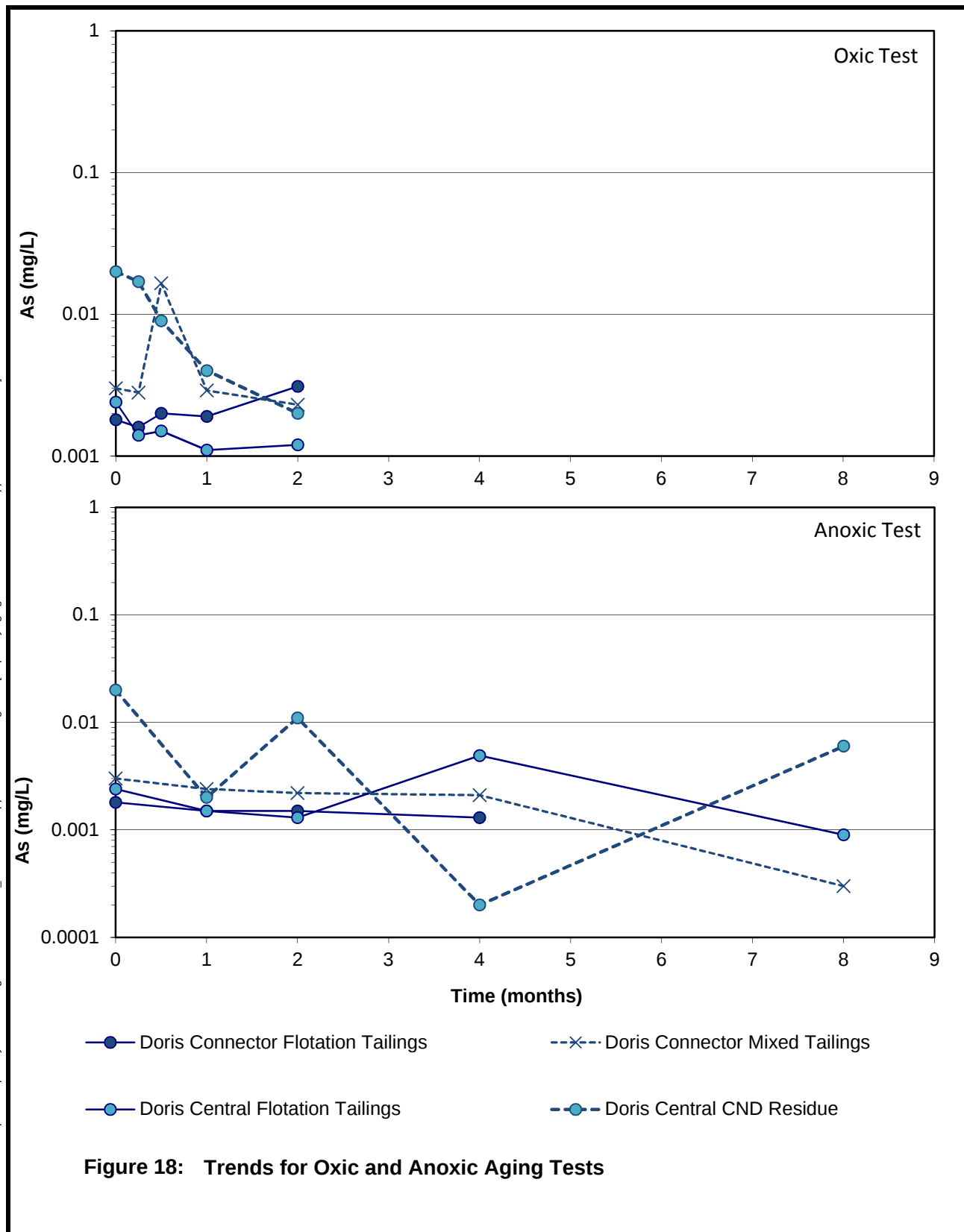
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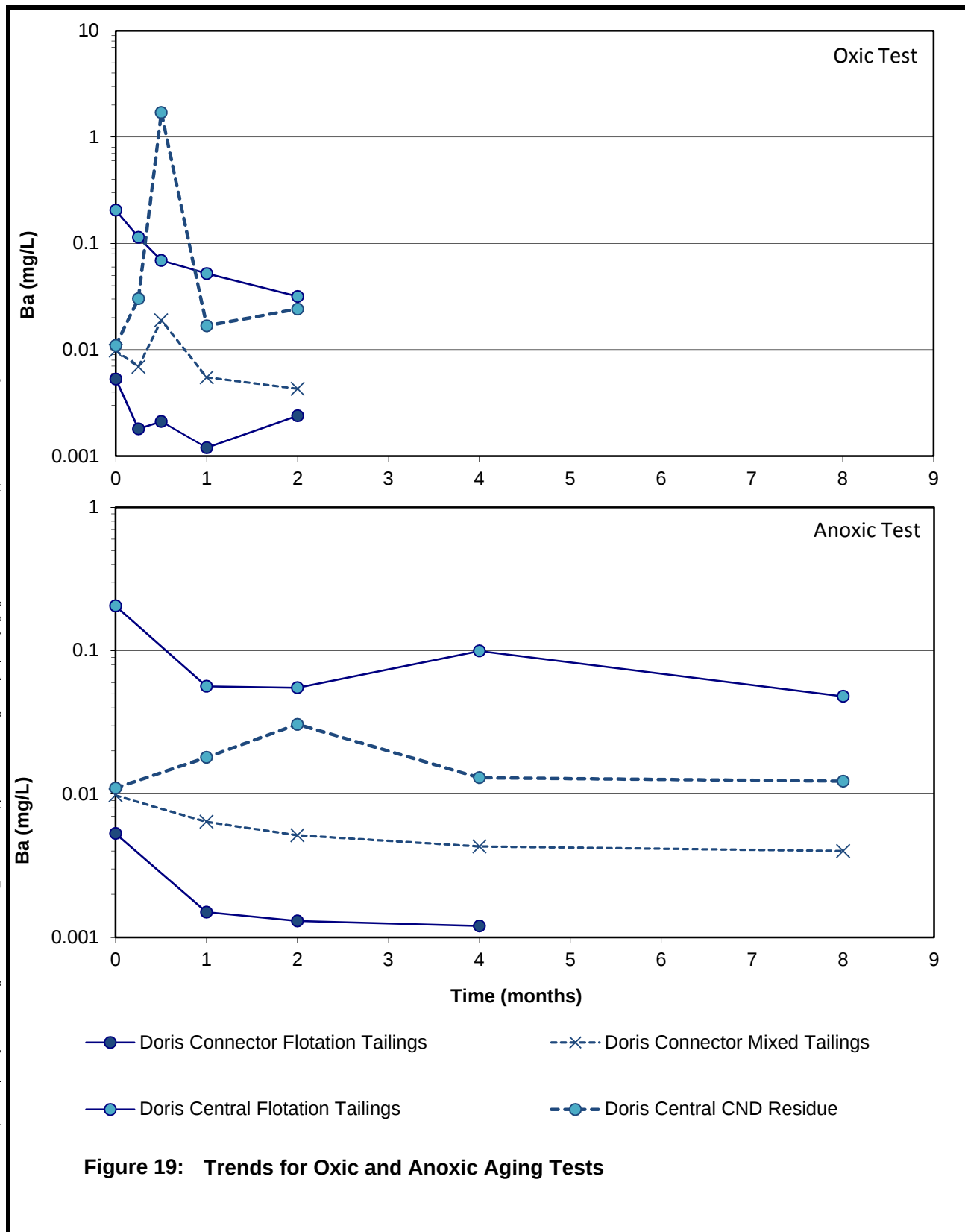
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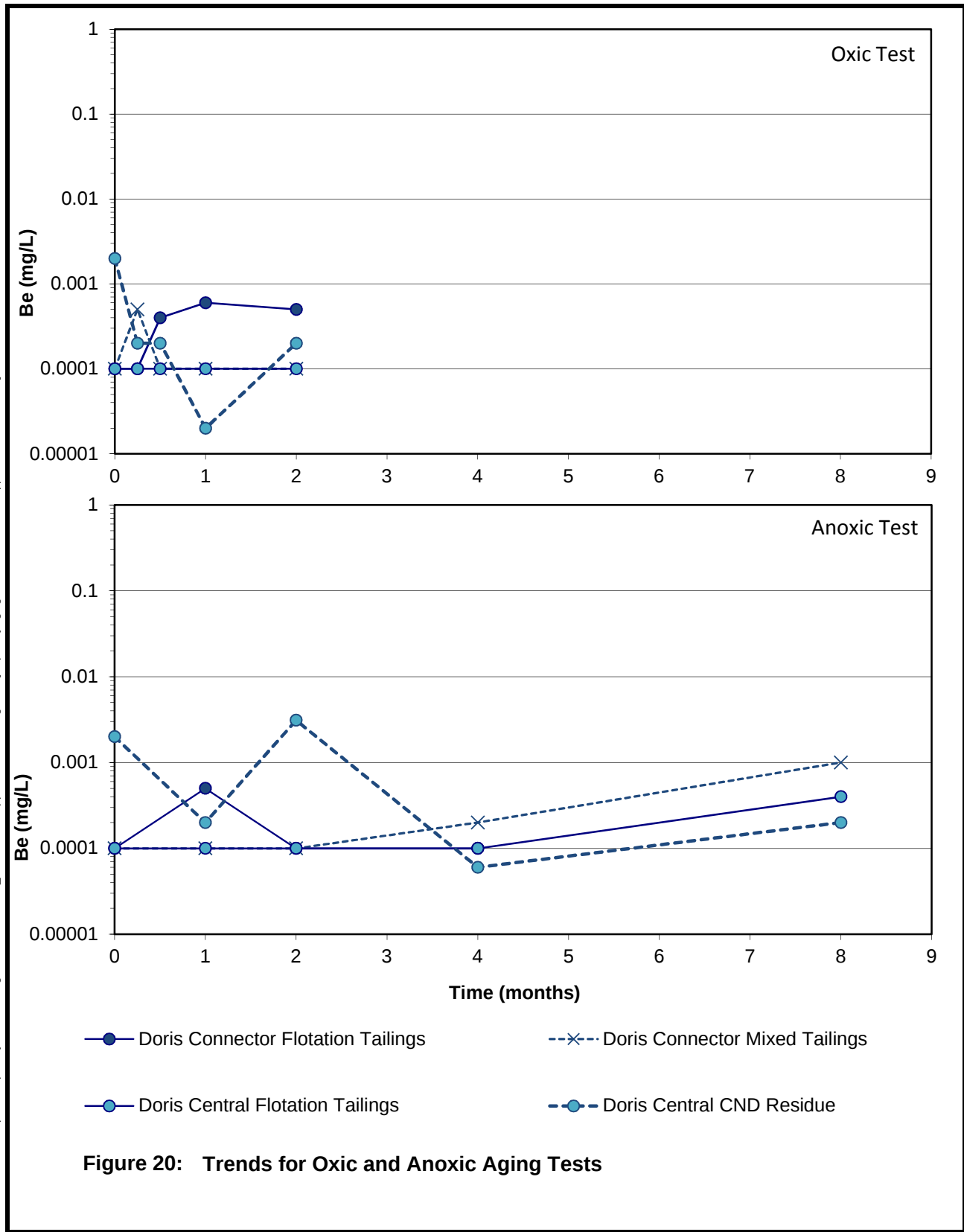
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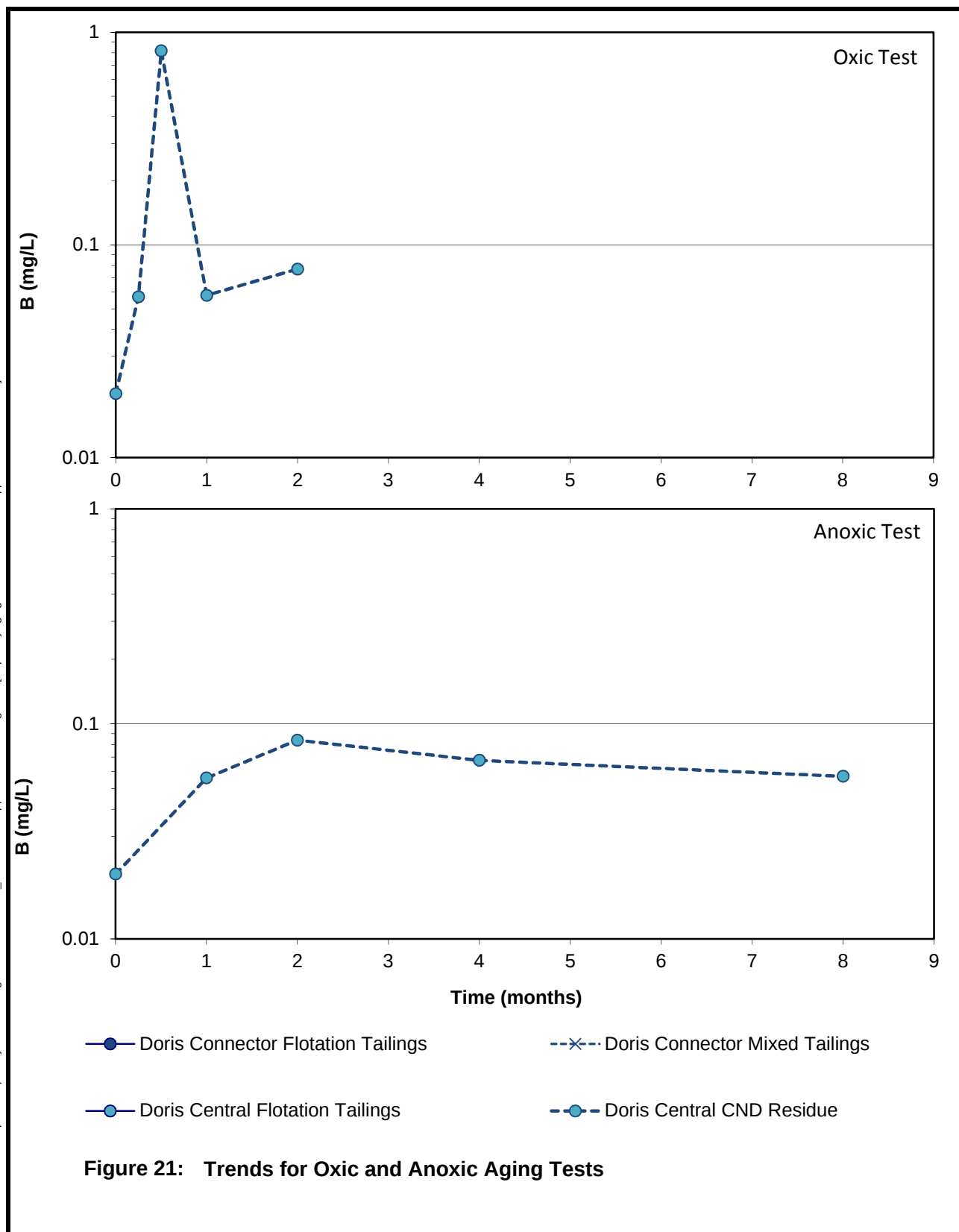


SRK Consulting, 4/13/15



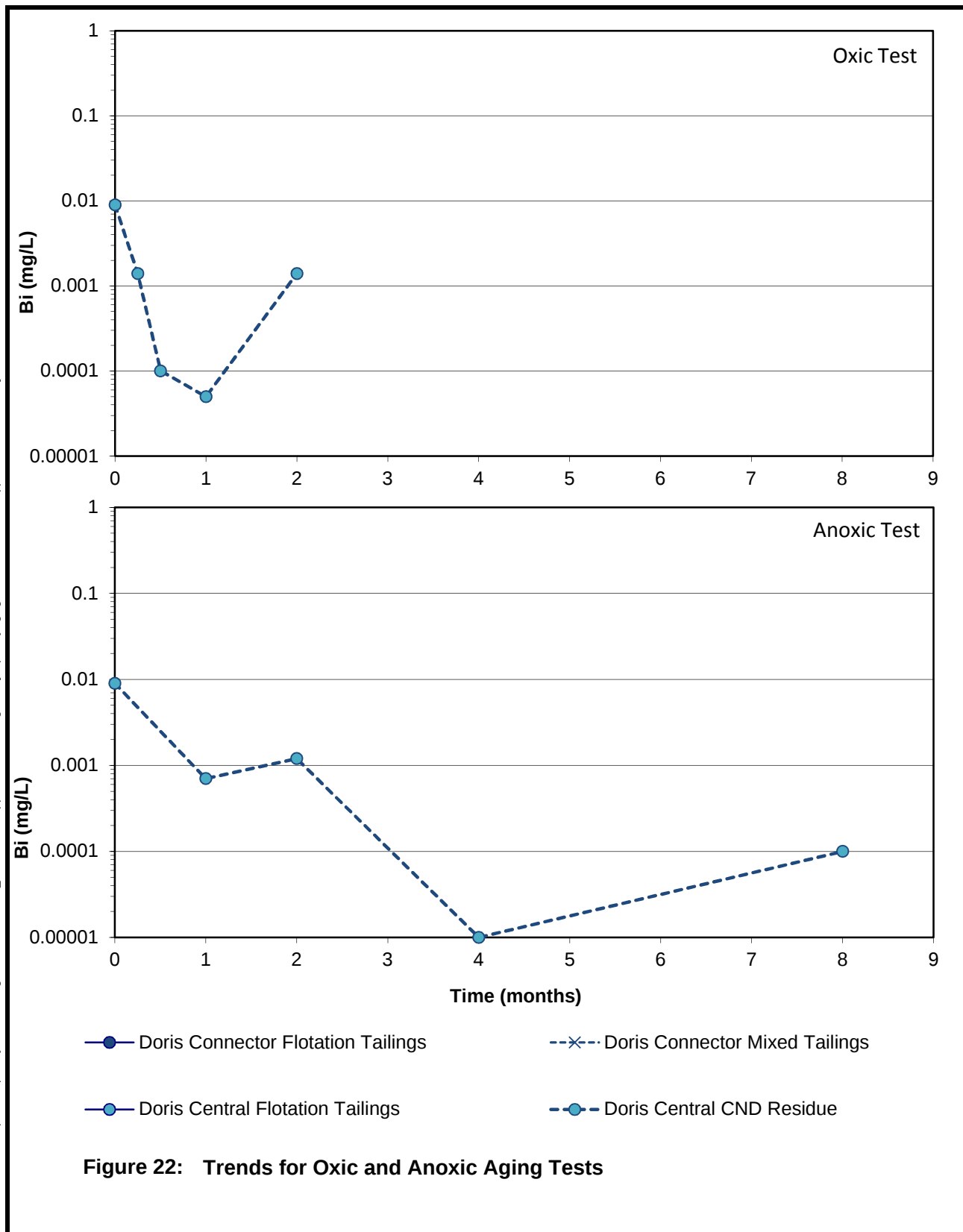
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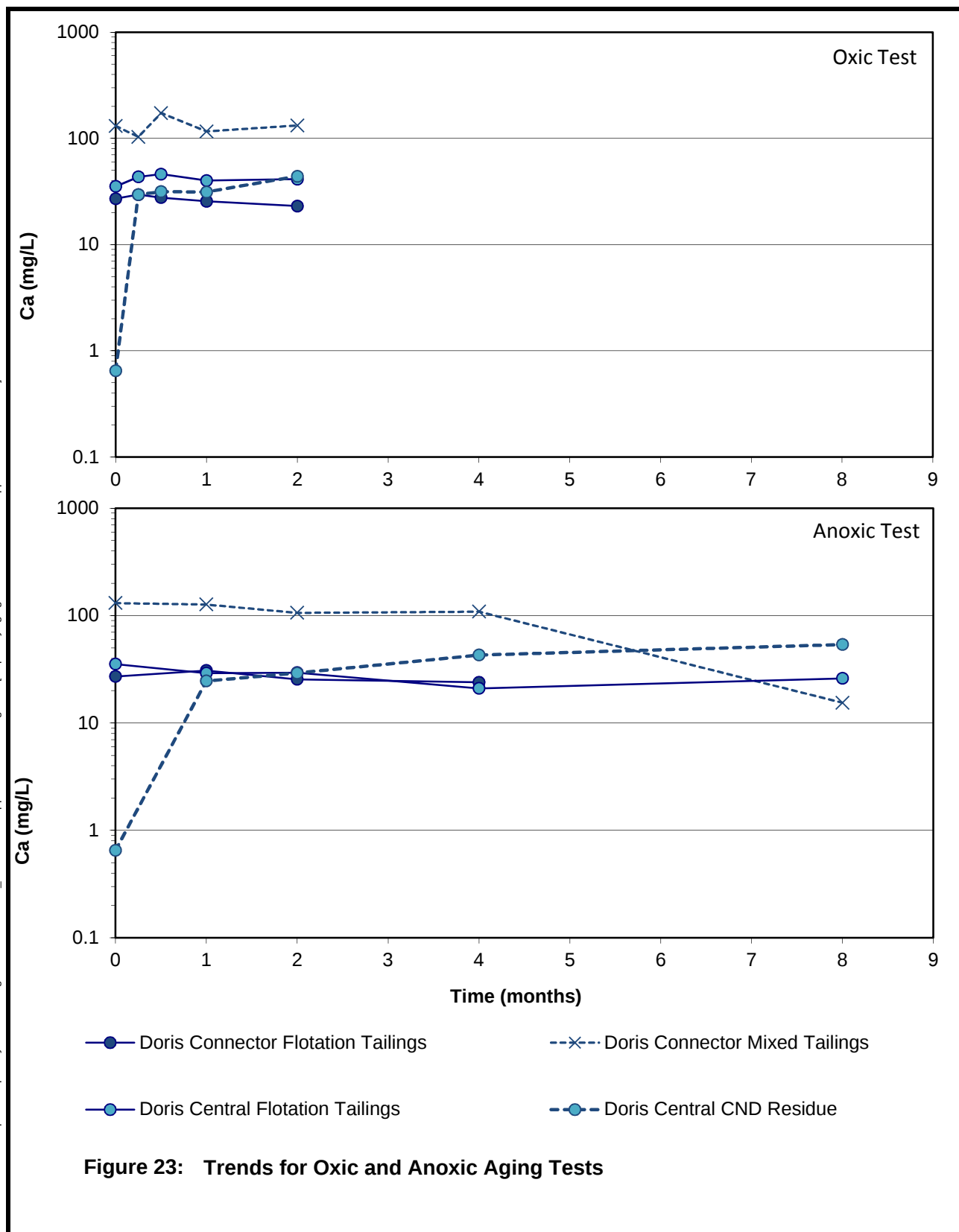


SRK Consulting, 4/13/15

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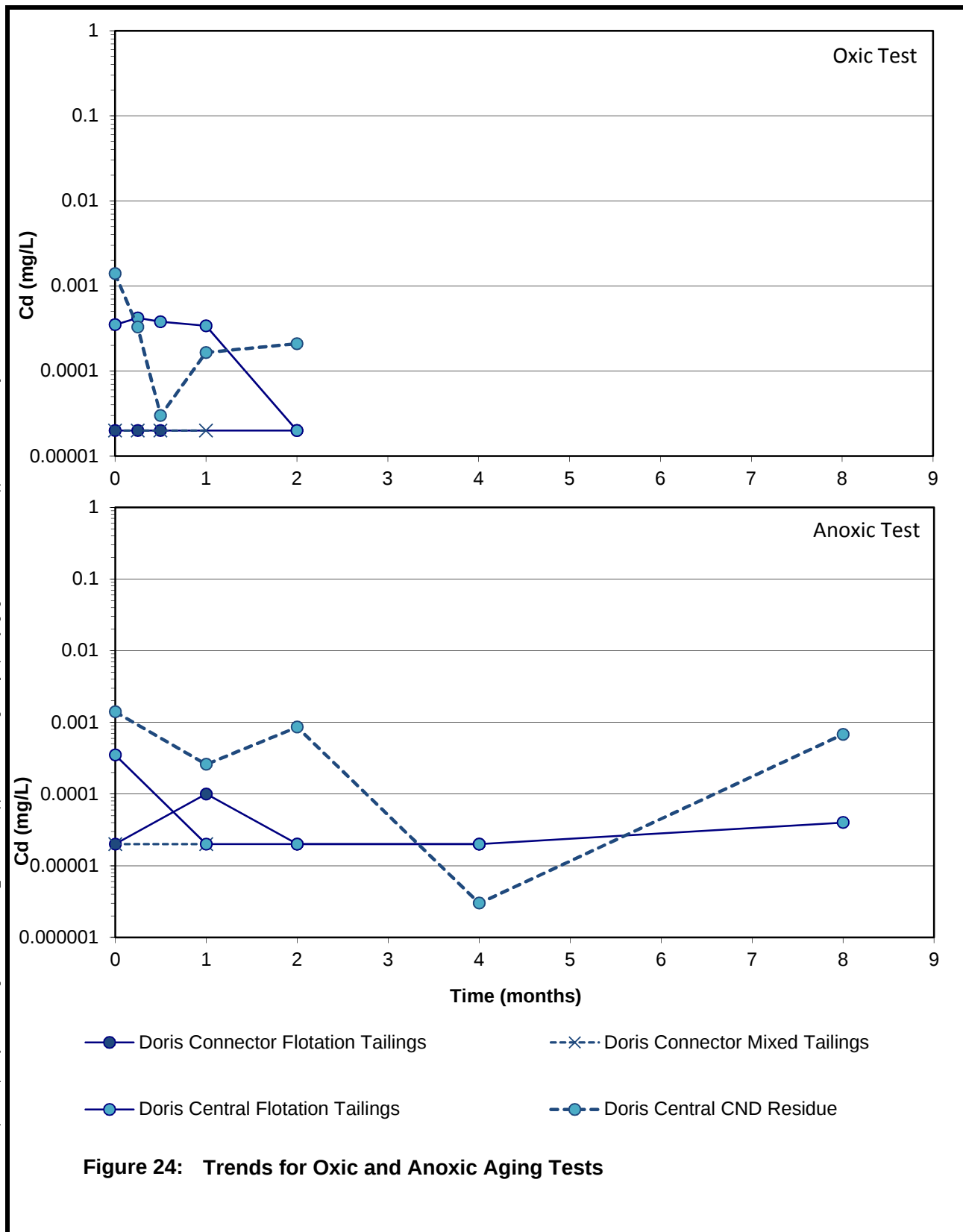


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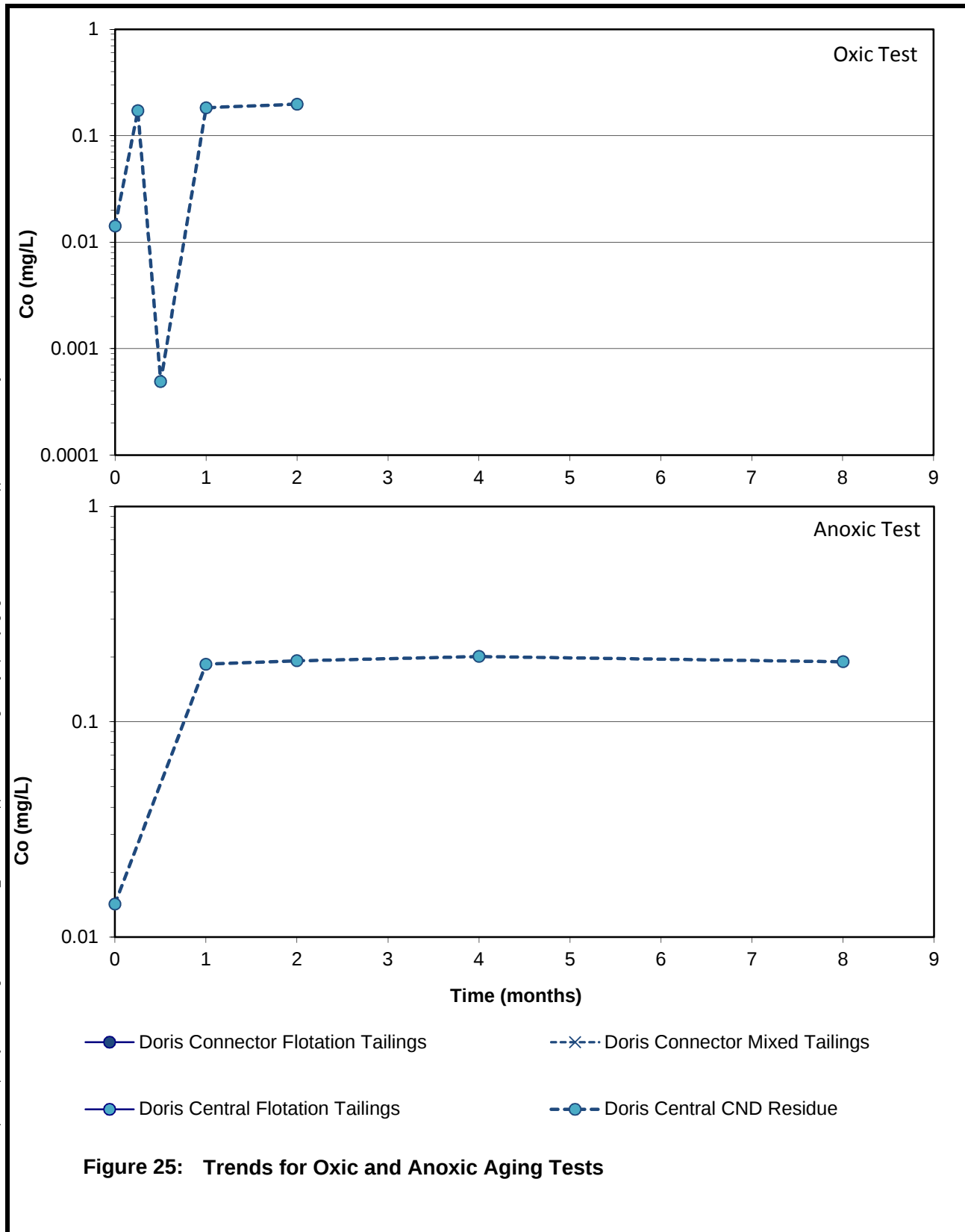


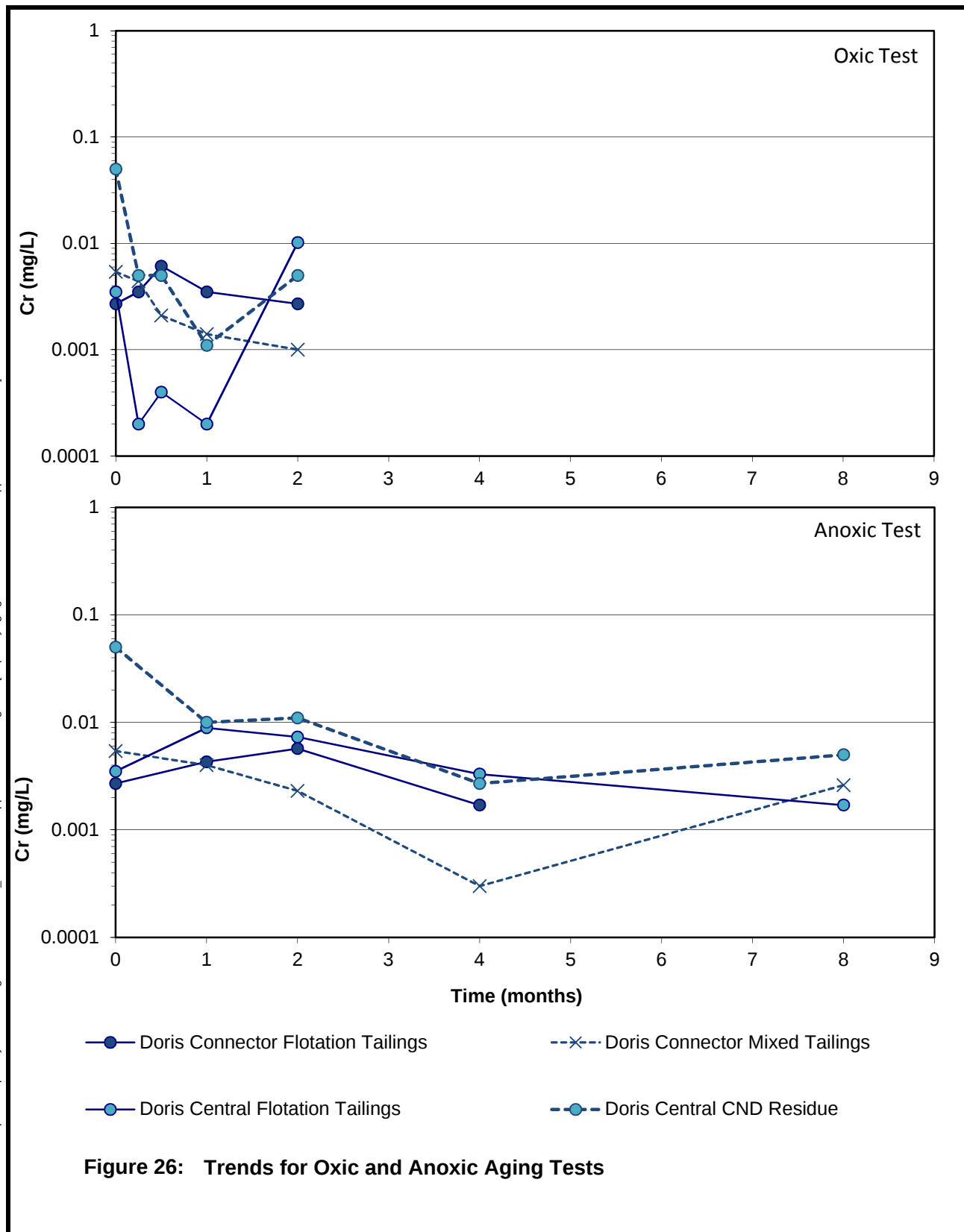
SRK Consulting, 4/13/15

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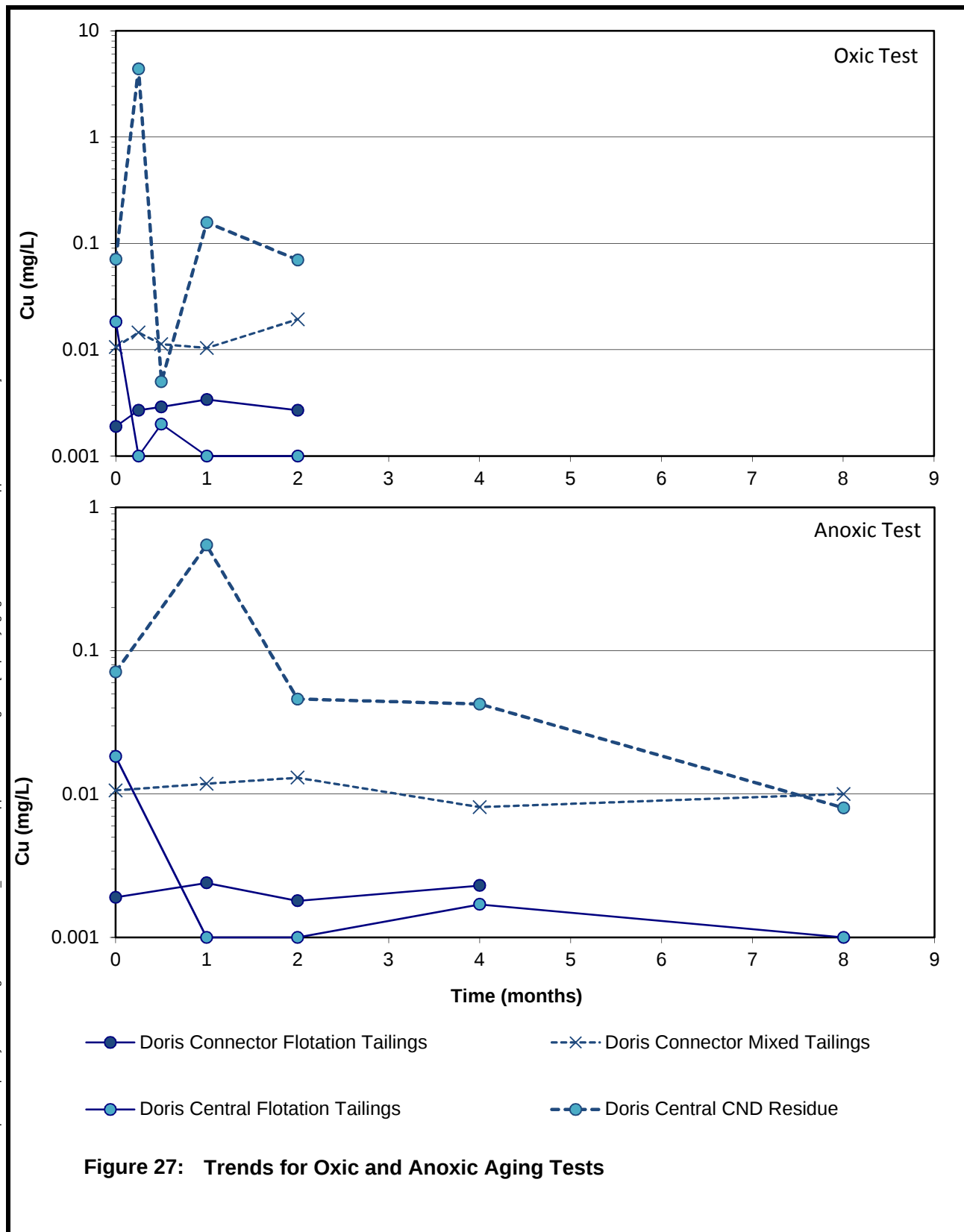


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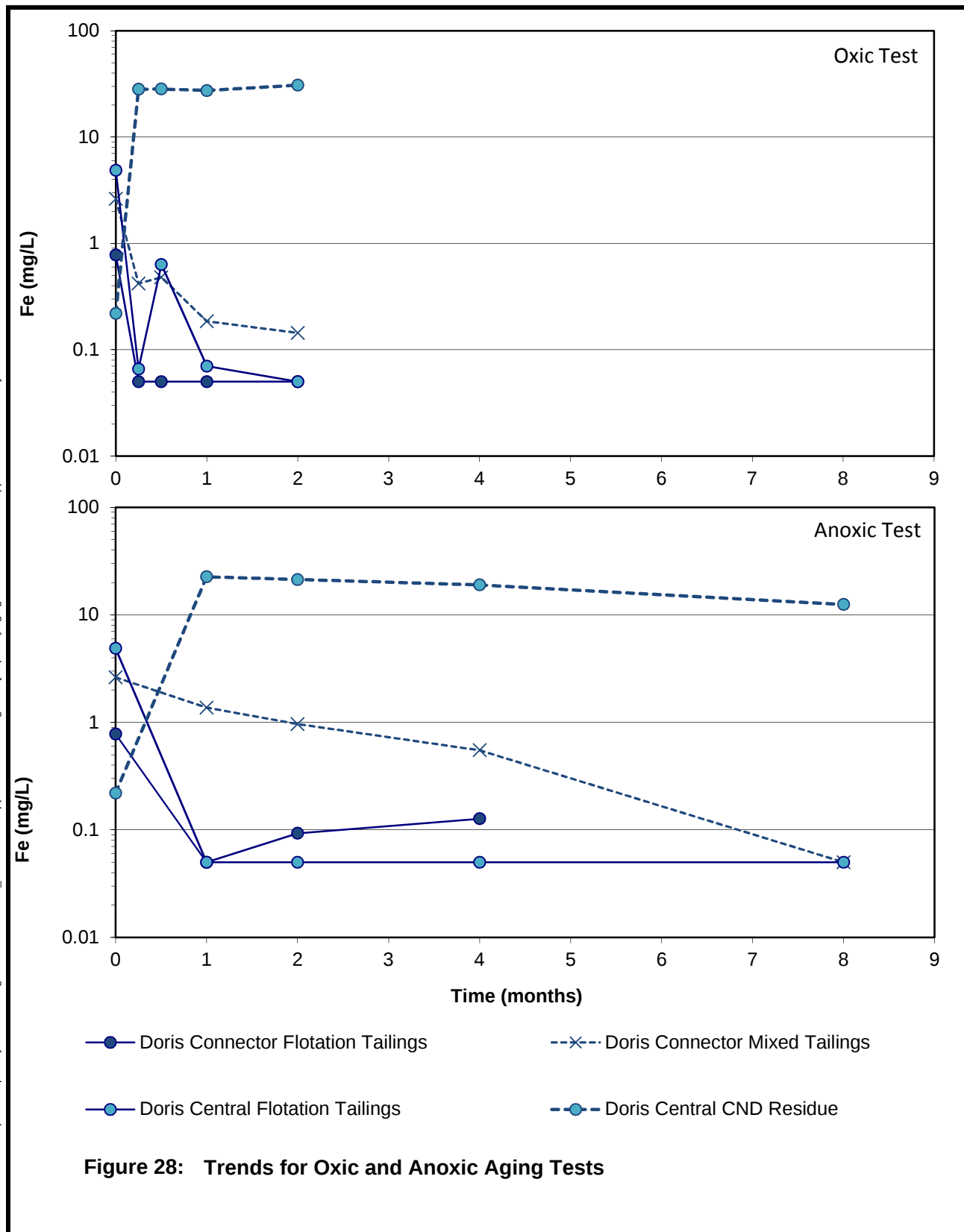




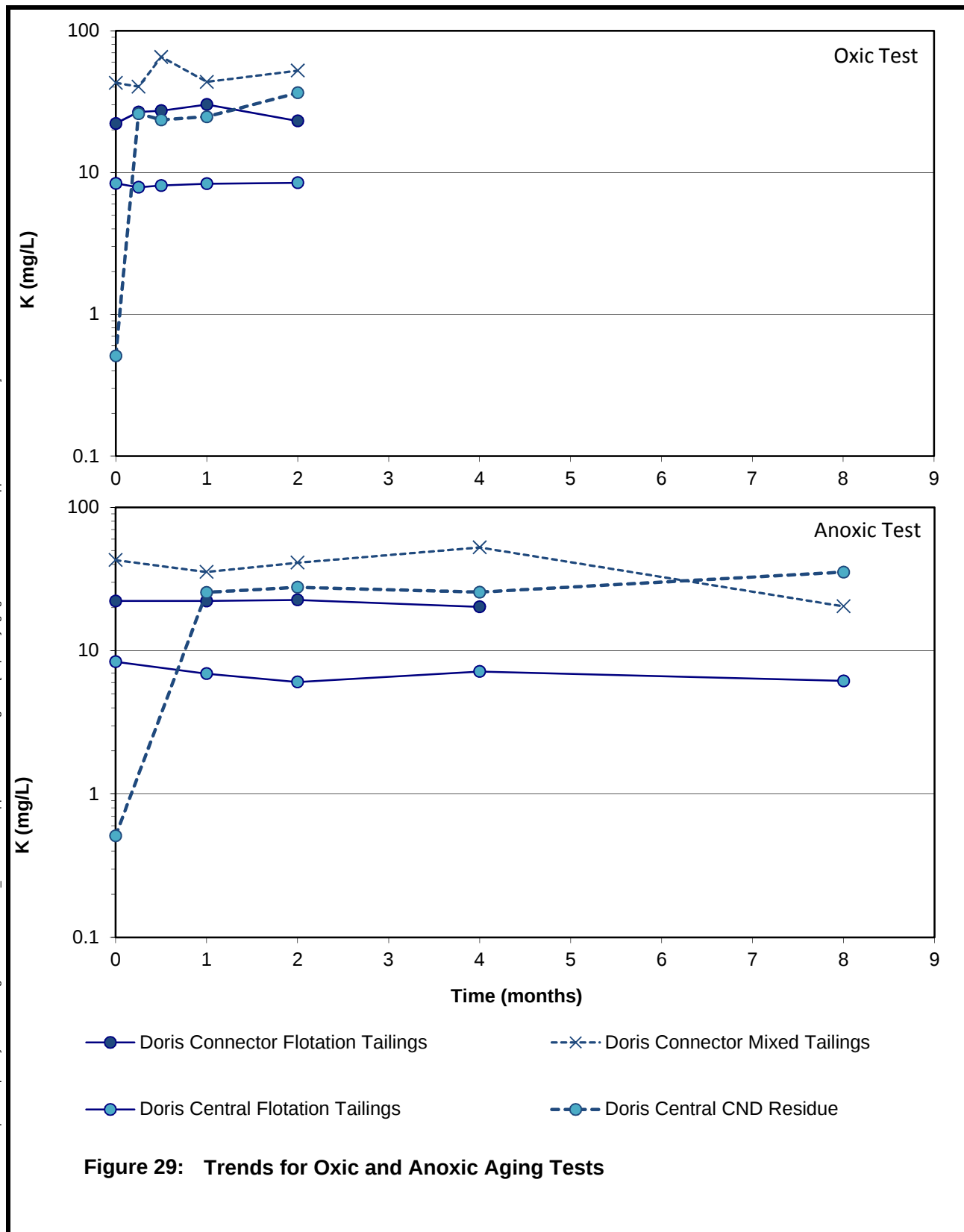
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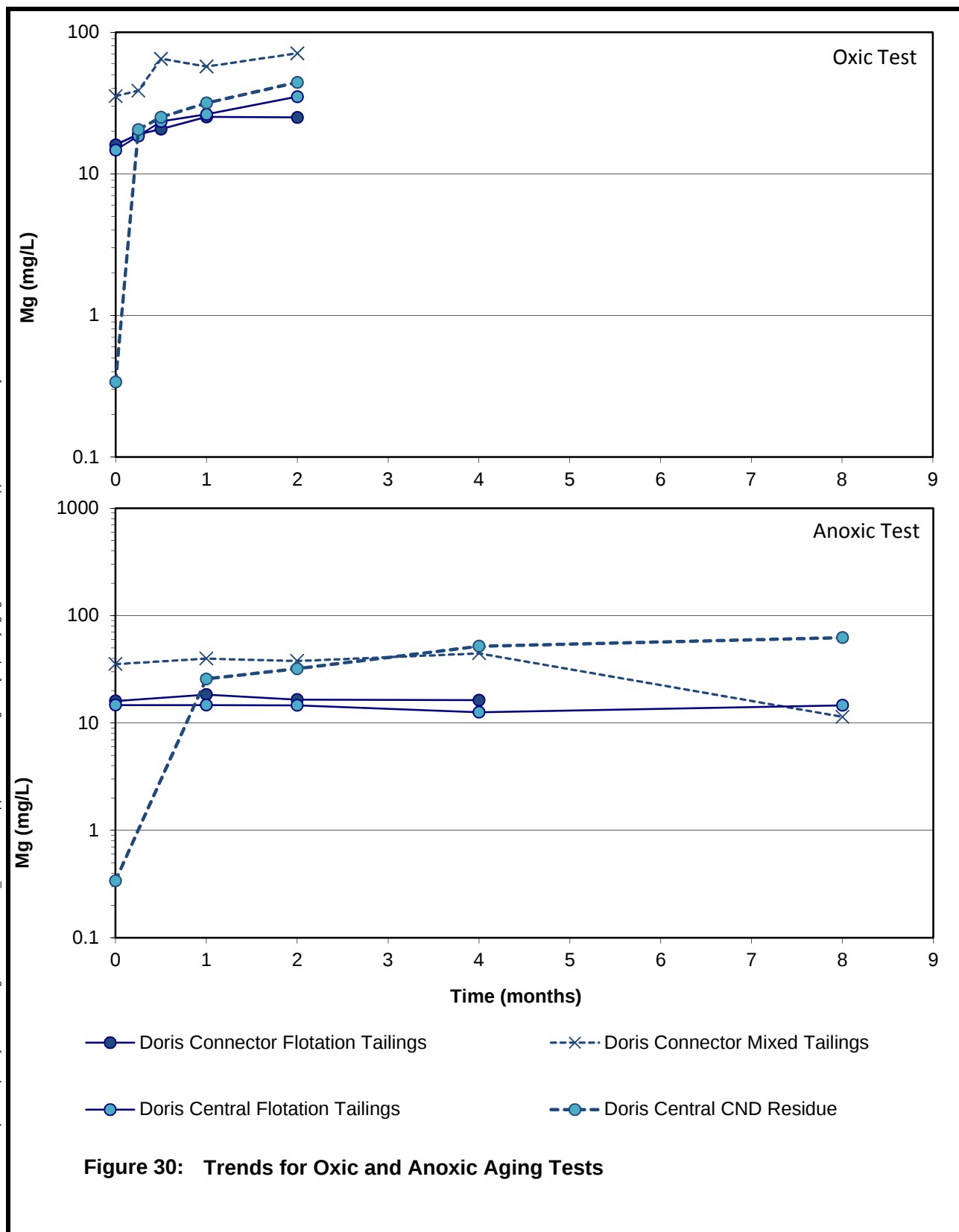
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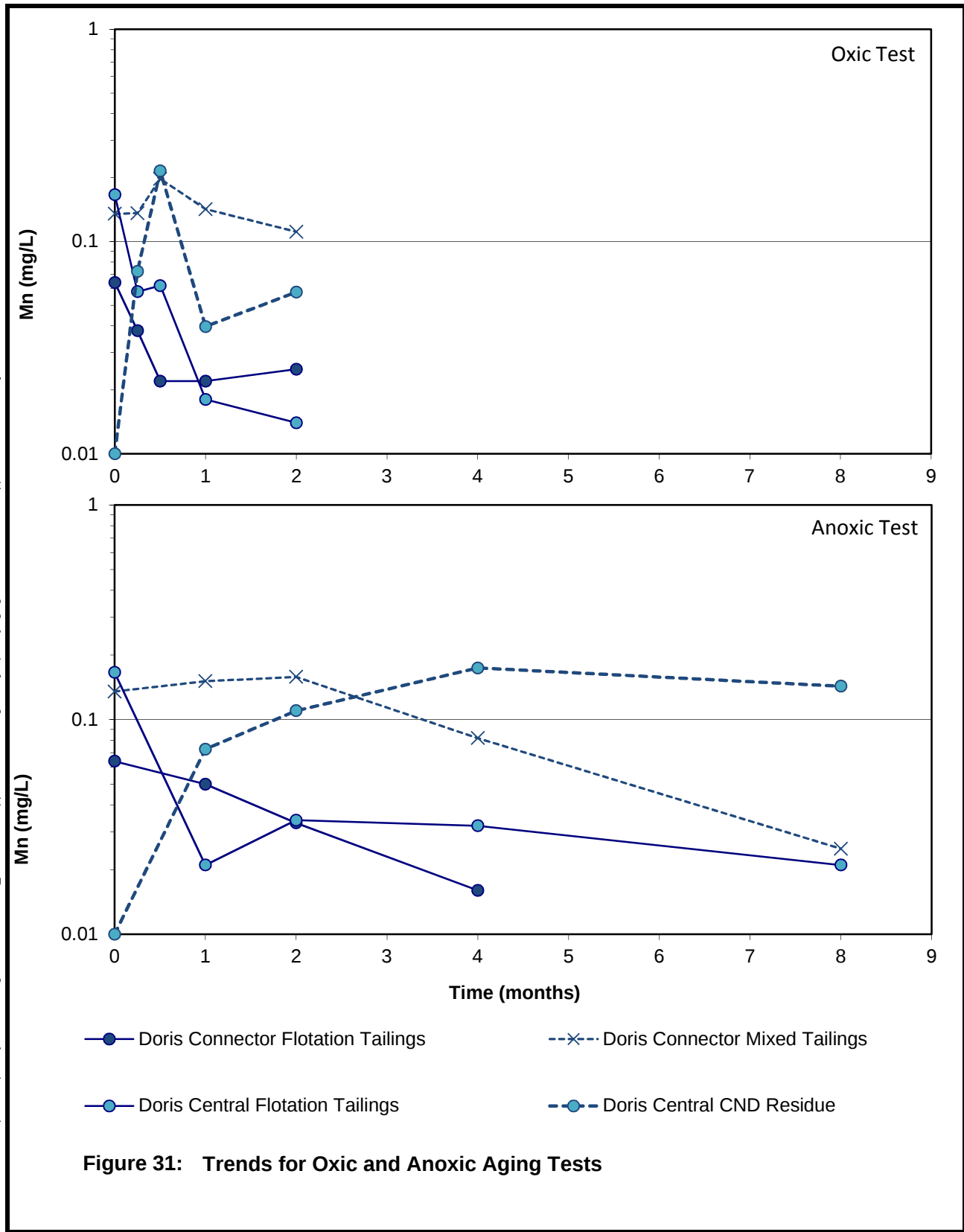
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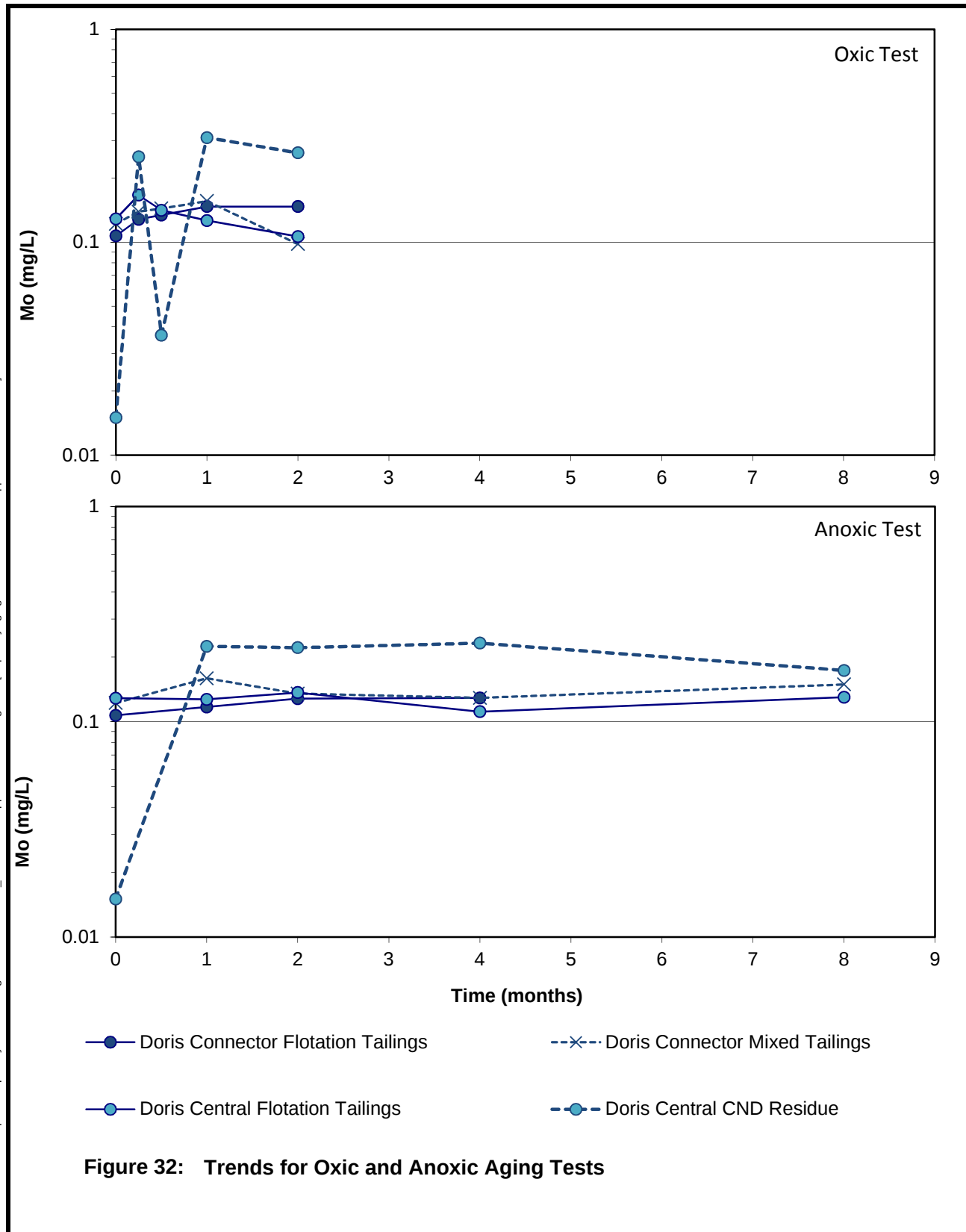
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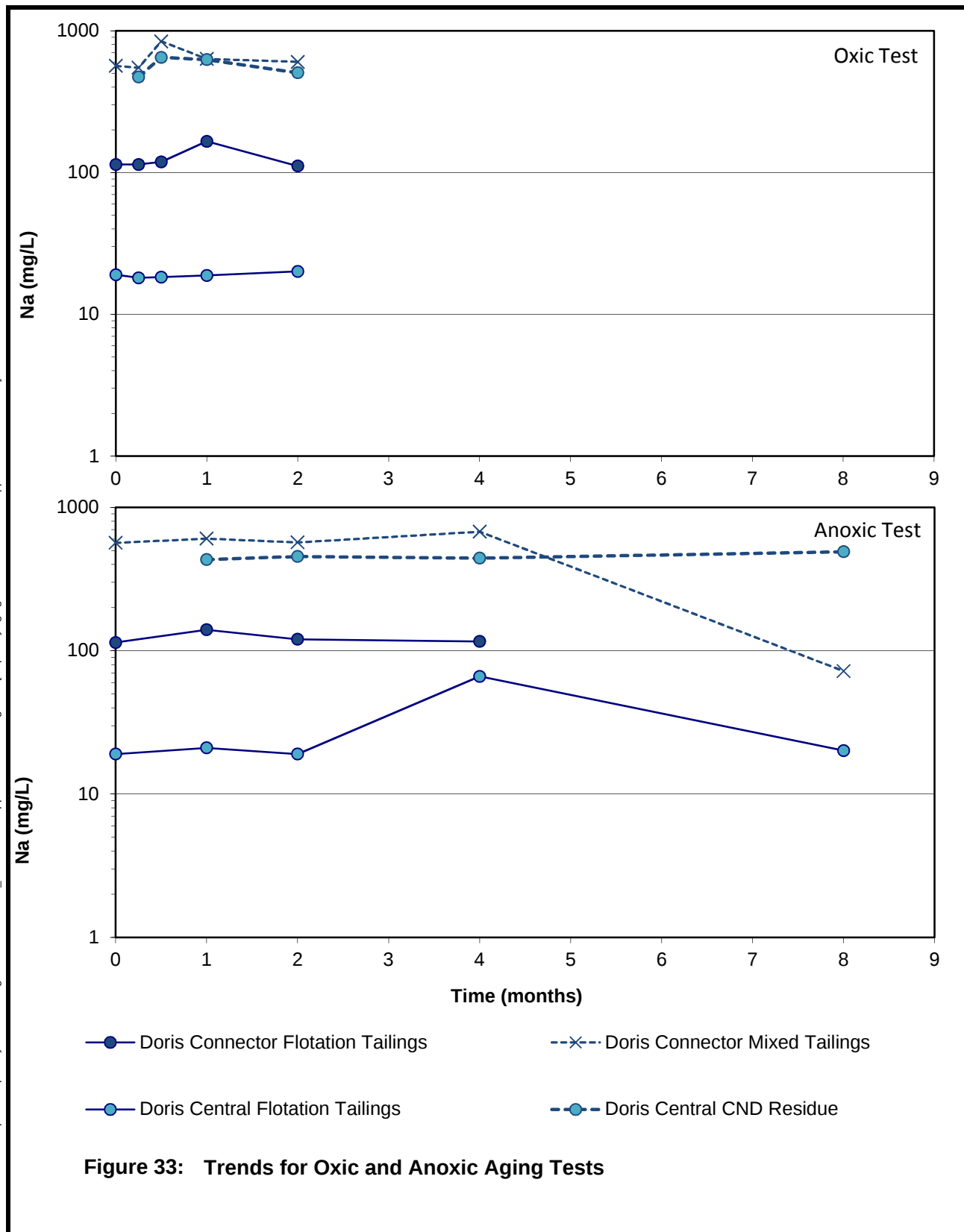
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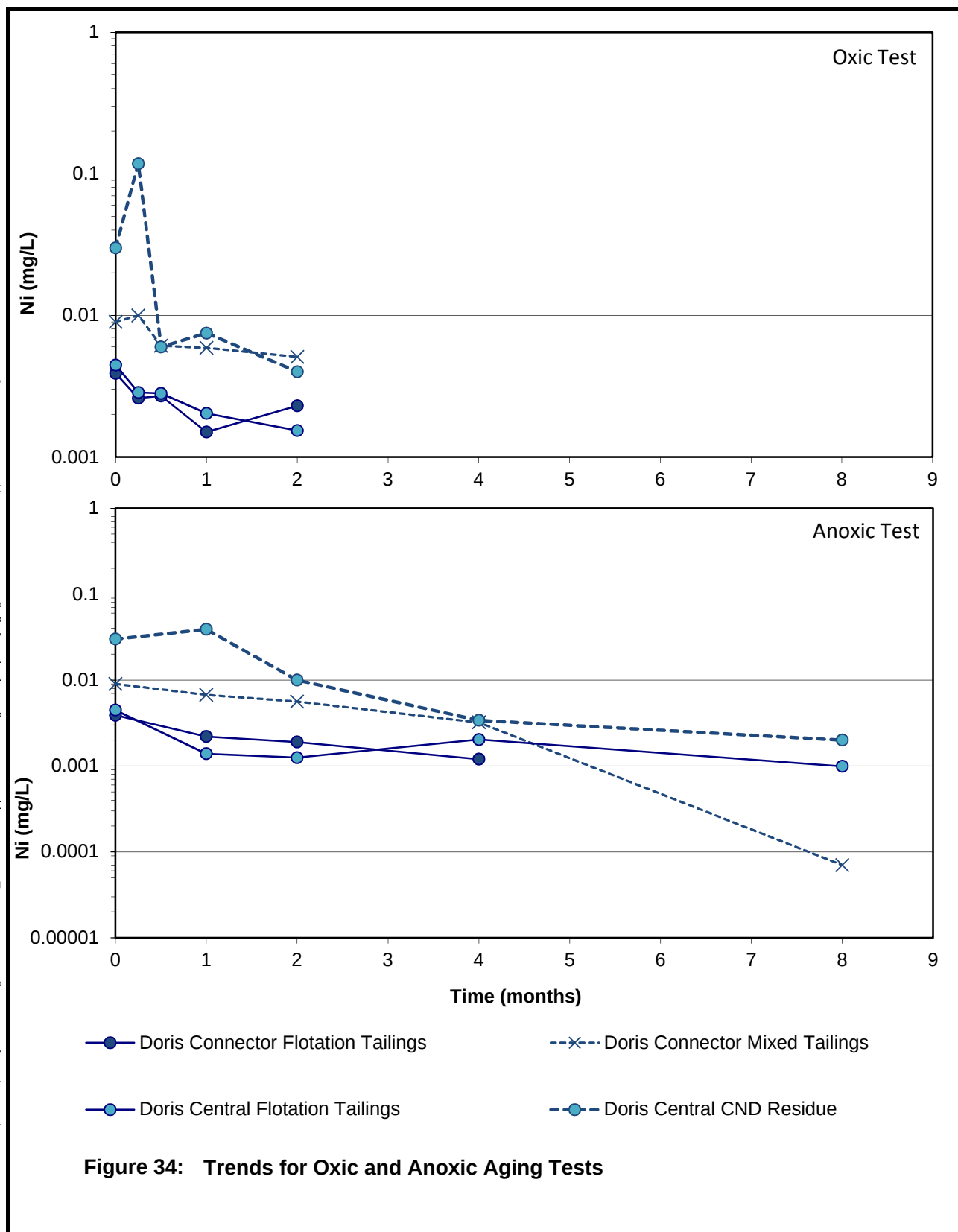
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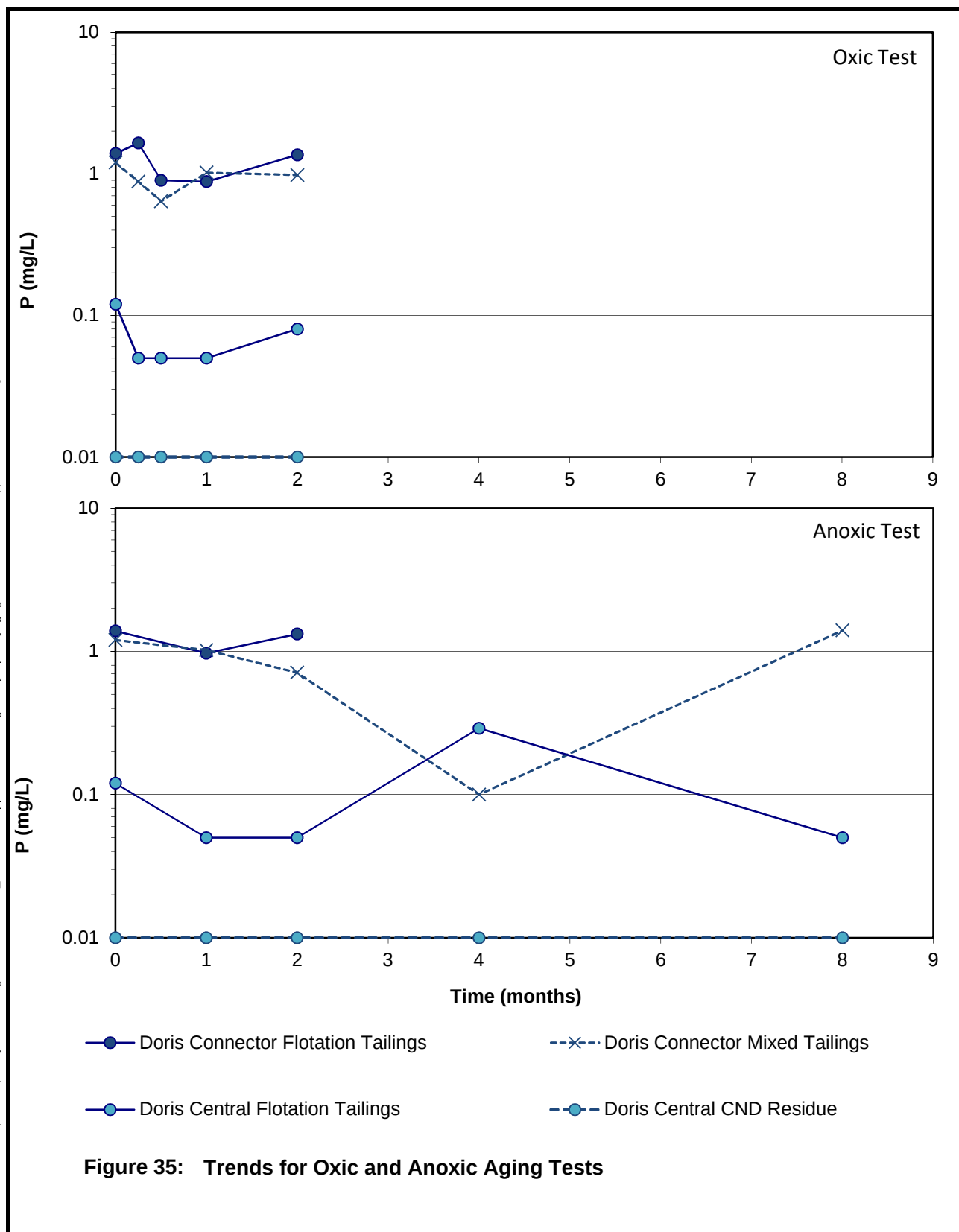
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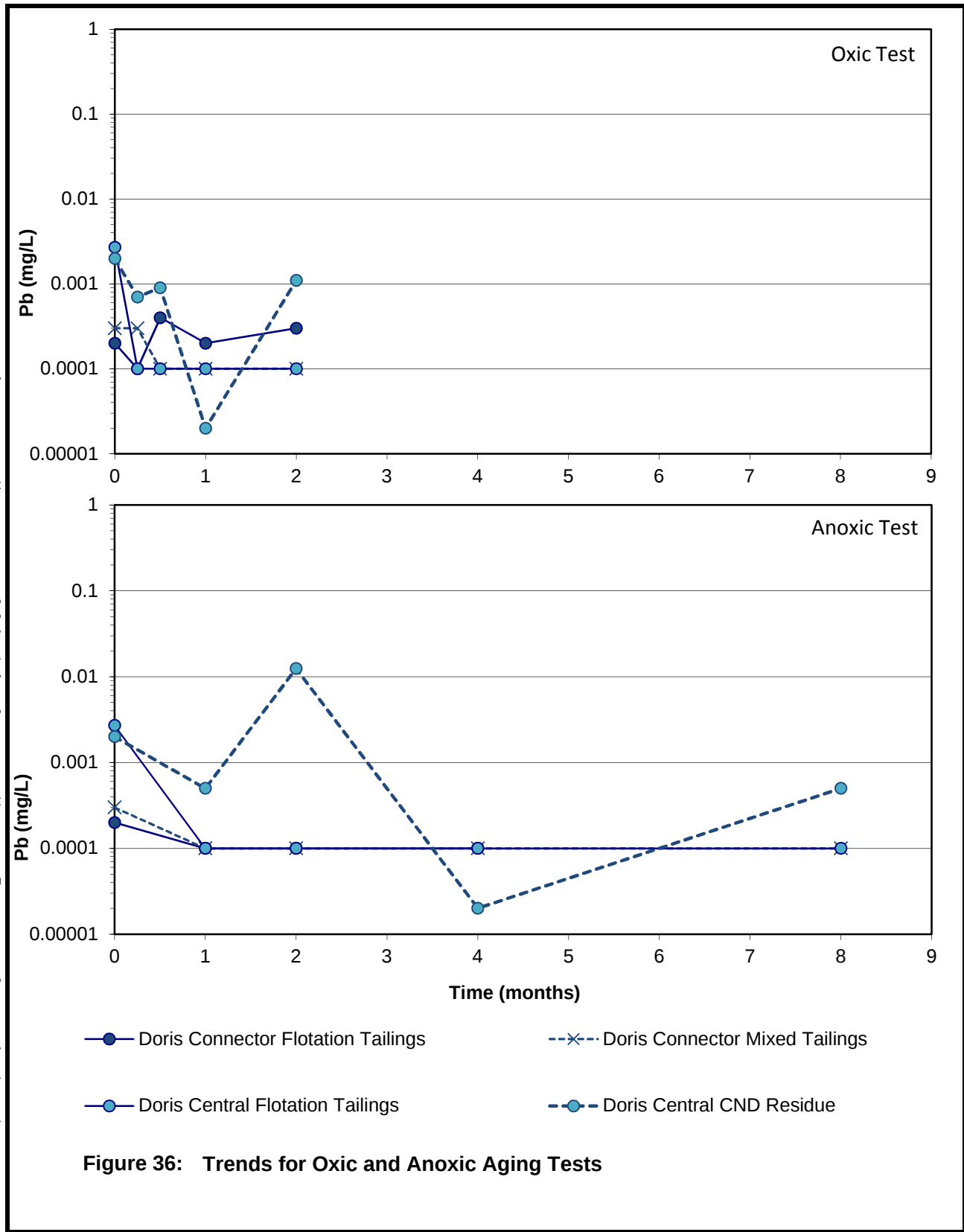
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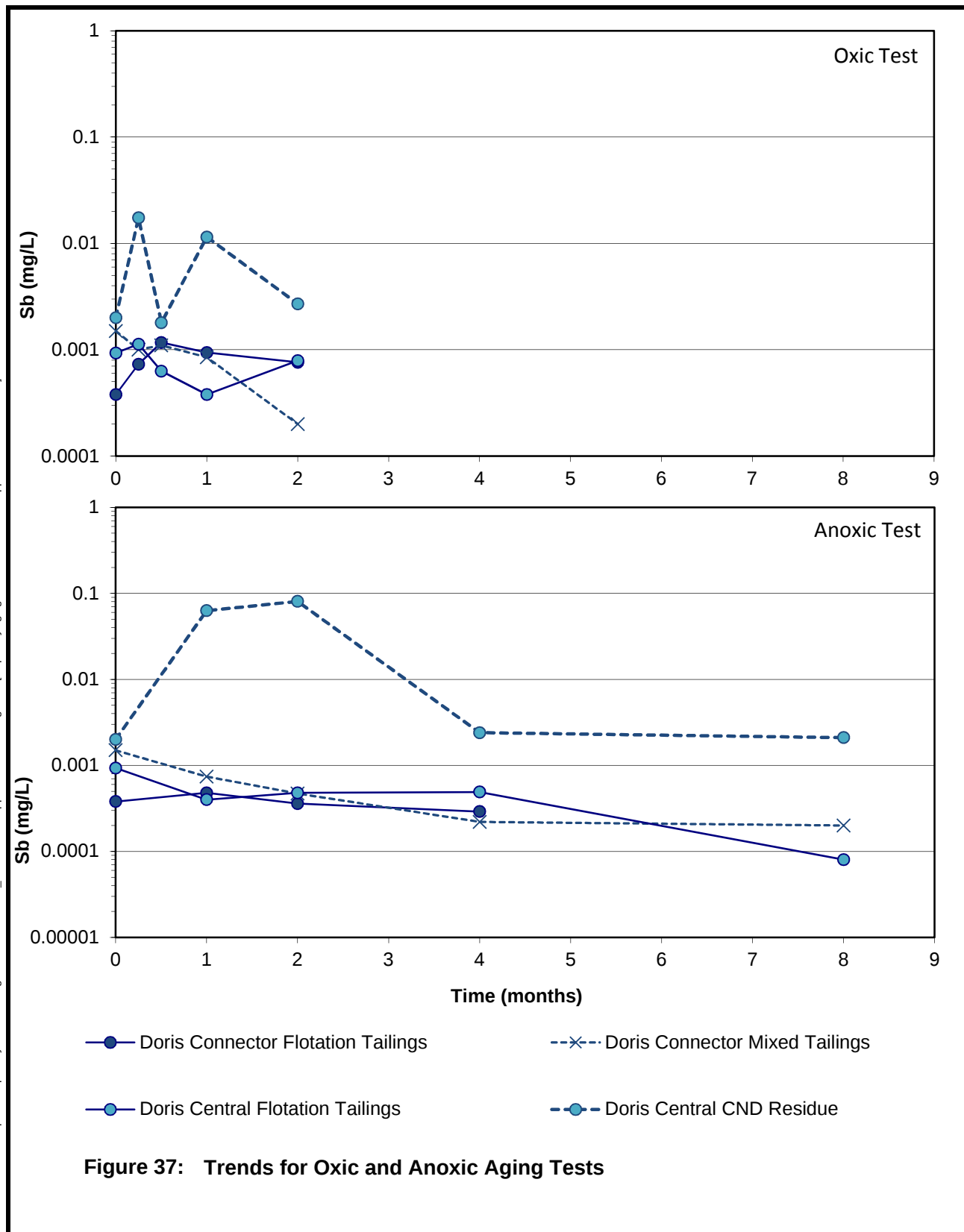
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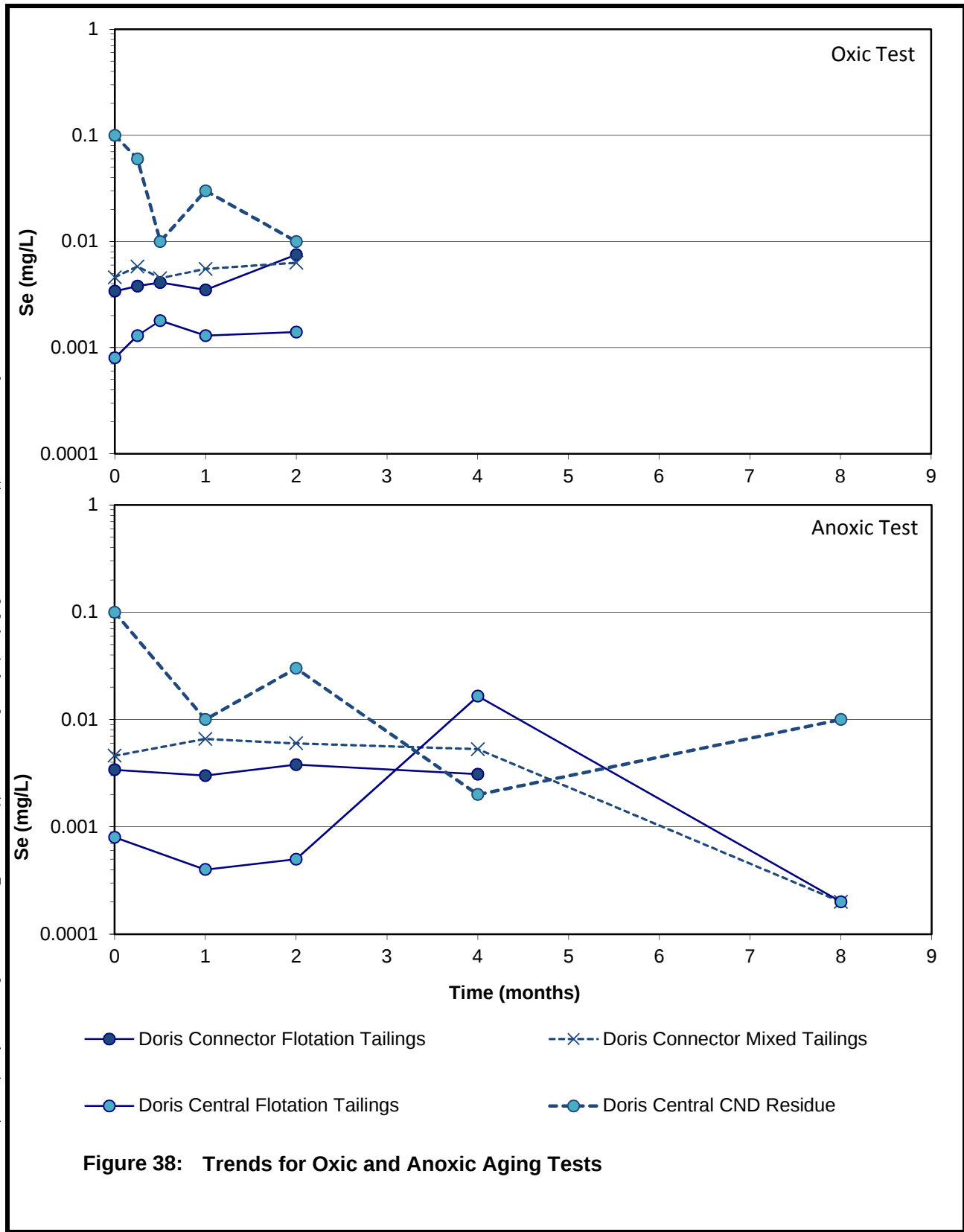
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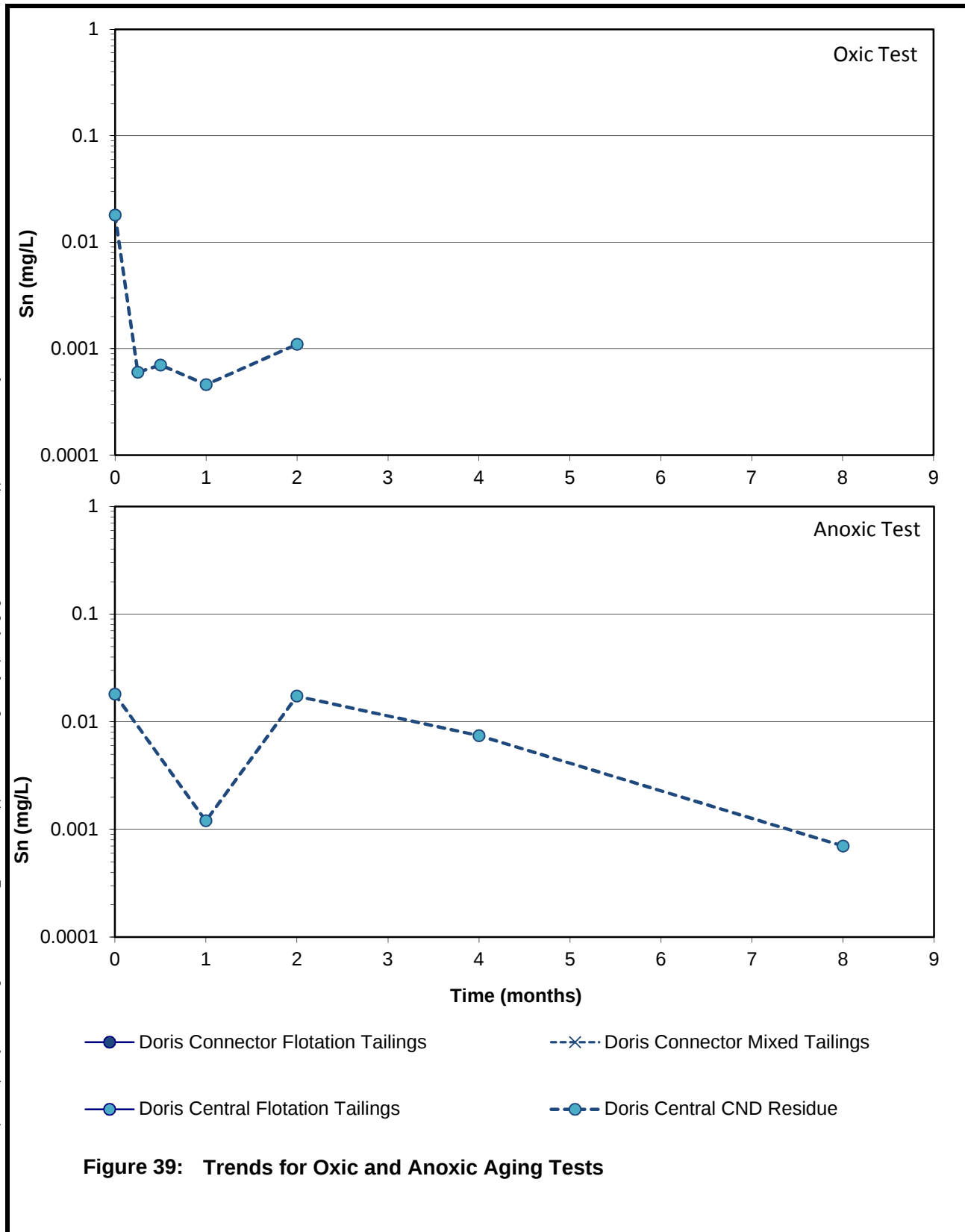


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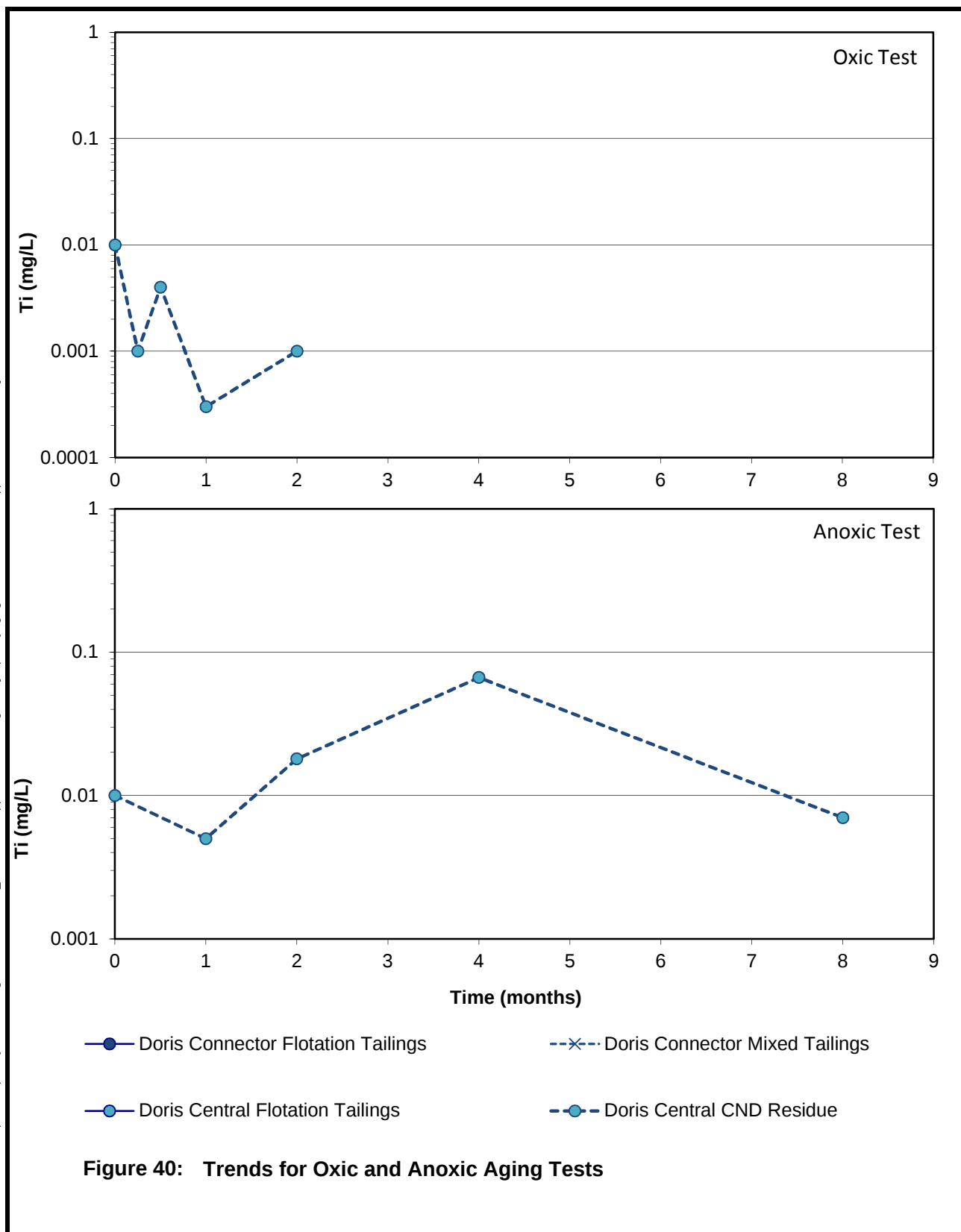
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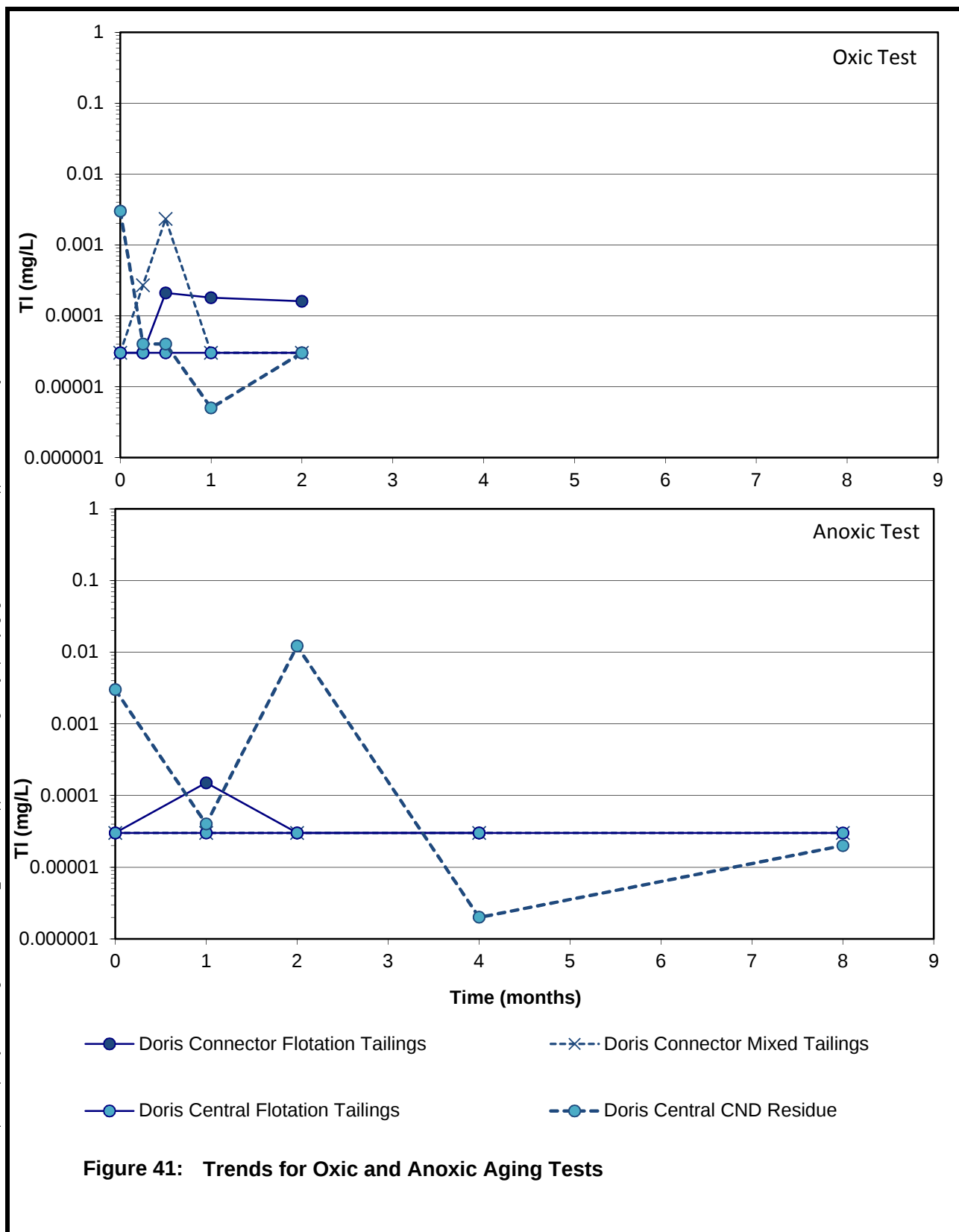


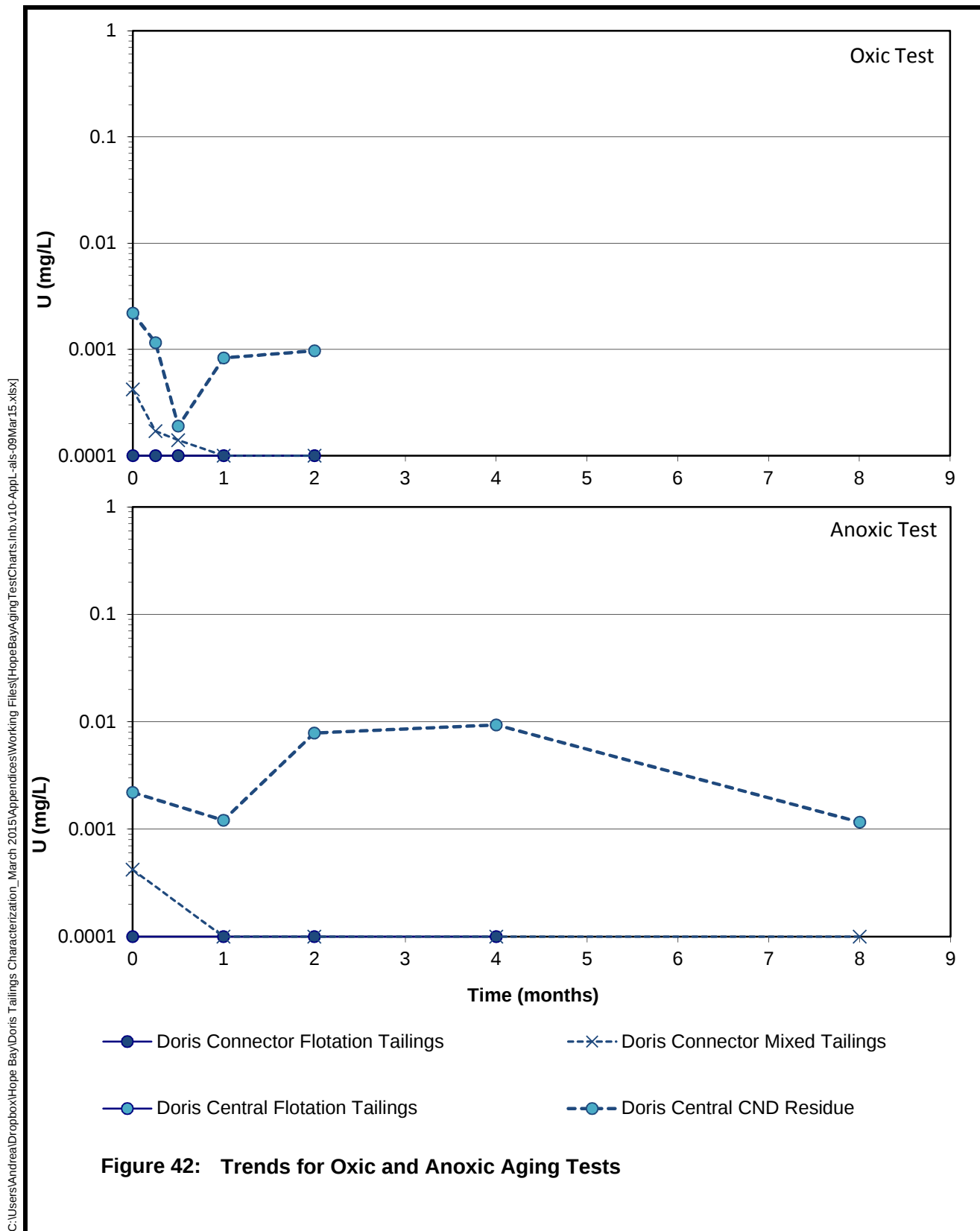
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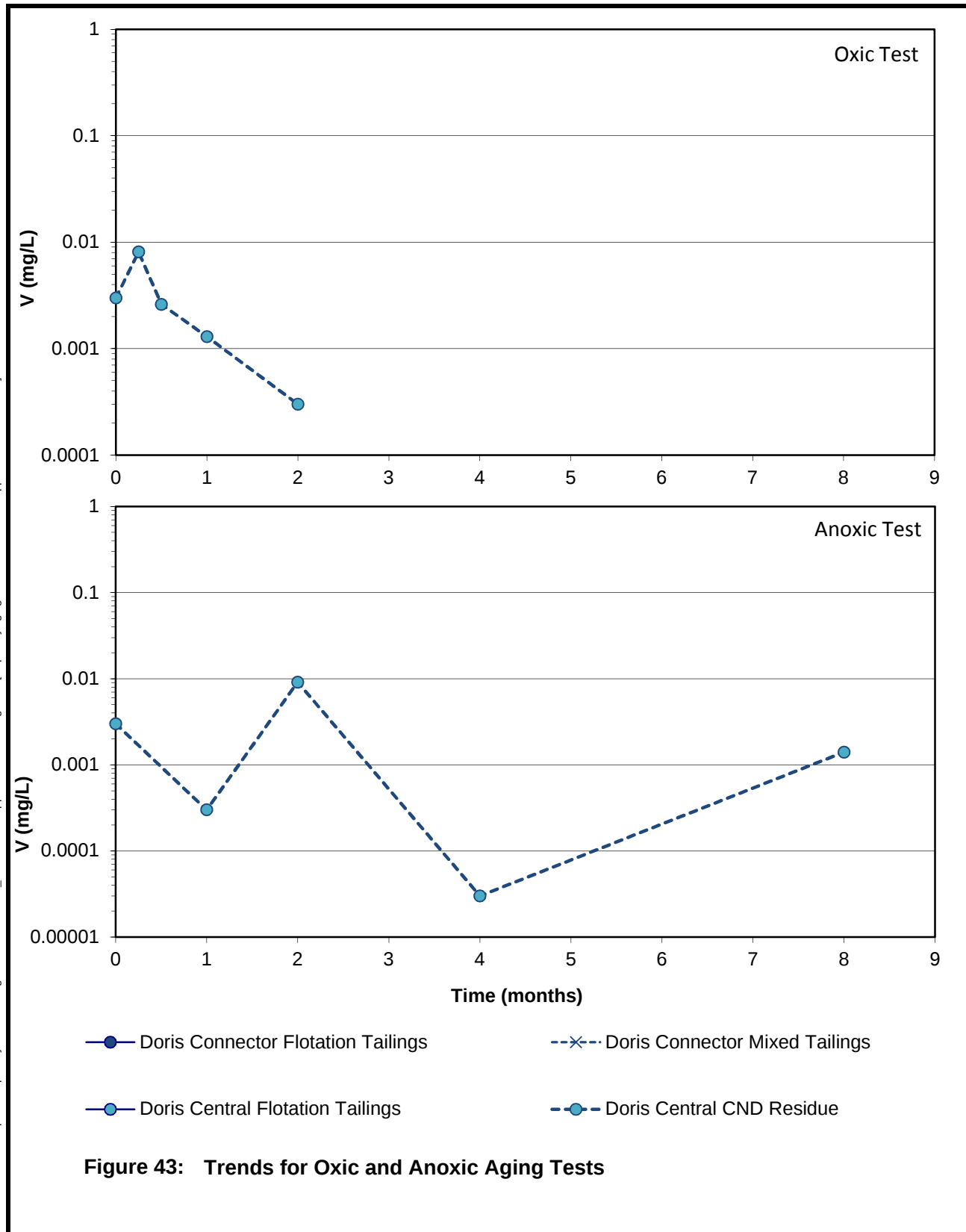


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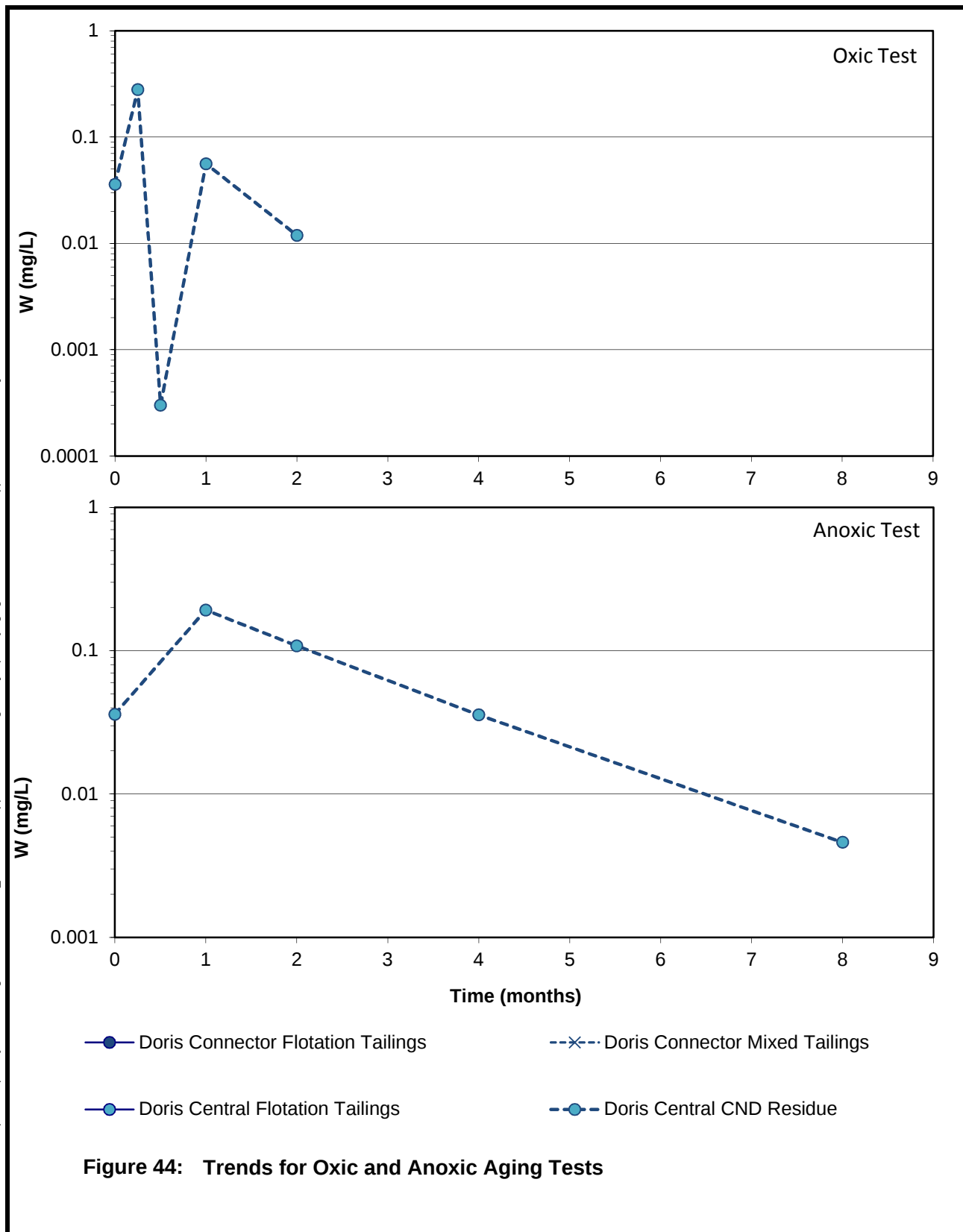


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