

2003 POLARIS TSS DATA - DOCK AND ADJACENT FORESHORE AREA

TSS = (Filter full(g)) - (Filter empty(g)) * (1000 (mL/L)) Sample volume (mL) * 1000mg/g
 Normal, Outlined Background value determined from uninfluenced area each day. Location changes based on observations of wind/ocean direction.
 Bold, Italics, Shaded Exceeds 25 mg/L over background which is the level permitted under the Fisheries Authorization.

Station	Date (dd/mm/yyyy)	Turbidity (NTU)	TSS (mg/L)	Wind Direction	Wind Velocity (mph)	Water Flow Direction	Comments
DS2-600	11/08/2003	30.6	21.8	S	17	N	Big waves from the South
DS2-800	11/08/2003	23	22.2	S	17	N	Big waves from the South
DS2-1000	11/08/2003	22.4	29.4	S	17	N	Big waves from the South
DS2-1200	11/08/2003	24.7	26.8	S	17	N	Big waves from the South
DS2-1400 at 1325	11/08/2003	15	24.2	S	17	N	Big waves from the South
DS3-1425 at 1450	11/08/2003	2.3	7	S	17	N	Big waves from the South
DS2-1600	11/08/2003	16.1	22.8	S	17	N	Big waves from the South
DS2-1800	11/08/2003	32.5	40.2	S	17	N	Not due to construction activities, not working in area along exposed shoreline.
DS2-1800 QA/QC Duplicate	11/08/2003	32.5	43	S	17	N	Big waves from the South
DS2-600	12/08/2003	4.76	16.6	S	14	S	
DS2-800	12/08/2003	1.18	3.3	S	14	S	
DS2-1000	12/08/2003	2.68	0.2	S	14	S	
DS2-1200	12/08/2003	3.44	0	S	14	S	
DS2-1400 at 1325	12/08/2003	48.1	46.6	S	14	S	Not due to construction activities, not working at dock or along exposed shoreline
DS3-1425 at 1450	12/08/2003	12.1	17.4	S	14	S	
DS2-1600	12/08/2003	10.6	15.2	S	14	S	
DS2-1800	12/08/2003	11.2	22.5	S	14	S	
DS2-1800 QA/QC Duplicate	12/08/2003	11.9	20.6	S	14	S	
DS2-600	13/08/2003	25.5	25.9	W	20	N	
DS2-800	13/08/2003	15.8	19.4	W	20	N	
DS2-1000	13/08/2003	32	33.4	W	20	N	
DS2-1200	13/08/2003	35.2	39.8	W	20	N	
DS2-1400 at 1325	13/08/2003	187	224	W	20	N	Work stopped during break, loading stockpile during night shift
DS3-1425 at 1450	13/08/2003	35.8	41.8	W	20	N	
DS2-1600	13/08/2003	56	71.8	W	20	N	Work stopped during break, loading stockpile during night shift
DS2-1800	13/08/2003	37.6	53	W	20	N	Work stopped during break, loading stockpile during night shift
DS2-1800 QA/QC Duplicate	13/08/2003	34.7	49	W	20	N	
DS2-600	15/08/2003	0.87	3.6	W	5	S	
DS2-800	15/08/2003	0.6	4	W	5	S	
DS2-1000	15/08/2003	0.58	3.4	W	5	S	
DS2-1200	15/08/2003	0.74	3.4	W	5	S	
DS2-1400 at 1325	15/08/2003	0.95	4.1	W	5	S	
DS3-1425 at 1450	15/08/2003	0.82	4.5	W	5	S	
DS2-1600	15/08/2003	0.79	2.8	W	5	S	
DS2-1800	15/08/2003	0.67	4.1	W	5	S	
DS2-1800 QA/QC Duplicate	15/08/2003	0.81	4	W	5	S	
DS2-600	16/08/2003	1.87	5.1	NA	NA	NA	
DS2-800	16/08/2003	1.77	3.3	NA	NA	NA	
DS2-1000	16/08/2003	4.68	6	NA	NA	NA	
DS2-1200	16/08/2003	3.16	4.7	NA	NA	NA	
DS2-1400 at 1325	16/08/2003	3.4	5.3	NA	NA	NA	
DS3-1425 at 1450	16/08/2003	2.69	5.2	NA	NA	NA	
DS2-1600	16/08/2003	5.46	6.5	NA	NA	NA	
DS2-1800	16/08/2003	2.65	3.7	NA	NA	NA	
DS2-1800 QA/QC Duplicate	16/08/2003	2.77	5.2	NA	NA	NA	
DS2-600	17/08/2003	1.14	4.5	NW	12	S	
DS2-800	17/08/2003	0.59	3.8	NW	12	S	
DS2-1000	17/08/2003	0.86	3.3	NW	12	S	
DS2-1200	17/08/2003	1.02	3.5	NW	12	S	
DS2-1400 at 1325	17/08/2003	1.11	4.1	NW	12	S	
DS3-1425 at 1450	17/08/2003	1.73	3.1	NW	12	S	
DS2-1600	17/08/2003	1.14	3.9	NW	12	S	
DS2-1800	17/08/2003	0.93	3.9	NW	12	S	
DS2-1800 QA/QC Duplicate	17/08/2003	0.82	4.9	NW	12	S	

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 Exceeds 25 mg/L, over background which is the level permitted under the Fisheries Authorization.

Station	Date (dd/mm/yyyy)	Turbidity (NTU)	TSS (mg/L)	Wind Direction	Wind Velocity (mph)	Water Flow Direction	Comments
DS2-600	18/08/2003	0.82	4.5	S	13	S	
DS2-800	18/08/2003	0.76	3.6	S	13	S	
DS2-1000	18/08/2003	0.51	3	S	13	S	
DS2-1200	18/08/2003	1.03	6.1	S	13	S	
DS2-1400 at 1325	18/08/2003	1.29	4.5	S	13	S	
DS3-1425 at 1450	18/08/2003	1.92	4.3	S	13	S	
DS2-1600	18/08/2003	1.98	5.6	S	13	S	
DS2-1800	18/08/2003	1.81	5.5	S	13	S	
DS2-1800 QA/QC Duplicate	18/08/2003	1.71	4.6	S	13	S	
DS2-600	19/08/2003	1.58	3.7	N	6	NA	
DS2-800	19/08/2003	1.97	3.7	N	6	NA	
DS2-1000	19/08/2003	2.56	4.2	N	6	NA	
DS2-1200	19/08/2003	2.47	4.5	N	6	NA	
DS2-1400 at 1325	19/08/2003	3.58	6.8	N	6	NA	
DS2-1400 at 1325 QA/QC Duplicate	19/08/2003	2.28	5.4	N	6	NA	
DS3-1425 at 1450	19/08/2003	1.9	3.6	N	6	NA	
DS2-1600	19/08/2003	0.64	2.9	N	6	NA	
DS2-1800	19/08/2003	1.07	18.7	N	6	NA	Forgot to rinse filter
DS2-600	20/08/2003	1.11	4.3	SW	12	NA	
DS2-600 QA/QC duplicate	20/08/2003	0.98	4.4	SW	12	NA	
DS2-800	20/08/2003	0.99	4.9	SW	12	NA	
DS2-1000	20/08/2003	1.59	4	SW	12	NA	
DS2-1200	20/08/2003	1.58	5.4	SW	12	NA	
DS2-1400 at 1325	20/08/2003	1.12	5.3	SW	12	NA	
DS3-1425 at 1450	20/08/2003	1.5	3.8	SW	12	NA	
DS2-1600	20/08/2003	0.95	4.5	SW	12	NA	
DS2-1800	20/08/2003	0.99	-2.7	SW	12	NA	Filter ripped on tin plate
DS2-600	21/08/2003	1.19	9.5	NW	12	NA	
DS2-800	21/08/2003	1.52	5.4	NW	12	NA	
DS2-800 QA/QC Duplicate	21/08/2003	1.54	4.1	NW	12	NA	
DS2-1000	21/08/2003	0.69	4.7	NW	12	NA	
DS2-1200	21/08/2003	3.14	7	NW	12	NA	
DS2-1400 at 1325	21/08/2003	3.5	6	NW	12	NA	
DS3-1425 at 1450	21/08/2003	2.75	5	NW	12	NA	
DS2-1600	21/08/2003	0.88	5.2	NW	12	NA	
DS2-1800	21/08/2003	1.41	4.2	NW	12	NA	
DS2-600	22/08/2003	1.05	5.3	W	15	NA	
DS2-800	22/08/2003	1.06	17.6	W	15	NA	Forgot to rinse filter
DS2-1000	22/08/2003	1.7	4.9	W	15	NA	
DS2-1200	22/08/2003	2.88	4.3	W	15	NA	
DS2-1400	22/08/2003	5.11	8	W	15	NA	
DS3-1425	22/08/2003	2.3	4.8	W	15	NA	
DS2-1600	22/08/2003	0.92	4.7	W	15	NA	
DS2-1800	22/08/2003	1.31	5.3	W	15	NA	
DS3-1425 QA/QC	22/08/2003	2.21	7.6	W	15	NA	
DS2-600	23/08/2003	2.92	2.1	SW	15	N	waves from SW to NE
DS2-800	23/08/2003	26.1	24.1	SW	15	N	Caused by wave action
DS2-1000	23/08/2003	17.6	17.5	SW	15	N	Caused by wave action
DS2-1200	23/08/2003	29.1	10.1	SW	15	N	waves from SW to NE
DS2-1400 at south side of dock cell	23/08/2003	3.18	1	SW	15	N	waves from SW to NE
DS3-1425 at north side of dock cell	23/08/2003	3.02	12.5	SW	15	N	Caused by wave action
DS2-1600	23/08/2003	2.61	8.6	SW	15	N	waves from SW to NE
DS2-1800	23/08/2003	2.39	0.8	SW	15	N	waves from SW to NE
DS2-1800 QA/QC Duplicate	23/08/2003	2.39	2.3	SW	15	N	waves from SW to NE

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Station	Date (dd/mm/yyyy)	Turbidity (NTU)	TSS (mg/L)	Wind Direction	Wind Velocity (mph)	Water Flow Direction	Comments
DS2-600	24/08/2003	1.89	5.7	SE	15	N	waves from SW to NE
DS2-800	24/08/2003	2.3	1.2	SE	15	N	waves from SW to NE
DS2-1000	24/08/2003	6.73	3.8	SE	15	N	waves from SW to NE
DS2-1200	24/08/2003	5.21	3.7	SE	15	N	waves from SW to NE
DS2-1200 QA/QC duplicate	24/08/2003	3.74	4.3	SE	15	N	waves from SW to NE
DS2-1400 at south side of dock cell	24/08/2003	8.76	8.9	SE	15	N	waves from SW to NE
DS3-1425 at north side of dock cell	24/08/2003	3.86	3	SE	15	N	waves from SW to NE
DS2-1600	24/08/2003	2.88	6.2	SE	15	N	waves from SW to NE
DS2-1800	24/08/2003	1.26	2.7	SE	15	N	waves from SW to NE
DS2-600	25/08/2003	0.89	5.1	SW	5	NA	waves from West to east
DS2-600 QA/QC duplicate using net	25/08/2003	0.89	3.9	SW	5	NA	waves from West to east
DS2-800	25/08/2003	1.28	3.5	SW	5	NA	waves from West to east
DS2-800 QA/QC Duplicate	25/08/2003	1.23	4.4	SW	5	NA	waves from West to east
DS2-1000	25/08/2003	1.02	4.4	SW	5	NA	waves from West to east
DS2-1200	25/08/2003	1.67	3.6	SW	5	NA	waves from West to east
DS2-1400 at south side of dock cell	25/08/2003	1.63	8.9	SW	5	NA	waves from West to east
DS3-1425 at north side of dock cell	25/08/2003	2.23	1.1	SW	5	NA	waves from West to east
DS2-1600	25/08/2003	1.67	2.4	SW	5	NA	waves from West to east
DS2-1800	25/08/2003	1.14	2.7	SW	5	NA	waves from West to east
DS2-600	26/08/2003	1.04	3.5	S	0	NA	no flow direction, no waves
DS2-600 (S&S filter)	26/08/2003	1.85	6.3	S	0	NA	no flow direction, no waves
DS2-800	26/08/2003	0.95	4.8	S	0	NA	no flow direction, no waves
DS2-800 QA/QC Duplicate	26/08/2003	1.65	3.7	S	0	NA	no flow direction, no waves
DS2-1000	26/08/2003	0.96	3.9	S	0	NA	no flow direction, no waves
DS2-1000 (S&S filter)	26/08/2003	0.91	4.7	S	0	NA	no flow direction, no waves
DS2-1200	26/08/2003	0.8	1.5	S	0	NA	no flow direction, no waves
DS2-1200 (S&S filter)	26/08/2003	2.1	6.3	S	0	NA	no flow direction, no waves
DS2-1400 at south side of dock cell	26/08/2003	1.33	5.7	S	0	NA	no flow direction, no waves
DS2-1400 Duplicate	26/08/2003	1.48	5	S	0	NA	no flow direction, no waves
DS3-1425 at north side of dock cell	26/08/2003	2.84	4.3	S	0	NA	no flow direction, no waves
DS2-1600	26/08/2003	1.25	6.3	S	0	NA	no flow direction, no waves
DS2-1800	26/08/2003	1.78	5.6	S	0	NA	no flow direction, no waves
DS2-600	27/08/2003	1.34	8.31	E	3	NA	no flow direction, no waves
DS2-600 QA/QC Duplicate	27/08/2003	1.67	3.8	E	3	NA	no flow direction, no waves
DS2-800	27/08/2003	1.2	7.4	E	3	NA	no flow direction, no waves
DS2-800 (S&S filter)	27/08/2003	1.06	6.7	E	3	NA	no flow direction, no waves
DS2-1000	27/08/2003	0.65	5.9	E	3	NA	no flow direction, no waves
DS2-1000 (S&S filter)	27/08/2003	1.68	4.3	E	3	NA	no flow direction, no waves
DS2-1200	27/08/2003	1.78	2.9	E	3	NA	no flow direction, no waves
DS2-1600	27/08/2003	0.92	5.6	E	3	NA	no flow direction, no waves
DS2-1800	27/08/2003	0.93	5.6	E	3	NA	no flow direction, no waves
DS2-600	31/08/2003	0.42	3.9	W	2	S	
DS2-800	31/08/2003	0.96	5	W	2	S	
DS2-1000	31/08/2003	0.6	5.7	W	2	S	
DS2-1200	31/08/2003	1.16	4.8	W	2	S	
DS2-1200 QA/QC duplicate	31/08/2003	0.81	4.9	W	2	S	
DS2-1400 at south side of dock cell	31/08/2003	0.76	4	W	2	S	
DS3-1425 at north side of dock cell	31/08/2003	1.6	2.5	W	2	S	
DS2-1600	31/08/2003	1.94	5	W	2	S	
DS2-1800	31/08/2003	1.09	3.6	W	2	S	

No work along shoreline from September 1 to September 15 except September 12th, no TSS sampling as a result.

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Station	Date (dd/mm/yyyy)	Turbidity (NTU)	TSS (mg/L)	Wind Direction	Wind Velocity (mph)	Water Flow Direction	Comments
DS2-600	12/09/2003	1.24	6	SW	18	NA	
DS2-800	12/09/2003	1.91	2.7	SW	18	NA	
DS2-1000	12/09/2003	1.11	5.3	SW	18	NA	
DS2-1200	12/09/2003	1.26	5.8	SW	18	NA	
DS2-1400 at south side of dock cell	12/09/2003	1.82	5.1	SW	18	NA	
DS3-1425 at north side of dock cell	12/09/2003	0.68	3.7	SW	18	NA	
DS2-1600	12/09/2003	1.05	6.2	SW	18	NA	
DS2-1800	12/09/2003	0.64	5.5	SW	18	NA	
Work along shoreline, TSS sampling resumed							
DS2-600	15/09/2003	0.45	4.8	W	15	NA	Ice packed in the Bay and shore, light snow, slush on surface.
DS2-800	15/09/2003	0.57	3.8	W	15	NA	Ice packed in the Bay and shore, light snow, slush on surface.
DS2-1000	15/09/2003	0.75	3.8	W	15	NA	Ice packed in the Bay and shore, light snow, slush on surface.
DS2-1200	15/09/2003	0.45	4.5	W	15	NA	Ice packed in the Bay and shore, light snow, slush on surface.
DS2-1400 at 1325	15/09/2003	1.46	5	W	15	NA	Ice packed in the Bay and shore, light snow, slush on surface.
DS3-1425 at 1450	15/09/2003	0.99	4.9	W	15	NA	Ice packed in the Bay and shore, light snow, slush on surface.
DS2-1600	15/09/2003	0.84	4.8	W	15	NA	Ice packed in the Bay and shore, light snow, slush on surface.
DS2-1800	15/09/2003	0.55	3.5	W	15	NA	Ice packed in the Bay and shore, light snow, slush on surface.
DS2-1800 QA/QC Duplicate	15/09/2003	0.7	4.1	W	15	NA	Ice packed in the Bay and shore, light snow, slush on surface.
DS2-600	17/09/2003	0.65	4.7	NW	17	NA	Low tide, slush on surface, ice packed in the Bay and shore.
DS2-800	17/09/2003	0.66	3.4	NW	17	NA	Low tide, slush on surface, ice packed in the Bay and shore.
DS2-1000	17/09/2003	0.55	5	NW	17	NA	Low tide, slush on surface, ice packed in the Bay and shore.
DS2-1200	17/09/2003	0.41	4.7	NW	17	NA	Low tide, slush on surface, ice packed in the Bay and shore.
DS2-1400 at 1325	17/09/2003	2.11	6.2	NW	17	NA	Low tide, slush on surface, ice packed in the Bay and shore.
DS3-1425 at 1450	17/09/2003	1.45	5.9	NW	17	NA	Low tide, slush on surface, ice packed in the Bay and shore.
DS2-1600	17/09/2003	0.54	4.3	NW	17	NA	Low tide, slush on surface, ice packed in the Bay and shore.
DS2-1800	17/09/2003	0.73	3.5	NW	17	NA	Low tide, slush on surface, ice packed in the Bay and shore.
DS2-1800 QA/QC Duplicate	17/09/2003	0.73	4.7	NW	17	NA	Low tide, slush on surface, ice packed in the Bay and shore.
DS2-600	18/09/2003	0.46	4.2	W	20	NA	Low tide, slush on surface, ice packed in the Bay and shore, Picture taken
DS2-800	18/09/2003	0.79	4.2	W	20	NA	Low tide, slush on surface, ice packed in the Bay and shore, Picture taken
DS2-1000	18/09/2003	0.62	4.4	W	20	NA	Low tide, slush on surface, ice packed in the Bay and shore, Picture taken
DS2-1200	18/09/2003	0.47	4.1	W	20	NA	Low tide, slush on surface, ice packed in the Bay and shore, Picture taken
DS2-1400 at 1325	18/09/2003	0.8	4.5	W	20	NA	Low tide, slush on surface, ice packed in the Bay and shore, Picture taken
DS3-1425 at 1450	18/09/2003	0.97	2.8	W	20	NA	Low tide, slush on surface, ice packed in the Bay and shore, Picture taken
DS2-1600	18/09/2003	0.69	4	W	20	NA	Low tide, slush on surface, ice packed in the Bay and shore, Picture taken
DS2-1800	18/09/2003	0.48	3.2	W	20	NA	Low tide, slush on surface, ice packed in the Bay and shore, Picture taken
DS2-1800 QA/QC Duplicate	18/09/2003	0.48	3	W	20	NA	Low tide, slush on surface, ice packed in the Bay and shore, Picture taken
DS2-600	19/09/2003	0.43	3.5	S	7	NA	Low tide, slush on surface, ice packed in the Bay and shore.
DS2-800	19/09/2003	0.39	3.9	S	7	NA	Low tide, slush on surface, ice packed in the Bay and shore.
DS2-1000	19/09/2003	0.45	3.9	S	7	NA	Low tide, slush on surface, ice packed in the Bay and shore.
DS2-1200	19/09/2003	0.54	4	S	7	NA	Low tide, slush on surface, ice packed in the Bay and shore.
DS2-1400 at 1325	19/09/2003	0.58	3.8	S	7	NA	Low tide, slush on surface, ice packed in the Bay and shore.
DS3-1425 at 1450	19/09/2003	0.89	3.8	S	7	NA	Low tide, slush on surface, ice packed in the Bay and shore.
DS2-1600	19/09/2003	0.56	4	S	7	NA	Low tide, slush on surface, ice packed in the Bay and shore.
DS2-1800	19/09/2003	1.4	4.1	S	7	NA	Low tide, slush on surface, ice packed in the Bay and shore.
DS2-1800 QA/QC Duplicate	19/09/2003	1.4	4.6	S	7	NA	Low tide, slush on surface, ice packed in the Bay and shore.
DS2-600	20/09/2003	1.03	4	S	5	NA	Low tide, slush on surface, ice packed in the Bay and shore, foggy, light snow.
DS2-800	20/09/2003	0.82	4.6	S	5	NA	Low tide, slush on surface, ice packed in the Bay and shore, foggy, light snow.
DS2-1000	20/09/2003	NA	NA	S	5	NA	Low tide, slush on surface, iced in too much, Foggy, light snow.
DS2-1200	20/09/2003	NA	NA	S	5	NA	Low tide, slush on surface, iced in too much, Foggy, light snow.
DS2-1400 at 1325	20/09/2003	NA	NA	S	5	NA	Low tide, slush on surface, iced in too much, Foggy, light snow.
DS3-1425 at 1450	20/09/2003	NA	NA	S	5	NA	Low tide, slush on surface, iced in too much, Foggy, light snow.
DS2-1600	20/09/2003	NA	NA	S	5	NA	Low tide, slush on surface, iced in too much, Foggy, light snow.
DS2-1800	20/09/2003	NA	NA	S	5	NA	Low tide, slush on surface, iced in too much, Foggy, light snow.
DS2-1800 QA/QC Duplicate	20/09/2003	NA	NA	S	5	NA	Low tide, slush on surface, iced in too much, Foggy, light snow.

TSS Sampling completed September 19th, shore iced in.

Marine Shoreline Photographs
Week of July 18, 2003



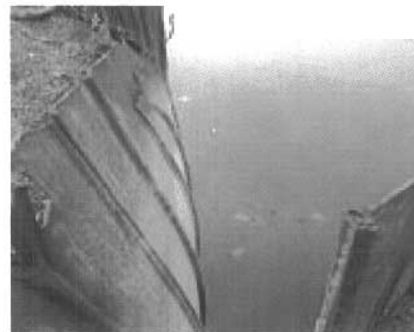
Station 800N



Station 1000N



Station 1200N



Station 1400N



Station 1600N



Station 1800N

Marine Shoreline Photographs
Week of July 25, 2003



Station 600N



Station 800N



Station 1000N



Station 1200N



Station 1400N



Station 1425N



Station 1600N



Station 1800N

Marine Shoreline Photographs
Week of August 2, 2003



Station 600N



Station 800N



Station 1000N



Station 1200N



Station 1400N

Could not access station

Station 1425N



Station 1600N



Station 1800N

Marine Shoreline Photographs
Week of August 9, 2003



Station 600N



Station 800N



Station 1000N



Station 1200N



Station 1400N



Station 1425N



Station 1600N



Station 1800N

Marine Shoreline Photographs
Week of August 17, 2003



Station 600N



Station 800N



Station 1000N



Station 1200N



Station 1400N



Station 1425N



Station 1600N



Station 1800N

Marine Shoreline Photographs
Week of August 24, 2003



Station 600N



Station 800N



Station 1000N



Station 1200N



Station 1400N



Station 1425N

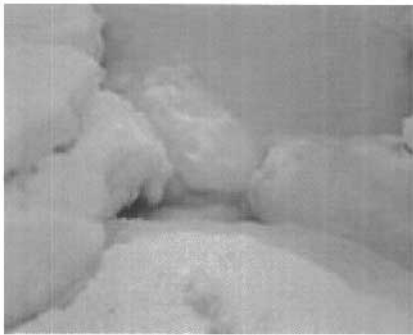


Station 1600N

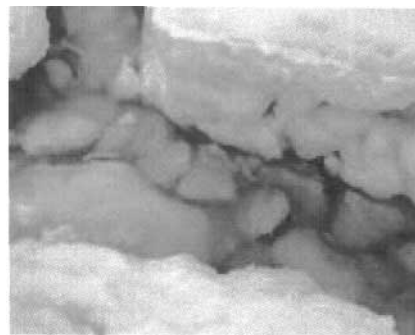


Station 1800N

Marine Shoreline Photographs
Week of September 21, 2003



Station 600N



Station 800N



Station 1000N



Station 1200N



Station 1400N

Could not access station

Station 1425N



Station 1600N



Station 1800N

APPENDIX 20

SUMMARY OF

EFFLUENT MONITORING

AND

EFFLUENT CHARACTERIZATION

POLARIS MINE – MMER MONITORING REPORT

3rd QUARTER 2003

APPENDIX A

- i. Information specified by Section 8.1 of Reference Method EPS 1/Rm/13: 96 hr acute rainbow trout test

APPENDIX B

- i. Information specified by Section 8.1 of Reference Method EPS 1/Rm/14: 72 hr acute *Daphnia magna* test

APPENDIX C

- i. Information specified in Schedule 5 of the MMER (June 2002) for Reference Method EPAW 95-EPA West Coast: 7-day Topsmelt Survival and Growth Test.

APPENDIX D

- i. Information specified in Schedule 5 of the MMER (June 2002) for Reference Method EPS 1/Rm/27-EC: 92 hr Echinoderm (sand dollar) Fertilization Test (Annual)

APPENDIX E

- i. Information specified in Schedule 5 of the MMER (June 2002) for Reference Method EPA/600/4-91-003, Method 1009.0: Algae (*Champia parvula*) 7-day Sublethal Growth Test (Annual).

APPENDIX F (Mass Loadings)

- i. Concentration & monthly mean concentrations of each deleterious substance of Schedule 4
- ii. pH of the effluents samples as required by subsection 12(1)
- iii. Description of sample collection method
- iv. Total volume of effluent deposited during each month of the quarter as per section 19
- v. Mass loading of the deleterious substances set out in Schedule 4 and as per section 20

APPENDIX G

- i. Results of the effluent characterization as per paragraph 15(1)(a)

APPENDIX A

96-h Acute Rainbow Trout Toxicity Test

Reporting Requirements for Reference Method EPS 1/RM/13

Section 8.1.1 Effluent

- i. Name & location of operation generating the effluent
 - Polaris Mine, Little Cornwallis Island, Nunavut
 - Final Discharge Point for Garrow Lake is geo referenced as 75° 22' 32" N, 97° 48' 37" W.
- ii. Date & time of sampling
 - Samples for monthly acute toxicity testing were collected
 - Test 1: Wednesday July 30, 2003 - 1:00 PM
 - Test 2: Wednesday August 20, 2003 - 12:30 AM
 - Test 3: Tuesday September 16, 2003 - 5:00 PM
- iii. Type of sample
 - Final effluent water
- iv. Brief description of sampling point
 - 20m downstream of the siphon discharge point at Garrow Lake dam
- v. Sampling method
 - Water was collected from at least 15cm below the surface using a water pump with silicon tubing
 - Water was collected from the upstream direction
 - The pump was flushed with site water for at least one minute prior to sample collection
 - 2 x 20L sample bottles were filled
- vi. Name of person submitting samples
 - Dennis Lu (Gartner Lee)

Section 8.1.2 Test Facilities and Conditions

- i. Test type & method
 - 96-hour Rainbow Trout LC₅₀
- ii. Indications of deviations from requirements in Sections 2 to 7 of Method EPS 1/RM/13
 - No deviations from requirements
 - Salinity controls were run
 - Sample water salinity was 2ppt (Test 1); 4ppt (Test 2), and 6ppt (Test 3)
- iii. Name and city of testing laboratory
 - EVS Environment Consultants, North Vancouver, BC
- iv. Percent mortality of fish in stock tank(s)
 - Test 1: 0.1%
 - Test 2: 0.1%
 - Test 3: 1%
- v. Species of test organism
 - Rainbow Trout (*Oncorhynchus mykiss*)
- vi. Date and time for start of definitive test
 - Test 1: Saturday August 2, 2003 - 2:00 PM
 - Test 2: Friday August 22, 2003 - 12:30 PM
 - Test 3: Friday September 19, 2003 - 5:00 PM
- vii. Person(s) performing the test and verifying the results
 - Andy Diewald, Devika Jayaweera, May Lee
- viii. pH, temperature, dissolved oxygen, and conductivity of unadjusted, undiluted effluent
 - Test 1: pH - 7.8, T - 15.0°C, DO - 10.0mg/L, C - 4100µmhos/cm
 - Test 2: pH - 7.8, T - 15.0°C, DO - 10.1mg/L, C - 6000µmhos/cm
 - Test 3: pH - 8.1, T - 16.0°C, DO - 10.0mg/L, C - 8000µmhos/cm

Reporting Requirements for Reference Method EPS 1/RM/13

- ix. Confirmation that no adjustment of sample or solution pH occurred
 - Test 1: No pH adjustment
 - Test 2: No pH adjustment
 - Test 3: No pH adjustment
- x. Indication of aeration of test solutions before introduction of fish
 - Test 1: 6.5 ± 1 mL/min/L for 60mins
 - Test 2: 6.5 ± 1 mL/min/L for 90mins
 - Test 3: 6.5 ± 1 mL/min/L for 120mins
- xi. Concentrations and volumes tested
 - Concentrations (% effluent volume / total volume) tested and total volumes used were:
 - Control (0%) - 12 L (test 1&2), 15 L (test 3)
 - 6.25% - 12 L (test 1&2), 15 L (test 3)
 - 12.5% - 12 L (test 1&2), 15 L (test 3)
 - 25% - 12 L (test 1&2), 15 L (test 3)
 - 50% - 12 L (test 1&2), 15 L (test 3)
 - 100% - 12 L (test 1&2), 15 L (test 3)
 - Salinity Control - 12 L (test 1&2), 15 L (test 3)
- xii. Measurements of dissolved oxygen, pH and temperature
 - Test 1: DO: 8.2 - 10.1 mg/L, pH: 7.0 - 7.8, T: 15.0 °C
 - Test 2: DO: 8.2 - 10.1 mg/L, pH: 7.1 - 7.8, T: 15.0 °C
 - Test 3: DO: 8.2 - 10.0 mg/L, pH: 6.6 - 8.1, T: 15.0 - 16.0 °C
- xiii. Number of fish added to each test vessel
 - 10 fish/ vessel
- xiv. Mean and range of fork length of control fish at end of test
 - Test 1: 42mm (40-44)
 - Test 2: 38mm (35-42)
 - Test 3: 36mm (32-40)
- xv. Mean wet weight of individual control fish at end of the test
 - Test 1: 0.57g (0.43-0.68)
 - Test 2: 0.59g (0.43-0.72)
 - Test 3: 0.50g (0.35-0.61)
- xvi. Estimated loading density of fish in test solutions
 - Test 1: 0.48g/L
 - Test 2: 0.49g/L
 - Test 3: 0.33g/L

Section 8.1.3 Results

- i. Number of mortalities of fish in each test solution
 - Results were the same for Test 1, Test 2, and Test 3, except where noted
 - Control (0%) - 0
 - 6.25% - 0
 - 12.5% - 0
 - 25% - 0
 - 50% - 0 (test 1&2), 1 (test 3)
 - 100% - 0
 - Salinity Control - 0

Reporting Requirements for Reference Method EPS 1/RM/13

- ii. Number of control fish showing atypical/stressed behaviour
 - None in Test 1, Test 2, or Test 3
- iii. Mean mortality rate in solutions of effluent and control water
 - Results were the same for Test 1, Test 2, and Test 3, except where noted
 - Control (0%) - 0%
 - 6.25% - 0%
 - 12.5% - 0%
 - 25% - 0%
 - 50% - 0% (test 1&2), 10% (test 3)
 - 100% - 0%
 - Salinity Control - 0%
- iv. Estimate of 96-h LC₅₀ in multi-concentration tests
 - Results were the same for Test 1, Test 2, and Test 3
 - 96hr LC₅₀ concentration > 100% effluent
- v. Most recent 96-h LC₅₀ for reference toxicity test(s)
 - Reference toxicity tests for Toxicant: SDS
 - Test 1: (Jul-10-03) 96-h LC₅₀ = 36mg/L SDS, 95% CL = 30-42mg/L
 - Test 2: (Aug-5-03) 96-h LC₅₀ = 24mg/L SDS, 95% CL = 18-32mg/L
 - Test 3: (Sep-3-03) 96-h LC₅₀ = 24mg/L SDS, 95% CL = 22-26mg/L

APPENDIX B

72-h Acute *Daphnia magna* Toxicity Test

Reporting Requirements for Reference Method EPS 1/RM/14

Section 8.1.1 Effluent

- i. Name & location of operation generating the effluent
 - Polaris Mine, Little Cornwallis Island, Nunavut
 - Final Discharge Point for Garrow Lake is geo referenced as 75° 22' 32" N, 97° 48' 37" W.
- ii. Date & time of sampling
 - Samples for monthly acute toxicity testing were collected
 - Test 1: Wednesday July 30, 2003 - 1:00 PM
 - Test 2: Wednesday August 20, 2003 - 12:30 AM
 - Test 3: Tuesday September 16, 2003 - 5:00 PM
- iii. Type of sample
 - Final effluent water
- iv. Brief description of sampling point
 - 20m downstream of the siphon discharge point at Garrow Lake dam
- v. Sampling method
 - Water was collected from at least 15cm below the surface using a water pump with silicon tubing
 - Water was collected from the upstream direction
 - The pump was flushed with site water for at least one minute prior to sample collection
 - 2 x 20L sample bottles were filled
- vi. Name of person submitting samples
 - Dennis Lu (Gartner Lee)

Section 8.1.2 Test Facilities and Conditions

- i. Test type & method
 - 48-hour *Daphnia magna* LC₅₀
- ii. Indications of deviations from requirements in Sections 2 to 7 of Method EPS 1/RM/13
 - No deviations from requirements
 - Salinity controls were run
 - Sample water salinity was 2ppt (Test 1); 4ppt (Test 2), and 6ppt (Test 3)
- iii. Name and city of testing laboratory
 - EVS Environment Consultants, North Vancouver, BC
- iv. Species of test organism
 - *Daphnia magna*
- v. Date and time for start of definitive test
 - Test 1: Saturday August 2, 2003 - 2:00 PM
 - Test 2: Friday August 22, 2003 - 3:30 PM
 - Test 3: Friday September 19, 2003 - 3:15 PM
- vi. Person(s) performing the test and verifying the results
 - Andy Diewald and May Lee
- vii. pH, temperature, dissolved oxygen, and conductivity of unadjusted, undiluted effluent
 - Test 1: pH - 7.5, T - 21.0°C, DO - 8.7mg/L, C - 4100µmhos/cm
 - Test 2: pH - 7.8, T - 20.0°C, DO - 8.9mg/L, C - 9280µmhos/cm
 - Test 3: pH - 8.0, T - 19.5°C, DO - 8.7mg/L, C - 11330µmhos/cm
- viii. Confirmation that no adjustment of sample or solution pH occurred
 - Test 1: No pH adjustment
 - Test 2: No pH adjustment
 - Test 3: No pH adjustment

Reporting Requirements for Reference Method EPS 1/RM/14

- ix. Indication of any adjustment of hardness of effluent sample
 - Test 1: No hardness adjustment
 - Test 2: No hardness adjustment
 - Test 3: No hardness adjustment
- x. Indication of any aeration of sample
 - Test 1: No pre-aeration adjustment
 - Test 2: No pre-aeration adjustment
 - Test 3: 25-50 mL/min/L for 10mins
- xi. Concentrations and volumes tested
 - Concentrations (% effluent volume / total volume) tested and total volumes used were:
 - Control (0%) - 200 mL
 - 6.25% - 200 mL
 - 12.5% - 200 mL
 - 25% - 200 mL
 - 50% - 200 mL
 - 100% - 200 mL
 - Salinity Control - 200 mL
- xii. Measurements of dissolved oxygen, pH and temperature
 - Test 1: DO: 8.3 - 8.7 mg/L, pH: 7.5 - 7.9, T: 20.0 - 21.0 °C
 - Test 2: DO: 8.4 - 9.0 mg/L, pH: 7.6 - 8.1, T: 20.0 - 20.5 °C
 - Test 3: DO: 8.3 - 9.1 mg/L, pH: 7.6 - 8.1, T: 19.5 - 21.0 °C
- xiii. Estimates of time to first brood, average number of neonates per brood, and percent mortality during the seven-day period prior to the test
 - Test 1: 9 days to brood, >15 neonates/brood, 4.6% mortality in 7d prior to test
 - Test 2: 9 days to brood, >19.9 neonates/brood, 10.0% mortality in 7d prior to test
 - Test 3: 8 days to brood, >26.3 neonates/brood, 5.5% mortality in 7d prior to test
- xiv. Number of neonates per test vessel and milliliters of solution per daphnid
 - Methods for all tests and dilution series were the same:
 - 10 neonates per vessel
 - 200 mL of solution per daphnid

Section 8.1.3 Results

- i. Number of dead and/or immobile daphnids in each test solution including controls
 - Results were the same for Test 1, Test 2, and Test 3, except where noted
 - Control (0%) - 0 dead / immobile (test 1&2), 1 dead (test 3)
 - 6.25% - 0 dead / immobile
 - 12.5% - 0 dead / immobile
 - 25% - 0 dead / immobile
 - 50% - 0 dead / immobile
 - 100% - 0 dead / immobile (test 1&2), 1 dead (test 3)
 - Salinity Control - 0 dead / immobile
- ii. For single-concentration test the number of daphnids dead in each of three replicate effluent solutions and in each of three replicate control solutions at end of test. Also report the mean value.
 - Single concentration test was not conducted, dilution series tests were conducted