

APPENDIX G

TOXICITY DATA

Toxicity Summary Tables

Table G-1.
2018 RHMP Sediment Quality Objectives (SQO) Assessment
Toxicity - Amphipod 10-Day Test

Harbor	Strata	Station ID	Control % Survival					Sample % Survival					Mean Control % Survival	Mean Sample % Survival	% of control	t-test (unequal variance)	Significant?
Dana Point Harbor	Deep	B18-10068	100	95	90	100	100	90	95	100	90	100	97	95	98	0.26	No
	Freshwater-Influenced	B18-10066	100	95	90	100	100	95	95	100	95	95	97	96	99	0.34	No
	Marina	B18-10067	100	95	90	100	100	100	90	100	85	90	97	93	96	0.15	No
	Shallow	B18-10065	100	95	90	100	100	100	85	90	90	80	97	89	92	0.04	Yes
Oceanside Harbor	Deep	B18-10071	100	95	90	100	100	100	80	100	100	95	97	95	98	0.33	No
	Freshwater-Influenced	B18-10070	100	95	90	100	100	100	100	90	95	100	97	97	100	0.50	No
	Marina	B18-10069	100	95	90	100	100	100	100	100	95	95	97	99	102	0.20	No
		B18-10072	100	95	90	100	100	70	60	60	85	75	97	70	72	0.00	Yes
Mission Bay	Deep	B18-10019	95	100	95	95	90	100	100	100	90	90	95	96	101	0.37	No
		B18-10020	95	100	95	95	90	95	100	100	95	100	95	98	103	0.09	No
	Freshwater-Influenced	B18-10015	95	100	95	95	90	85	100	95	100	85	95	93	98	0.31	No
		B18-10074	95	100	95	95	90	95	100	100	95	100	95	98	103	0.09	No
	Marina	B18-10075	95	100	95	95	90	95	95	95	100	95	95	96	101	0.31	No
		B18-10016	95	100	95	95	90	100	100	85	100	90	95	95	100	0.50	No
	Shallow	B18-10017	95	100	95	95	90	75	75	80	85	90	95	81	85	0.00	Yes
		B18-10073	95	100	95	95	90	100	100	100	100	100	95	98	103	0.14	No
		B18-10438	95	100	95	95	90	95	90	95	95	100	95	95	100	0.50	No
San Diego Bay - North	Deep	B18-10022	100	100	100	95	100	100	95	95	100	100	99	98	99	0.27	No
		B18-10023	100	100	100	95	100	95	95	100	100	100	99	98	99	0.27	No
		B18-10024	100	100	100	100	95	100	95	95	100	100	99	98	99	0.27	No
		B18-10030	100	100	100	95	100	100	100	100	95	100	99	99	100	0.50	No
		B18-10112	100	100	100	100	95	100	95	95	95	100	99	97	98	0.12	No
		B18-10113	100	100	100	100	95	95	95	100	100	95	99	97	98	0.12	No
		B18-10116	100	100	100	100	95	95	95	95	95	95	99	95	96	0.01	Yes
		B18-10117	100	100	100	95	100	100	95	95	85	90	99	93	94	0.04	Yes
	Freshwater-Influenced	B18-10029	100	100	100	100	95	90	100	95	100	100	99	97	98	0.20	No
		B18-10076	100	100	100	95	100	100	100	100	100	100	99	100	101	0.19	No
	Industrial/Port	B18-10114	100	100	100	100	95	100	95	95	95	95	99	96	97	0.03	Yes
		B18-10115	100	100	100	100	95	95	100	90	90	95	99	94	95	0.03	Yes
	Marina	B18-10078	100	100	100	95	100	95	95	100	100	100	99	98	99	0.27	No
		B18-10079	100	100	100	95	100	100	100	95	100	100	99	99	100	0.50	No
		B18-10080	100	100	100	95	100	95	85	100	95	95	99	94	95	0.06	No
		B18-10081	100	100	100	95	100	90	100	100	100	100	99	98	99	0.34	No
		B18-10082	100	100	100	95	100	90	100	100	100	95	99	97	98	0.20	No
		B18-10083	100	100	100	95	100	100	95	95	100	95	99	97	98	0.12	No
		B18-10084	100	100	100	95	100	100	95	100	90	100	99	97	98	0.20	No
	Shallow	B18-10077	100	100	100	95	100	95	100	100	100	95	99	98	99	0.27	No

Table G-1.
2018 RHMP Sediment Quality Objectives (SQO) Assessment
Toxicity - Amphipod 10-Day Test

Harbor	Strata	Station ID	Control % Survival					Sample % Survival					Mean Control % Survival	Mean Sample % Survival	% of control	t-test (unequal variance)	Significant?
San Diego Bay - Central	Deep	B18-10133	100	100	100	80	100	85	90	85	95	90	96	89	93	0.08	No
		B18-10141	100	100	100	80	100	100	100	85	100	95	96	96	100	0.50	No
		B18-10144	100	100	100	80	100	95	90	100	95	95	96	95	99	0.41	No
	Freshwater-Influenced	B18-10031	100	100	100	100	95	95	100	100	100	95	99	98	99	0.27	No
		B18-10178	100	100	100	100	95	90	70	90	95	75	99	84	85	0.02	Yes
	Industrial/Port	B18-10119	100	100	100	100	95	90	85	85	95	95	99	90	91	0.01	Yes
		B18-10121	100	100	100	100	95	90	90	100	100	100	99	96	97	0.15	No
		B18-10123	100	100	100	100	95	100	90	95	85	90	99	92	93	0.02	Yes
		B18-10124	100	100	100	80	100	85	70	95	95	90	96	87	91	0.09	No
		B18-10126	100	100	100	80	100	100	85	95	90	90	96	92	96	0.21	No
		B18-10127	100	100	100	80	100	95	100	100	90	95	96	96	100	0.50	No
		B18-10132	100	100	100	80	100	100	100	85	90	90	96	93	97	0.28	No
		B18-10136	100	100	100	80	100	85	100	90	95	85	96	91	95	0.17	No
		B18-10137	100	100	100	80	100	95	85	90	85	95	96	90	94	0.12	No
		B18-10139	100	100	100	80	100	100	100	90	90	90	96	94	98	0.34	No
		B18-10140	100	100	100	80	100	85	95	100	100	95	96	95	99	0.42	No
		B18-10142	100	100	100	80	100	90	100	80	90	100	96	92	96	0.24	No
		B18-10143	100	100	100	80	100	90	100	95	95	90	96	94	98	0.33	No
	Shallow	B18-10032	100	100	100	100	95	95	100	100	95	85	99	95	96	0.11	No
		B18-10034	100	100	100	80	100	90	100	90	100	100	96	96	100	0.50	No
		B18-10035	100	100	100	80	100	90	100	95	95	95	96	95	99	0.41	No
		B18-10036	100	100	100	80	100	95	85	95	75	80	96	86	90	0.06	No
San Diego Bay - South	Freshwater-Influenced	B18-10037	95	95	100	95	95	100	90	90	100	100	96	96	100	0.50	No
		B18-10040	75	95	95	95	95	95	90	85	90	90	91	90	99	0.41	No
		B18-10044	75	95	95	95	95	70	80	100	85	70	91	81	89	0.09	No
		B18-10179	95	95	100	95	95	100	90	100	95	90	96	95	99	0.35	No
		B18-10180	95	95	100	95	95	85	100	100	85	95	96	93	97	0.22	No
		B18-10181	95	95	100	95	95	95	100	90	100	85	96	94	98	0.27	No
		B18-10200	100	100	95	95	95	80	90	80	90	70	97	82	85	0.01	Yes
	Marina	B18-10085	95	95	100	95	95	95	100	100	100	90	96	97	101	0.34	No
		B18-10086	95	95	100	95	95	90	80	90	90	100	96	90	94	0.07	No
		B18-10087	95	95	100	95	95	90	90	100	80	75	96	87	91	0.05	No
	Shallow	B18-10038	95	95	100	95	95	100	100	100	100	95	96	99	103	0.03	Yes
		B18-10039	100	100	100	80	100	95	90	95	95	85	96	92	96	0.20	No
		B18-10041	95	95	100	95	95	100	100	90	100	95	96	97	101	0.34	No
		B18-10042	95	95	100	95	95	90	95	95	95	85	96	92	96	0.06	No
		B18-10043	75	95	95	95	95	90	95	85	90	75	91	87	96	0.23	No
		B18-10088	95	95	100	95	95	70	95	90	70	80	96	81	84	0.02	Yes

Table G-2.
2018 RHMP Sediment Quality Objectives (SQO) Assessment
Toxicity - Bivalve Sediment Water Interface Test

Harbor	Stratum	Station ID	Control Combined % Normal and Alive					Sample Combined % Normal and Alive					Mean Control Combined % Normal and Alive	Mean Sample Combined % Normal and Alive	% of Control	t-test (unequal variance)	Significant?
Dana Point Harbor	Deep	B18-10068	96	88	82	96	94	87	93	75	85	83	91.1	84.7	93	0.07	No
	Freshwater-Influenced	B18-10066	96	88	82	96	94	77	95	80	96	83	91.1	86.2	94.59	0.17	No
	Marina	B18-10067	96	88	82	96	94	87	95	77	87	84	91.1	86.1	94	0.12	No
	Shallow	B18-10065	96	88	82	96	94	94	86	78	73	85	91.1	82.8	91	0.05	No
Oceanside Harbor	Deep	B18-10071	96	88	82	96	94	82	87	82	81	75	91.1	81.5	89	0.01	Yes
	Freshwater-Influenced	B18-10070	96	88	82	96	94	90	73	96	88	87	91.1	87.1	95.56	0.20	No
	Marina	B18-10069	96	88	82	96	94	72	74	74	95	85	91.1	80.2	88	0.04	Yes
		B18-10072	96	88	82	96	94	81	83	85	95	89	91.1	86.5	95	0.12	No
Mission Bay	Deep	B18-10019	98	94	98	96	77	93	84	89	92	93	92.4	90.0	97	0.30	No
		B18-10020	98	94	98	96	77	77	94	87	86	87	92.4	86.1	93	0.12	No
	Freshwater-Influenced	B18-10015	98	94	98	96	77	98	94	94	92	97	92.4	94.9	102.68	0.29	No
		B18-10074	98	94	98	96	77	85	85	89	78	87	92.4	84.7	92	0.07	No
	Marina	B18-10075	98	94	98	96	77	76	94	87	97	81	92.4	86.8	94	0.17	No
		B18-10016	98	94	98	96	77	93	96	90	97	77	92.4	90.6	98	0.37	No
		B18-10017	98	94	98	96	77	85	87	93	91	94	92.4	90.2	98	0.32	No
		B18-10073	98	94	98	96	77	93	78	73	78	77	92.4	79.6	86	0.02	Yes
		B18-10438	98	94	98	96	77	78	98	93	89	91	92.4	89.6	97	0.30	No
San Diego Bay - North	Deep	B18-10022	73	75	79	76	77	77	77	79	83	78	76.0	78.7	104	0.07	No
		B18-10023	73	75	79	76	77	78	83	89	81	92	76.0	84.7	111	0.01	Yes
		B18-10024	71	73	69	79	85	73	69	85	85	64	75.4	75.0	99	0.47	No
		B18-10030	73	75	79	76	77	79	79	88	79	81	76.0	81.3	107	0.02	Yes
		B18-10112	71	73	69	79	85	80	77	86	79	84	75.4	81.2	108	0.07	No
		B18-10113	71	73	69	79	85	71	82	91	82	38	75.4	72.9	97	0.40	No
		B18-10116	71	73	69	79	85	88	84	61	73	80	75.4	77.2	102	0.38	No
		B18-10117	73	75	79	76	77	64	71	81	77	70	76.0	72.7	96	0.17	No
	Freshwater-Influenced	B18-10029	71	73	69	79	85	77	71	57	64	70	75.4	67.7	89.69	0.06	No
		B18-10076	73	75	79	76	77	77	86	75	79	84	76.0	80.2	105.63	0.06	No
	Industrial/Port	B18-10114	71	73	69	79	85	68	82	71	75	66	75.4	72.4	96	0.24	No
		B18-10115	71	73	69	79	85	86	87	89	84	70	75.4	83.5	111	0.06	No
	Marina	B18-10078	73	75	79	76	77	78	77	71	78	89	76.0	78.9	104	0.19	No
		B18-10079	73	75	79	76	77	91	88	83	76	81	76.0	83.7	110	0.02	Yes
		B18-10080	73	75	79	76	77	88	85	70	66	83	76.0	78.5	103	0.30	No
		B18-10081	73	75	79	76	77	66	78	73	85	75	76.0	75.6	99	0.46	No
		B18-10082	73	75	79	76	77	40	64	53	65	70	76.0	58.1	77	0.01	Yes
		B18-10083	73	75	79	76	77	68	69	80	73	63	76.0	70.9	93	0.08	No
		B18-10084	73	75	79	76	77	73	76	84	71	79	76.0	76.6	101	0.40	No
	Shallow	B18-10077	73	75	79	76	77	77	79	85	77	77	76.0	79.1	104	0.07	No

Table G-2.
2018 RHMP Sediment Quality Objectives (SQO) Assessment
Toxicity - Bivalve Sediment Water Interface Test

Harbor	Stratum	Station ID	Control Combined % Normal and Alive					Sample Combined % Normal and Alive					Mean Control Combined % Normal and Alive	Mean Sample Combined % Normal and Alive	% of Control	t-test (unequal variance)	Significant?
San Diego Bay - Central	Deep	B18-10133	89	87	78	87	80	84	87	79	76	90	84.2	83.1	99	0.37	No
		B18-10141	89	87	78	87	80	79	80	88	75	82	84.2	80.9	96	0.16	No
		B18-10144	87	89	82	85	85	81	84	75	82	71	85.4	78.4	92	0.02	Yes
	Freshwater-Influenced	B18-10031	71	73	69	79	85	72	76	86	81	77	75.4	78.5	104.12	0.22	No
		B18-10178	71	73	69	79	85	78	78	92	82	81	75.4	82.1	108.83	0.06	No
	Industrial/Port	B18-10119	71	73	69	79	85	88	87	81	70	75	75.4	80.2	106	0.16	No
		B18-10121	71	73	69	79	85	75	77	83	77	81	75.4	78.5	104	0.20	No
		B18-10123	71	73	69	79	85	78	84	75	87	88	75.4	82.3	109	0.06	No
		B18-10124	89	87	78	87	80	83	96	86	91	83	84.2	88.0	104	0.15	No
		B18-10126	89	87	78	87	80	67	88	91	84	87	84.2	83.5	99	0.44	No
		B18-10127	89	87	78	87	80	82	83	91	85	88	84.2	85.5	102	0.33	No
		B18-10132	89	87	78	87	80	79	90	73	85	78	84.2	81.1	96	0.21	No
		B18-10136	89	87	78	87	80	86	90	83	90	67	84.2	83.2	99	0.42	No
		B18-10137	89	87	78	87	80	89	88	61	87	82	84.2	81.6	97	0.33	No
		B18-10139	89	87	78	87	80	84	83	73	80	78	84.2	79.6	95	0.08	No
		B18-10140	89	87	78	87	80	78	95	82	73	80	84.2	81.6	97	0.28	No
		B18-10142	89	87	78	87	80	69	85	81	83	70	84.2	77.5	92	0.07	No
		B18-10143	87	89	82	85	85	83	85	95	88	87	85.4	87.7	103	0.19	No
	Shallow	B18-10032	71	73	69	79	85	83	77	75	84	75	75.4	78.7	104	0.19	No
		B18-10034	87	89	82	85	85	79	85	68	93	81	85.4	81.0	95	0.18	No
		B18-10035	87	89	82	85	85	83	85	76	90	79	85.4	82.6	97	0.18	No
		B18-10036	87	89	82	85	85	86	82	91	78	84	85.4	84.2	99	0.33	No
San Diego Bay - South	Freshwater-Influenced	B18-10037	70	85	83	82	91	86	80	76	87	78	82.0	81.3	99.03	0.43	No
		B18-10040	98	97	97	89	91	86	92	85	87	80	94.1	86.0	91.39	0.01	Yes
		B18-10044	98	97	97	89	91	87	85	95	99	95	94.1	92.1	97.88	0.27	No
		B18-10179	70	85	83	82	91	76	79	70	77	77	82.0	75.8	92.39	0.08	No
		B18-10180	70	85	83	82	91	79	92	74		83	82.0	81.9	99.85	0.49	No
		B18-10181	70	85	83	82	91	79	94	94	92	89	82.0	89.6	109.19	0.07	No
		B18-10200	83	96	86	96	84	77	70	68	75	68	89.0	71.5	80.36	0.00	Yes
	Marina	B18-10085	70	85	83	82	91	90		82	75	78	82.0	81.0	99	0.42	No
		B18-10086	70	85	83	82	91	83	78	75	74	89	82.0	79.8	97	0.32	No
		B18-10087	70	85	83	82	91	82	64	92	91	73	82.0	80.3	98	0.40	No
	Shallow	B18-10038	70	85	83	82	91		75	85	80	78	82.0	79.5	97	0.27	No
		B18-10039	87	89	82	85	85	88	78	86	74	93	85.4	83.8	98	0.34	No
		B18-10041	70	85	83	82	91	80	91	76	79	83	82.0	81.8	100	0.48	No
		B18-10042	70	85	83	82	91	73	73	78	79	81	82.0	76.8	94	0.11	No
		B18-10043	98	97	97	89	91	93	97	81	86	92	94.1	89.7	95	0.12	No
		B18-10088	70	85	83	82	91	82	83	77	81	82	82.0	80.8	98	0.37	No

Toxicity
SQO Line of Evidence
Matrix

Table G-3.
2018 RHMP Sediment Quality Objectives (SQO) Assessment
Toxicity Scores

Harbor	Strata	Station ID	Eohaustorius 10-Day Test: Toxicity Category	Mytilus SWI Test: Toxicity Category	Integrated Toxicity Indicator
Dana Point Harbor	Deep	B18-10068	Nontoxic	Nontoxic	Nontoxic
	Freshwater-Influenced	B18-10066	Nontoxic	Nontoxic	Nontoxic
	Marina	B18-10067	Nontoxic	Nontoxic	Nontoxic
	Shallow	B18-10065	Low Toxicity	Nontoxic	Low Toxicity
Oceanside Harbor	Deep	B18-10071	Nontoxic	Nontoxic	Nontoxic
	Freshwater-Influenced	B18-10070	Nontoxic	Nontoxic	Nontoxic
	Marina	B18-10069	Nontoxic	Nontoxic	Nontoxic
		B18-10072	Moderate Toxicity	Nontoxic	Low Toxicity
Mission Bay	Deep	B18-10019	Nontoxic	Nontoxic	Nontoxic
		B18-10020	Nontoxic	Nontoxic	Nontoxic
	Freshwater-Influenced	B18-10015	Nontoxic	Nontoxic	Nontoxic
	Marina	B18-10074	Nontoxic	Nontoxic	Nontoxic
		B18-10075	Nontoxic	Nontoxic	Nontoxic
	Shallow	B18-10016	Nontoxic	Nontoxic	Nontoxic
		B18-10017	Low Toxicity	Nontoxic	Low Toxicity
		B18-10073	Nontoxic	Nontoxic	Nontoxic
San Diego Bay - North	Deep	B18-10438 (overdraw)	Nontoxic	Nontoxic	Nontoxic
		B18-10022	Nontoxic	Nontoxic	Nontoxic
		B18-10023	Nontoxic	Nontoxic	Nontoxic
		B18-10024	Nontoxic	Nontoxic	Nontoxic
		B18-10030	Nontoxic	Nontoxic	Nontoxic
		B18-10112	Nontoxic	Nontoxic	Nontoxic
		B18-10113	Nontoxic	Nontoxic	Nontoxic
		B18-10116	Nontoxic	Nontoxic	Nontoxic
	Freshwater-Influenced	B18-10117	Nontoxic	Nontoxic	Nontoxic
		B18-10029	Nontoxic	Nontoxic	Nontoxic
	Industrial/Port	B18-10076	Nontoxic	Nontoxic	Nontoxic
		B18-10114	Nontoxic	Nontoxic	Nontoxic
	Marina	B18-10115	Nontoxic	Nontoxic	Nontoxic
		B18-10078	Nontoxic	Nontoxic	Nontoxic
		B18-10079	Nontoxic	Nontoxic	Nontoxic
		B18-10080	Nontoxic	Nontoxic	Nontoxic
		B18-10081	Nontoxic	Nontoxic	Nontoxic
		B18-10082	Nontoxic	Moderate Toxicity	Low Toxicity
		B18-10083	Nontoxic	Nontoxic	Nontoxic
		B18-10084	Nontoxic	Nontoxic	Nontoxic
	Shallow	B18-10077	Nontoxic	Nontoxic	Nontoxic
San Diego Bay - Central	Deep	B18-10133	Nontoxic	Nontoxic	Nontoxic
		B18-10141	Nontoxic	Nontoxic	Nontoxic
		B18-10144	Nontoxic	Low Toxicity	Low Toxicity
	Freshwater-Influenced	B18-10031	Nontoxic	Nontoxic	Nontoxic
		B18-10178	Low Toxicity	Nontoxic	Low Toxicity
	Industrial/Port	B18-10119	Nontoxic	Nontoxic	Nontoxic
		B18-10121	Nontoxic	Nontoxic	Nontoxic
		B18-10123	Nontoxic	Nontoxic	Nontoxic
		B18-10124	Nontoxic	Nontoxic	Nontoxic
		B18-10126	Nontoxic	Nontoxic	Nontoxic
		B18-10127	Nontoxic	Nontoxic	Nontoxic
		B18-10132	Nontoxic	Nontoxic	Nontoxic
		B18-10136	Nontoxic	Nontoxic	Nontoxic
		B18-10137	Nontoxic	Nontoxic	Nontoxic
		B18-10139	Nontoxic	Nontoxic	Nontoxic
		B18-10140	Nontoxic	Nontoxic	Nontoxic
		B18-10142	Nontoxic	Nontoxic	Nontoxic
		B18-10143	Nontoxic	Nontoxic	Nontoxic
	Shallow	B18-10032	Nontoxic	Nontoxic	Nontoxic
		B18-10034	Nontoxic	Nontoxic	Nontoxic
		B18-10035	Nontoxic	Nontoxic	Nontoxic
		B18-10036	Nontoxic	Nontoxic	Nontoxic
San Diego Bay - South	Freshwater-Influenced	B18-10037	Nontoxic	Nontoxic	Nontoxic
		B18-10040	Nontoxic	Nontoxic	Nontoxic
		B18-10044	Nontoxic	Nontoxic	Nontoxic
		B18-10179	Nontoxic	Nontoxic	Nontoxic
		B18-10180	Nontoxic	Nontoxic	Nontoxic
		B18-10181	Nontoxic	Nontoxic	Nontoxic
	Marina	B18-10200	Low Toxicity	Low Toxicity	Low Toxicity
		B18-10085	Nontoxic	Nontoxic	Nontoxic
		B18-10086	Nontoxic	Nontoxic	Nontoxic
		B18-10087	Nontoxic	Nontoxic	Nontoxic
	Shallow	B18-10038	Nontoxic	Nontoxic	Nontoxic
		B18-10039	Nontoxic	Nontoxic	Nontoxic
		B18-10041	Nontoxic	Nontoxic	Nontoxic
		B18-10042	Nontoxic	Nontoxic	Nontoxic
		B18-10043	Nontoxic	Nontoxic	Nontoxic
		B18-10088	Low Toxicity	Nontoxic	Low Toxicity

Raw Data Report

(Wood Aquatic Toxicology Laboratory)

2018 REGIONAL HARBOR MONITORING PROGRAM

Sediment Toxicity Testing Report

Submitted to:

**Wood Environment & Infrastructure Solutions, Inc.
9210 Sky Park Court, Suite 200
San Diego, CA 92123**

Wood Project Number: 1715100802

Submitted by:



**Wood Environment & Infrastructure Solutions, Inc.
Aquatic Toxicology Laboratory
4905 Morena Blvd., Suite 1304
San Diego, California 92117**

Submitted: March 2020

The Wood aquatic toxicology laboratory is certified by the State of California Department of Health Services – Environmental Lab Accreditation Program (ELAP) under Certificate Number 3010. All test results were obtained following EPA Protocol guidelines and internal QA Program requirements. The data and test results have been reviewed and verified by the following laboratory representative:

Verified by:  Date: 3/17/20.

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1.0 INTRODUCTION

The Regional Harbor Monitoring Program (RHMP) was developed by the Port of San Diego, City of San Diego, City of Oceanside, and County of Orange (RHMP Agencies) in response to a July 24, 2003, request by the San Diego Regional Water Quality Control Board (SDRWQCB) under §13225 of the California Water Code. The RHMP is a comprehensive effort to survey the general water quality and condition of aquatic life in Dana Point Harbor, Oceanside Harbor, Mission Bay, and San Diego Bay and to determine whether beneficial uses are being protected and attained. Monitoring efforts in 2018 were fulfilled by the RHMP agencies through participation in the Southern California Bight 2018 Regional Marine Monitoring Survey (**Bight '18**) coordinated by the Southern California Coastal Water Research Project (SCCWRP). Program management and sample collection for the RHMP agencies was performed by Wood Environment and Infrastructure Solutions, Inc. (Wood). Sediment toxicity testing **was performed by Wood's** in-house Aquatic Toxicology Laboratory (Wood Lab) in San Diego. Since the RHMP program coincided with the region-wide Bight '18 survey, in addition to standard USEPA testing protocols, specific testing guidelines provided by SCCWRP for Bight '18 were also followed for this monitoring event (SCCWRP 2018). Furthermore, toxicology and analytical laboratories were required to participate in a laboratory intercalibration exercise to ensure standard practices between labs and comparability of data generated throughout the region. The Wood Lab passed intercalibration testing for all toxicity test methods used during **Bight '18**. A total of 75 samples were collected throughout the RHMP area between July and September 2018. Sediments sampled for toxicity testing were collected in five batches to ensure that all samples were tested within the program specified two-week holding time. All sediment samples were evaluated using two test methods. These included:

- 10-Day amphipod *Eohaustorius estuarius* (*Eohaustorius*) solid-phase test (USEPA 1994; SCCWRP 2018)
- 48-hour mussel *Mytilus galloprovincialis* (*Mytilus*) larvae development sediment-water interface (SWI) test (Anderson et al., 1996; SCCWRP 2018)

2.0 MATERIALS & METHODS

The methods employed to evaluate sediment toxicity are described below.

2.1 Sample Collection, Receipt, and Preparation

Test site sediments for RHMP program samples were collected by Wood personnel. Approximately five liters of sediment were provided from each site in chemically inert PTFE (Teflon) containers. Samples were delivered in coolers with wet ice to the Wood Aquatic Toxicology Laboratory by Wood personnel following each collection event. Upon receipt, contents of coolers were verified against chain of custody forms. Temperatures were measured and recorded on a sample check-in form. All samples were stored at $4 \pm 2^{\circ}\text{C}$ in the dark until used

for testing. Copies of chain of custody forms and sample check-in data sheets are provided in Appendix A. For the entire testing program, each sample was sieved through a 1-mm Nitex® mesh screen to remove potential native organisms and ensure reliable test organism recovery. Following homogenization and sieving, interstitial pore water samples were collected and analyzed for unionized and total ammonia content. Prior to testing, each sample was thoroughly homogenized.

2.2 Toxicity Test Methodology

Test methods and acceptability criteria for the 10-day amphipod and the mussel SWI are described in Tables 1 and 2, respectively. Additional guidance for the regional program was developed by SCCWRP in collaboration with participating laboratories and is outlined in the Bight '18 Toxicity Testing Manual (SCCWRP 2018). The solid-phase amphipod tests were conducted with two concurrent controls. The primary lab control sediment consisted of coarse sand collected in the same location as the amphipods. The lab control sand from the amphipod collection site is composed of nearly 100 percent sand and lacks silt and clay fractions. Therefore, an additional **"fine grain size" control sediment was tested to better represent the fine sediments** commonly found within bays and harbors.

Table 1. Test Conditions for the 10-Day Sediment Test
Using *Eohaustorius estuarius*

Sediment Sample Information	
Test sediment holding time requirements	2 weeks, maximum 4 weeks
Test sample storage conditions	4°C, dark, minimal head space
Lab control sediment source	From <i>E. estuarius</i> supplier
Fine grain size control source	Locally collected by Wood Lab personnel in Mission Bay, CA
Test Species	<i>E. estuarius</i>
Supplier	Northwestern Aquatic Sciences; Newport, Oregon
Test Procedures	USEPA 1994; SCCWRP 2018
Acclimation/holding time	2-10 days, including holding time required to adjust to test temperature and salinity (adjust by changing <3°C per day, and <5 ppt per day); measure water quality (DO, pH, salinity, and temperature) daily while holding
Age & Size class	Mature, 3–5 mm
Test type/duration	Acute solid phase (SP) / 10 days
Overlying water	Natural seawater collected off the SIO Pier in La Jolla, CA. 20µm filtered and diluted to 32 ppt with deionized water prior to testing.
Test temperature	15 ± 2°C
Test dissolved oxygen (DO)	≥90% saturation (~8.0 mg/L)
Test pH	7.7-8.3 (pH not adjusted if outside the specified range)
Test interstitial total ammonia	<60 mg/L
Test interstitial un-ionized ammonia	<0.8 mg/L
Test photoperiod	Constant light to encourage amphipods to stay buried
Illuminance	500-1000 lux
Test chamber	1-L glass test chamber
Replicates/treatment	5
Organisms/replicate	20
Exposure volume	2 cm sediment; 800 mL water
Feeding	No feeding during testing. Organisms in holding fed once, immediately upon receipt. 0.25g TetraMin® slurry in 100 mL seawater, for ~1000 animals.
Water renewal	None
Reference Toxicant Test	
Reference toxicant	Ammonia
Range of concentrations	Control, 15.6, 31.2, 62.5, 125, and 250 mg total ammonia (NH ₃)/L, 4 replicates at 32 ± 2 ppt

Table 1. Test Conditions for the 10-Day Sediment Test
Using *Eohaustorius estuarius* (Cont.)

Water Quality Measurements	
Porewater: ammonia, pH, salinity	At sample receipt and on Day 0
Overlying water: ammonia	Start and end of test (Day 0 and Day 10)
Overlying water: pH, temperature, DO, salinity	Every other day, in 1 replicate or surrogate from each treatment
Test Acceptability Criteria	Control survival $\geq 90\%$; coefficient of variation (CV) ≤ 11.9 in the lab control

Notes:

°C - degrees Celsius
< - less than
 \geq - greater than or equal to
 \leq - less than or equal to
 μm - micrometer(s)
DO - dissolved oxygen
g - gram(s)

L - liter(s)
mg/L - milligrams per liter
mL - milliliter(s)
mm - millimeter(s)
 NH_3 - ammonia
ppt - parts per thousand

Table 2. Test Conditions for the 48-Hour Sediment-Water Interface Test
Using *Mytilus galloprovincialis*

Sediment Sample Information	
Test sediment holding time requirements	2 weeks, maximum 4 weeks
Test sample storage conditions	4°C, dark, minimal head space
Test Species	<i>Mytilus galloprovincialis</i>
Source	Locally collected by Wood Lab personnel in San Diego, CA
Test procedures	Anderson, 1996 (modified); USEPA 1995; SCCWRP 2018
Test type:	Static non-renewal
Salinity:	32 ± 2 ppt
Temperature:	15 ± 2 °C
Test dissolved oxygen:	≥4.0 mg/L
Test pH:	pH 7.6-8.3 (pH not adjusted if outside the specified range)
Light quality:	Ambient laboratory light
Light intensity:	740 -1480 lux (ambient)
Photoperiod:	16h light 8h dark
Number of replicates:	5
Organisms/replicate	~250
Overlying water:	Natural seawater collected off the SIO Pier in La Jolla, CA. 1µm filtered and diluted to 32 ppt with deionized water prior to testing.
Test duration:	48-54 hours
Endpoint	Survival & normal shell development
Test chamber	7.5-cm diameter x 14-cm-high glass container; 600-mL tall-form beakers recommended
Sediment depth	4-5 cm
Water volume	300 mL
Reference Toxicant Test	
Reference toxicant	Ammonia
Range of concentrations	Control, 2, 4, 6, 8, 10, and 20 mg total NH ₃ /L, 5 replicates at 32 ±2 ppt
Water Quality Measurements	
Overlying water: ammonia	Start and end of test (Day 0 and Day 2)
Overlying water: pH, temperature, DO, salinity	Daily, in 1 replicate or surrogate from each treatment
Test Acceptability Criteria	Control %normal-alive must be ≥ 70%

Notes:

°C - degrees Celsius
≥ - greater than or equal to
µm - micrometer(s)
cm - centimeter
DO - dissolved oxygen
h - hour(s)

mg/L - milligrams per liter
mL - milliliter(s)
ppt - parts per thousand
USEPA - U.S. Environmental Protection Agency

2.3 Statistical Analyses

For the amphipod tests, survival in each sample was compared to survival in the lab control. Per standard EPA methods, amphipod survival data (expressed as a proportion) were arcsine square-root transformed prior to analysis to normalize the distribution of the data and satisfy statistical assumptions for analysis. Unpaired t-test comparisons assuming unequal variance were performed to identify significant differences between the amphipod survival in the laboratory control and individual samples.

For the mussel tests, percent normal-alive (# normal embryos/ # initial embryos) in each sample was compared to percent normal-alive in the lab control. Per standard EPA methods, percent normal-alive results were arcsine square-root transformed prior to analysis to normalize the distribution of the data and satisfy statistical assumptions for analysis. Unpaired t-test comparisons assuming unequal variance were performed to identify significant differences between mussel survival and development in the laboratory control and individual samples. Statistical analyses of test data for both species were performed using GraphPad Prism, Version 7.04. Statistical analyses for the reference toxicant data were performed using Comprehensive Environmental Toxicity Information System Software (CETIS™), version 1.9.3.0 (Tidepool Scientific Software 2012).

2.4 Testing Schedule

Tests for all samples were initiated within two weeks of sample collection for both species. A summary of the sample identification numbers, sample collection and receipt dates, and chain of custody forms is provided in Appendix A.

3.0 RESULTS

Results for all test batches are summarized below. Each control group represents the group of samples randomized with that specific control on the same shelf within the environmental chamber. All lab controls for both species met test acceptability criteria as defined in the Bight '18 Toxicity Testing Manual. A summary of toxicity test results is discussed below and detailed summaries, statistical results, and raw data sheets are provided in Appendix B (amphipods) and Appendix C (mussels).

3.1 Solid-Phase Tests

Mean *Eohaustorius* survival for each of the eight test batches is provided in Table 3, and detailed results are available in Appendix B. A total of sixteen samples exhibited statistically significant effects to survival compared to the respective lab control; one from Oceanside Harbor (B18-10072), one from Mission Bay (B18-10017), five from San Diego Bay North (B18-10080, B18-10117, B18-10114, B18-10115, and B18-10116), seven from San Diego Bay Central (B18-10178, B18-10119, B18-10123, B18-10124, B18-10133, B18-10137, and B18-10036), and two from San Diego Bay South (B18-10088 and B18-10200). Mean survival in the Fine Grain Size Control across all test batches ranged from 90 to 99 percent, indicating that the organisms were not particularly sensitive to fine grain size throughout this study.

Table 3. Summary of Amphipod Survival Test Results

Test Batch #	Test Date	Mean Percent Survival		# Samples Statistically Reduced from Control
		Lab Control Result	Samples (Range of Results)	
1 (LC#1)	7/13/18	97	70-99	1
2 (LC#1)	7/17/18	95	81-98	1
3 (LC#1)	7/24/18	99	93-100	2
4 (LC#1)	7/26/18	99	84-98	6
5 (LC#1)	8/3/18	96	86-96	4
6 (LC#1)	8/10/18	96	81-99	1
7 (LC#1)	8/22/18	91	81-90	0
8 (LC#1)	10/10/18	97	82	1

3.2 Sediment-Water Interface Tests

A summary of mean percent normal-alive mussel embryos for each of the six test batches is provided in Table 4, and detailed results are available in Appendix C. A total of nine samples were found to be statistically reduced from the control; one from Dana Point Harbor (B18-10065), two from Oceanside Harbor (B18-10069 and B18-10071), two from Mission Bay (B18-10073 and

B18-10074), one from San Diego Bay North (B18-10082), one from San Diego Bay Central (B18-10144), and two from San Diego Bay South (B18-10040 and B18-10200).

Table 4. Summary of Bivalve Sediment Water Interface Test Results

Test Batch #	Test Date	Mean Percent Normal-Alive		# Samples Statistically Reduced from Control
		Lab Control Result	Samples (Range of Results)	
1 (LC#1)	7/18/18	91	80-87	3
1 (LC#2)	7/18/18	92	80-95	2
2 (LC#1)	7/26/18	76	58-85	1
2 (LC#2)	7/26/18	75	68-84	0
3 (LC#1)	8/2/18	84	78-88	0
3 (LC#2)	8/2/18	85	78-88	1
4 (LC#1)	8/14/18	82	76-90	0
5 (LC#1)	8/17/18	94	86-92	1
6 (LC#1)	9/14/18	89	72	1

Following guidance from SCCWRP, unpaired t-test comparisons assuming unequal variances were also performed for each sample using untransformed data for both amphipod survival and mussel survival and development (percent normal-alive). Using untransformed data for statistical comparisons resulted in fewer statistically significant effects in both the amphipod test and mussel test. These unpaired t-test comparisons identified 11 samples that exhibited statistically significant effects to amphipod survival and 7 samples that resulted in statistically significant effects to mussel survival and development. A table summarizing statistical results using arcsine square-root transformed data compared untransformed data is provided in Appendix D.

4.0 QUALITY ASSURANCE

All data presented has been thoroughly reviewed and deemed acceptable for reporting in accordance with relevant protocols and **Wood's** internal QA/QC program. Any deviations with respect to test conditions and acceptability criteria are summarized below by test type. All were determined to be minor with no impact on the final data or its interpretation. A list of laboratory qualifier codes can be found in Appendix E.

4.1 Sample Receipt, Handling and Holding Time

Samples were received and processed according to protocol described in previous sections. All tests were initiated within the recommended holding time of two weeks as suggested in the SCCWRP Bight '18 Toxicology Laboratory Manual (SCCWRP 2018). All samples were received on ice and held at $4 \pm 2^{\circ}\text{C}$ in the dark until used for testing. All total and unionized ammonia values were below reported thresholds for both test species (SCCWRP 2018; USEPA 1994). All

ammonia calculations and raw ammonia data sheets are included with raw bench data sheets for each batch of amphipod and mussel tests.

4.2 Solid-Phase Toxicity Tests

All water quality parameters were within required ranges as defined by the test protocol for the entirety of the test.

Due to insufficient sample volume, a Fine Grain Size Control could not be tested concurrently with the final batch of amphipod tests on 10/10/18. However, mean survival in the Fine Grain Size Control of all other batches was at least 90 percent, indicating that the amphipods were not adversely affected by the fine grain size throughout the study.

4.3 Sediment-Water Interface Tests

All water quality parameters were within required ranges as defined by the test protocol for the entirety of the test.

4.4 Reference Toxicant Tests

Concurrent reference toxicant tests and control charts for both test species are provided in Appendix F. All reference toxicant tests met test acceptability criteria, and median effect (EC₅₀) concentration values for the reference toxicant tests were within \pm two standard deviations of internal control chart means for both species.

5.0 REFERENCES

Anderson B.S., J.W. Hunt, M. Hester, B.M. Phillips. 1996. Assessment of sediment toxicity at the sediment-water interface. In: G.K. Ostrander (ed.) Techniques in Aquatic Toxicology. Lewis Publishers, Ann Arbor, MI.

GraphPad© Prism Software, Inc. 1992-2004. Prism, Version 7.04.

SCCWRP, 2018. **BIGHT'18** Toxicology Laboratory Manual. June, 2018

Tidepool Scientific Software. 2012. CETIS Comprehensive Toxicity Data Analysis and Database Software, Version 1.9.3.0.

USEPA 1994. Methods for Assessing the Toxicity of Sediment-associated Contaminants with Estuarine and Marine Amphipods. June 1994. Environmental Protection Agency, Office of Research and Development. EPA 600/R-94/025.

USEPA 1995. Short-term methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms. August 1995. Environmental Protection Agency, Office of Water. EPA 600/R-95/136.

APPENDIX A

Chain of Custody Forms and Sample Receipt Information

Sample Check-In: Sediments

Amec Foster Wheeler - Environmental Lab
4905 Morena Blvd, Ste. 1304
San Diego, CA 92117

Client: AMEC / Wood
Project Name: RHMP
Test ID Numbers: 18-07-003 to 018
Test Type/Organism: Amphipod + Mussel

Sample ID	Sample Number	Collection Date/Time	Receipt Date/Time	Total Volume	Receipt Temp.	Sample Description	Porewater Analyses	
							Salinity (ppt)	pH (units)
B18-10065	2018-S0024	7/10/18 0914	7/11/18 0935	4L	6°C	Brown/gray sediment	29.7	7.51
B18-10066	2018-S0025	1038	0935	4L	6°C		34.1	7.62
B18-10067	2018-S0026	1155	0935	4L	8°C		33.7	6.5
B18-10068	2018-S0027	1345	0935	4L	8°C		34.2	7.39
B18-10069	2018-S0028	7/11/18 1210	7/11/18 16:00	~4L	4°C	Brown/gray sediment	33.3	7.37
B18-10070	2018-S0029	7/11/18 1055	7/11/18 16:00		8°C		34.1	7.28
B18-10071	2018-S0030	7/11/18 1000	7/11/18 16:00		8°C		33.8	7.45
B18-10072	2018-S0031	7/11/18 1345	7/11/18 16:00		4°C		34.0	7.56

Samples checked-in by: Ab/KB
Samples shipped via: Wood
Control sediment used: For control sed
Samples sieved by: Ab Date: 7/10-7/12 Screen Size: 1mm
Wood

Additional Analysis:	
Porewater:	<u>NH3</u>
Ammonia:	
Other:	

Test Organism	Supplier	Receipt Date	Condition	Initials
Amphipod	NW Aquatic	7/11/18	Good	SC
Mussels	Local Divers	June/July	Fair	SC

Additional Comments:

Initial QC: Ab 11/9/18
Final Review: 2w 12/26/18



Wood Environmental Toxicology Lab
4905 Morena Blvd, Ste. 1304
San Diego, CA 92117
Phone: (858) 299-5368

Chain of Custody Form

Page 1 of 2

Client/Send Report To:				Project Information (if needed):				Analysis Requested (write out or use codes below)			
Company Wood Environmental Infrastructure Address 9210 Skyway Park, Ct. Suite 200 San Diego, CA 92123 Contact/PM Chris Stransky Phone Number 858-300-4346 Email Address chris.stransky@woodplc.com				Project Name 2018 RAMP Project No. 1715100802-0003-XXXX PO Number _____ Personal Cooler Shipped: Return Requested: YES _____ NO _____				For 10-day Survival Muscle 48h - SWI Muscle 48h - SWI			
Sample ID	Collection Date	Collection Time	Sample Volume	Sample Type: Grab/Comp.	Sample Number (for lab use)	Receipt Temp (°C)					
B18-10065	7/10/18	0914	~4L			6°C					
B18-10066	7/10/18	1038				6°C					
B18-10067	7/10/18	1155				8°C					
B18-10068	7/10/18	1345				8°C					
Additional Comments:											
Samples Collected By: THCS											
Samples Shipped via: Condition Upon Receipt:											
Relinquished/Shipped By:											
Signature: _____											
Print Name: JW OBO CS											
Date/Time: 7/11/18 0935											
Received By:											
Signature: _____											
Print Name: Jeff Van Voorhis											
Date/Time: 7/11/18 0935											

Test Codes (marine):

Mp-c: Chronic Kelp
Hr-dv: Chronic Abalone
Aa-a: Acute Topsmelt
Aa-c: Chronic Topsmelt

Test Codes (freshwater):

Mb-a: Acute Menidia/Silverside
Mb-c: Chronic Menidia/Silverside
Ab-a: Acute Mysid Shrimp
Ab-c: Chronic Mysid Shrimp
Sp-c: Chronic Urchin Fertilization
Sp-dv: Chronic Urchin Development
Ms-dv: Chronic Mussel Development
Other: Write out the test organism

Sc-c: Chronic Green Algae
Ha-a: Acute Hyalella amphipod
Ha-c: Chronic Hyalella amphipod
Pp-c: Chronic Fathead Minnow T-22: CA Title 22 Hazardous Waste

Client/Send Report To:				Project Information (if needed):				Analysis Requested (write out or use codes below)			
Company	Address	Contact/PM	Phone Number	Email Address	Project Name	Project No.	PO Number	Personal Cooler Shipped:	Return Requested: YES	NO	
Wood E&S	9210 Sky Park Ct. Suite 200	San Diego CA 92123	Chris Strandberg	658-300-4340							
B18-10069	7/11/18	1210	~4L								4.0°C
B18-10070	7/11/18	1055									8.0°C
B18-10071	7/11/18	1000									8.0°C
B18-10072	7/11/18	1345									4.0°C
Samples Collected By:				Additional Comments:				Samples Shipped via:			
TH, CS											
Relinquished/Shipped By:				Received By:				Condition Upon Receipt:			
Signature: _____				Signature: _____				Signature: _____			
Print Name: _____				Print Name: _____				Print Name: _____			
Date/Time: 7/11/18 16:00				Date/Time: 7/11/18 16:00				Date/Time: _____			

Test Codes (marine):

Mp-c: Chronic Kelp

Hr-dv: Chronic Abalone

Aa-a: Acute Topsmelt

Aa-c: Chronic Topsmelt

Mb-a: Acute Menidia/Silverside **Sp-c:** Chronic Irbion Fertilization

Mb-c: Chronic Menidia/Silverside **Sp-dy:** Chronic Ilirichin Development

Ab-a: Acute Mysid Shrimp
Ms-dy: Chronic Mussel Development

Ab-c: Chronic Mysid Shrimp **Other:** Write out the test organism

Test Codes (freshwater):

Cd-a: Acute Ceriodaphnia

Cd-c: Chronic Ceriodaphnia

Pp-a: Acute Fathead Minnow **Ha-c:** Chronic Hvalella amphipod

Pp-c: Chronic Fathead Minno T-22: CA Title 22 Hazardous Waste

Ammonia Subsample Analysis

Client: Amec FW
Project ID: RHMP - Porewater
Test No.: 18-07-603 to 18-07

Test Species: *E. estuarius* / *M. galloprovincialis*
Start Date: 7/13/2018 / 7/18/18
End Date: 7/23/2018 / 7/20/18

DI Blank: 0.0

10 mg/L Ammonia Stock: $7.1 \times 1.22 = 8.7$ mg/L as NH_3

[illegible]

QC Check: AD 11/9/18

Final Review: sw 12/26/14

Unionized Ammonia Calculation for Pressure of 1 atm

I	pK
1	9.26
2	9.27
3	9.28
4	9.29
5	9.30
6	9.32
7	9.33
8	9.34

Final Review: on 11/3/16

Amec Foster Wheeler - Environmental Lab
4905 Morena Blvd, Ste. 1304
San Diego, CA 92117

Client: Amec / Wood
Project Name: RHMP
Test ID Numbers: Various
Test Type/Organism: Amphipod + Mussel

[illegible]

Samples checked-in by: SW
 Samples shipped via: FedEx Wood
 Control sediment used: N/A
 Samples seived by: AD/GM Date: 7/11/18 Screen Size: 7mm

<u>Additional Analysis:</u>	
Porewater:	NH ₃
Ammonia:	
Other:	

Test Organism	Supplier	Receipt Date	Condition	Initials

Additional Comments:

Initial QC: AD 11/9/18
Final Review: JW 12/26/18

Sample Check-In: Sediments

Amec Foster Wheeler - Environmental Lab
4905 Morena Blvd, Ste. 1304
San Diego, CA 92117

Client: Amec / Wood
Project Name: RAMP
Test ID Numbers: 18-07-019 to 036
Test Type/Organism: Amphipod + Mussels

Sample ID	Sample Number	Collection Date/Time	Receipt Date/Time	Total Volume	Receipt Temp.	Sample Description	Porewater Analyses	
							Salinity (ppt)	pH (units)
B18-10073	2018-50033	7/12/18 1108	7/12/18 1730	~4L	9.0	Brown/Gray Sediment	33.8	7.34
B18-10074	-50034	0952			9.0		33.7	7.28
B18-10075	-50035	0830			8.0		33.9	7.39
B18-10015	-50036	1400			7.0		35.8	7.80
B18-10016	-50037	1215			7.0		34.4	7.23
B18-10020	-50038	0715			8.0		(A)	(A)
B18-10438	-50039	↓ 1557	↓	↓	6.0	↓	34.4	7.27
B18-10017	-50041	7/13/18 0830	7/13/18 1358	~4L	10.0	Brown/Gray Sediment	35.5	7.79
B18-10019	-50042	↓ 0655	↓	↓	10.0	↓	(A)	(A)

Samples checked-in by: AD / KB
Samples shipped via: Hand
Control sediment used: Eon Home Sediment + Mission Bay Mud
Samples seived by: Wood Date: - Screen Size: 1mm

Additional Analysis:
Porewater: NH₃ AG 080 JV
Ammonia: AD
Other:

Test Organism	Supplier	Receipt Date	Condition	Initials
<u>Amphipod</u>	<u>NW Aquatic</u>	<u>7/11/18</u>	<u>Good</u>	<u>R</u>
<u>mussels</u>	<u>Local Diver</u>	<u>June/July</u>	<u>Fair</u>	<u>SC</u>

Additional Comments: (A) No porewater available

Initial QC: AG 8/22/18
Final Review: SW 1/2/19

Final Review: 2001/5/18

Unionized Ammonia Calculation for Pressure of 1 atm									
Input 'Shaded' data									
	I	pK							
	1	9.26							
	2	9.27							
	3	9.28							
	4	9.29							
	5	9.30							
	6	9.32							
	7	9.33							
	8	9.34							

Log Number	Beaker Day	Dilution	Total Ammonia		Salinity		pH	Temp (K)	I		Unionized Ammonia	D.O. (mg/L)	Beaker Num.	Station
			(mg/L)	Temp (C)	(ppt)				Rounded	pK				
B18-10015	-1	PW	1	15.0	35.8	7.80	288.16	7.90	8	9.34	0.014		0	
B18-10016	-1	PW	2.7	15.0	34.4	7.23	288.16	7.60	8	9.34	0.010		0	
B18-10017	-1	PW	2.7	15.0	35.5	7.79	288.16	7.84	8	9.34	0.036		0	
B18-10438	-1	PW	3.8	15.0	34.4	7.27	288.16	7.60	8	9.34	0.015		0	
B18-10019	-1	PW	N/A	15.0	N/A	N/A	288.16	#VALUE!	#VALUE!	#VALUE!	#VALUE!		0	
B18-10020	-1	PW	N/A	15.0	N/A	N/A	288.16	#VALUE!	#VALUE!	#VALUE!	#VALUE!		0	
B18-10073	-1	PW	1.6	15.0	33.8	7.34	288.16	7.47	7	9.33	0.008		0	
B18-10074	-1	PW	1.7	15.0	33.7	7.28	288.16	7.45	7	9.33	0.007		0	
B18-10075	-1	PW	1.1	15.0	33.9	7.39	288.16	7.49	7	9.33	0.006		0	

Ammonia Subsample Analysis

Client: Amec FW
Project ID: RHMP - Porewater
Test No.: 18-07-019 to 036

Test Species: E. estuarius / M. galloprovincialis
 Start Date: 7/17/2018 1315 / 7/18/18 1310
 End Date: 7/27/2018 1100 / 7/20/18 1200

DI Blank: 0.0

10 mg/L Ammonia Stock: $6.8 \times 1.22 = 8.3 \text{ mg/L } \text{NH}_3$

[illegible]

QC Check: AG 8/22/18

Final Review: 2w 1/2/19

④ No pore water available

CHAIN OF CUSTODY RECORD

STANDARD

Page 1 of 1

CLIENT NAME: Wood Environment & Infrastructure Solutions, Inc. ADDRESS: 9210 Sky Park Ct., Suite 200 San Diego, CA 92123		PROJECT: 2018 Regional Harbor Monitoring Program PHONE: 858-300-4316 FAX: 858-300-4301 EMAIL: chris.stransky@woodplc.com corey.sheredy@woodplc.com		ANALYSES REQUESTED		SPECIAL HANDLING	
PROJECT MANAGER Chris Stransky		SAMPLER Tyler Huff, Chris Stransky		<input type="checkbox"/> Same Day Rush 150% <input type="checkbox"/> 24 Hour Rush 100% <input type="checkbox"/> 48-72 Hour Rush 75% <input type="checkbox"/> 4 - 5 Day Rush 30% <input type="checkbox"/> Rush Extractions 50% <input checked="" type="checkbox"/> 10 Business Days <input type="checkbox"/> QA/QC Data Package		Charges will apply for weekends/holidays Method of Shipment: COMMENTS:	
ID# (For Lab Use Only)	DATE SAMPLED	TIME SAMPLED	SMPL TYPE	SAMPLE IDENTIFICATION/SITE LOCATION	# OF CONT.	Toxicity (Eohaustorius estuarius 10-day amphipod survival test) Toxicity (48-hour Mytilus galloprovincialis embryo sediment-water interface test)	Temp.
18-50036	7/12/2018	14:00	sediment	B18-10015	1	X	7.0
18-50037	7/12/2018	12:15	sediment	B18-10016	1	X	7.0
18-50039	7/12/2018	15:57	sediment	B18-10438 (overdraw)	1	X	6.0
18-50038	7/12/2018	07:15	sediment	B18-10020	1	X	8.0
18-50033	7/12/2018	11:08	sediment	B18-10073	1	X	9.0
18-50034	7/12/2018	09:52	sediment	B18-10074	1	X	9.0
18-50035	7/12/2018	08:30	sediment	B18-10075	1	X	8.0
18-50041	7/13/2018	08:30	sediment	B18-10017	1	X	10.0
18-50040	7/13/2018	06:55	sediment	B18-10019	1	X	10.0
42							
RELINQUISHED BY Merrin		DATE / TIME 07/13/18 13:58		RECEIVED BY Steve Carlson, Wood Lab		SAMPLE CONDITION: Actual Temperature: Received On Ice Preserved Evidence Seals Present Container Intact Preserved at Lab	
RELINQUISHED BY		DATE / TIME		RECEIVED BY		SAMPLE TYPE CODE: AQ=Aqueous NA= Non Aqueous SL= Sludge DW= Drinking Water WW= Waste Water RW= Rain Water GW= Ground Water SO= Soil SW= Solid Waste OL= Oil OT= Other Matrix	
RELINQUISHED BY		DATE / TIME		RECEIVED BY			

SPECIAL REQUIREMENTS / BILLING INFORMATION

Preserve at 4° C

*Samples collected on 7/12/18 were received on 7/12/18 at 1730 and stored at 4°C, however no LOC was present. Samples collected 7/12/18 were relinquished to LMS on same LOC as samples collected 7/13/18.

Initial QC: AG 8/22/18

Sample Check-In: Sediments

Amec Foster Wheeler - Environmental Lab
4905 Morena Blvd, Ste. 1304
San Diego, CA 92117

Client: Amec / Wood
Project Name: RHMP
Test ID Numbers: 18-07-053 to 18-07-104
Test Type/Organism: Amphipod + Mussels

Sample ID	Sample Number	Collection Date/Time	Receipt Date/Time	Total Volume	Receipt Temp.	Sample Description	Porewater Analyses	
							Salinity (ppt)	pH (units)
B18-10117	2018-50043	7/16/18 0739	7/16/18 ¹²¹⁵	~4L	6.0	Brown/Gray Sediment	34.2	7.47
B18-10078	2018-50044	7/16/18 1024	↓	↓	6.0	↓	34.3	7.44
B18-10079	2018-50045	7/16/18 0924	↓	↓	6.0	↓	34.1	7.37
B18-10023	2018-50046	7/16/18 1230	7/16/18 ¹⁶⁵⁰	~4L	4.0	Brown/Gray sediment	34.2	7.51
B18-10030	2018-50047	7/16/18 1437	↓ ¹⁶⁵⁰	~4L	4.0	Brown/Gray sediment w/shells	34.3	7.35
B18-10080	2018-50048	7/17/18 0615	7/17/18 ¹³⁰⁰	~4L	4.0	Brown/Gray Sediment	32.1	7.33
B18-10081	2018-50049	7/17/18 0722	↓	~4L	4.0	↓	34.0	7.36
B18-10082	2018-50050	7/17/18 0920	↓	~4L	4.0	↓	34.2	7.50
B18-10083	2018-50051	7/17/18 1020	↓	~4L	4.0	↓	33.9 34.2	7.59
B18-10084	2018-50052	7/17/18 1115	↓	~4L	4.0	↓	33.4	7.57
B18-10022	2018-50053	7/18/18 0815	7/18/18 ¹⁴¹¹	4L	4.0	brown sediment	32.5	7.61
-10076	-50054	0920	↓	4L	↓	↓	33.2	7.66
-10077	-50055	0720	↓	4L	↓	↓	33.2	7.64
-10112	-50056	1030	↓	4L	↓	↓	32.4	7.63
✓-10113	↓-50057	↓1130	↓	4L	↓	↓	33.4	7.43

Samples checked-in by: JUV/AD

Samples shipped via: Hand

Control sediment used: For home sediment for amphipods and Mission Bay Mud For mussels

Samples seized by: Wood Date: Various Screen Size: 7mm

Additional Analysis:

Porewater: NH3

Ammonia:

Other:

Test Organism	Supplier	Receipt Date	Condition	Initials
Amphipods	NW Aquatic	7/19/18	Good	SC
Mussels	Local Diver	June/July	Fair	SC

Additional Comments:

Initial QC: AG 9/27/18

Final Review: ju 11/2/19

Sample Check-In: Sediments

Amec Foster Wheeler - Environmental Lab
4905 Morena Blvd, Ste. 1304
San Diego, CA 92117

Client: Amec/Wood
Project Name: RAMP
Test ID Numbers: 18-07-053 to 18-07-104
Test Type/Organism: Amphipod + Mussels

Sample ID	Sample Number	Collection Date/Time	Receipt Date/Time	Total Volume	Receipt Temp.	Sample Description	Porewater Analyses	
							Salinity (ppt)	pH (units)
B18-10115	2018-50058	7/14/18 0720	7/14/18 1510	~7L	5.0	Brown/Gray sediment	34.5	7.52
B18-10116	-50059	0855		~7L	5.0	Gray sand w/shells	34.5	7.59
B18-10114	-50060	1030		~6L	5.0	Brown/Gray sediment	34.4	7.52
B18-10024	-50061	1120		~5.5L	5.0		34.3	7.24
B18-10024	-50062	1255		~6L	5.0		34.1	7.74
B18-10031	2018-50064	7/20/18 1035	7/20/18 1700	8L	4.0	Gray Sediment	34.4	7.91
B18-10032	-50065	1910		5.5L	4.0	Brown/Gray Sed	34.5	7.52
B18-10119	-50066	0740		7L	4.0	Brown/Gray sed	34.1	7.63
B18-10121	-50067	0840		8L	4.0	Brown/Gray Sed	34.7	7.49
B18-10123	-50068	0935		9L	4.0	Brown/Gray Sed	33.7	7.37
B18-10178	-50069	1135		7.5	4.0	Gray sediment	32.0	7.69

Samples checked-in by: SW/AD

Samples shipped via: Hand

Control sediment used: For home sediment for amphipods and Mission Bay Mud for mussels

Samples seized by: Wood Date: Various Screen Size: 1mm

Additional Analysis:

Porewater: NH3

Ammonia:

Other:

Test Organism	Supplier	Receipt Date	Condition	Initials
Amphipods	NW Aquatics	7/24/18	Good	SC
Mussels	Local Diver	June/July Fair		SC

Additional Comments:

Initial QC: AG 9/27/18

Final Review: SW 1/21/19

Ammonia Subsample Analysis

Client: Amec FW
Project ID: RHMP - Porewater
Test No.: 18-07-053 to 104

Test Species: E. estuarius M. gallopapirincialis
Start Date: 7/24/18 ; 7/26/18
End Date: 8/3/18 ; 7/28/18

DI Blank: 0.0 mg/L

10 mg/L Ammonia Stock: 8-8 mg/L as NH₃

[illegible]

QC Check: AD 11/9/18

Final Review: 22 1/2/19

Porewater - Check in

Unionized Ammonia Calculation for Pressure of 1 atm														
Input 'Shaded' data														
Log Number	Beaker	Day	Dilution	Total Ammonia		Salinity	pH	Temp (K)	I		Unionized Ammonia	D.O. (mg/L)	Beaker Num.	Station
				Ammonia (mg/L)	Temp (C)				Rounded	pK				

Final Review: 4/5/19

STANDARD

CLIENT NAME:				PROJECT:		ANALYSES REQUESTED										SPECIAL HANDLING	
Wood Environment & Infrastructure Solutions, Inc.				2018 Regional Harbor Monitoring Program												<input type="checkbox"/> Same Day Rush 150% <input type="checkbox"/> 24 Hour Rush 100% <input type="checkbox"/> 48-72 Hour Rush 75% <input type="checkbox"/> 4 - 5 Day Rush 30% <input type="checkbox"/> Rush Extractions 50% <input checked="" type="checkbox"/> 10 Business Days <input type="checkbox"/> QA/QC Data Package	
ADDRESS:				PHONE: 858-300-4316												Charges will apply for weekends/holidays	
9210 Sky Park Ct., Suite 200				FAX: 858-300-4301												Method of Shipment:	
San Diego, CA 92123				EMAIL: chris.stransky@woodplc.com													
PROJECT MANAGER				SAMPLER													
Chris Stransky				Tyler Huff, Chris Stransky													
ID#	DATE SAMPLED	TIME SAMPLED	SMPL TYPE	SAMPLE IDENTIFICATION/SITE LOCATION	# OF CONT.	Toxicity (Eohaustorius estuarius 10-day amphipod survival test)	Toxicity (48-hour Mytilus galloprovincialis embryo sediment-water interface test)								COMMENTS		
	7/16/2018	14:40	sediment	B18-10023	1	X	X										
	7/16/2018	14:00	sediment	B18-10030	1	X	X										
	7/16/2018	10:00	sediment	B18-10078	1	X	X										
	7/16/2018	08:56	sediment	B18-10079	1	X	X										
	07/16/18	07:20	sediment	B18-10117	1	X	X										
	07/17/18	08:00	sediment	B18-10080	1	X	X										
	07/17/18	07:00	sediment	B18-10081	1	X	X										
	07/17/18	09:00	sediment	B18-10082	1	X	X										
	07/17/18	10:00	sediment	B18-10083	1	X	X										
	07/17/18	11:00	sediment	B18-10084	1	X	X										
RELINQUISHED BY <i>E. Stransky</i>				DATE / TIME 7/18/18 1150		RECEIVED BY <i>Steve Carlson</i>										SAMPLE TYPE CODE: AQ=Aqueous NA= Non Aqueous SL= Sludge DW= Drinking Water WW= Waste Water RW= Rain Water GW= Ground Water SO= Soil SW= Solid Waste OL= Oil OT= Other Matrix	
RELINQUISHED BY				DATE / TIME		RECEIVED BY										SAMPLE CONDITION: Actual Temperature: Received On Ice Preserved Evidence Seals Present Container Intact Preserved at Lab	
RELINQUISHED BY				DATE / TIME		RECEIVED BY											

SPECIAL REQUIREMENTS / BILLING INFORMATION

Preserve at 4° C

- CDC signed on 7/18/18
- 7/16/18 samples actually received on 7/16/18 at 1215 and 1650
- 7/17/18 samples actually received on 7/17/18 at 1300.

Client/Send Report To:

Company Wood Environmental
Address 9260 Sky Park Court
SD CA 92123
Contact/PM Chris Stranicky / Corey Sheredy
Phone Number 858-359-7761
Email Address corey.sheredy@woodplc.com

Project Information (if needed):

Project Name 2018 RTRUP
Project No. 1715100807
PO Number _____
Personal Cooler Shipped: _____
Return Requested: YES _____ NO _____

Client/Send Report To:		Project Information (if needed):		Analysis Requested (write out or use codes below)		Receipt Temp (°C)
Company	Address	Project Name	Project No.	PO Number	Personal Cooler Shipped	
B18-10022	7/18/18	0815	4L	Comp	X	4°C
B18-10076	7/18/18	0920			X	
B18-10077	7/18/18	0720			X	
B18-10112	7/18/18	1030			X	
B18-10113	7/18/18	1130			X	
Additional Comments:						
Samples Collected By: <u>Tyler Huff, Bill Ingram, Matt Smith</u>						
Relinquished/Shipped By: <u>Corey Sheredy</u>						
Signature: <u>Corey Sheredy</u>						
Print Name: <u>Corey Sheredy</u>						
Date/Time: <u>7/18/18 1411</u>						
Received By: <u>Steve Carlson</u>						
Signature: <u>Steve Carlson</u>						
Print Name: <u>Steve Carlson</u>						
Date/Time: <u>7/18/18 1411</u>						
Relinquished By: _____						
Signature: _____						
Print Name: _____						
Date/Time: _____						
Samples Shipped via: <u>Conner</u>						
Condition Upon Receipt: _____						
Received By: _____						
Signature: _____						
Print Name: _____						
Date/Time: _____						

Test Codes (marine):

Mp-c: Chronic Kelp
Hr-dv: Chronic Abalone
Aa-a: Acute Topsmelt
Aa-c: Chronic Topsmelt

Test Codes (freshwater):

Cd-a: Acute Ceriodaphnia
Cd-c: Chronic Ceriodaphnia
Pp-a: Acute Fathead Minnow
Pp-c: Chronic Fathead Minnow

Mb-a: Acute Menidia/Silverside
Mb-c: Chronic Menidia/Silverside
Ab-a: Acute Mysid Shrimp
Ab-c: Chronic Mysid Shrimp

Sp-c: Chronic Urchin Fertilization
Sp-dv: Chronic Urchin Development
Ms-dv: Chronic Mussel Development
Other: Write out the test organism

Sc-c: Chronic Green Algae
Ha-a: Acute Hyalella amphipod
Ha-c: Chronic Hyalella amphipod
T-22: CA Title 22 Hazardous Waste



Wood Environmental Toxicology Lab
4905 Morena Blvd, Ste. 1304
San Diego, CA 92117
Phone: (858) 299-5368

Chain of Custody Form

Page 1 of 1

Client/Send Report To:			Project Information (if needed):			Analysis Requested (write out or use codes below)		
Company	Wood Environmental & Infrastructure		Project Name	2018 Regional Harbor Monitoring Program		Ms-dv 10-day Marine Amphipod		
Address	9210 Sky Park Court Suite 200 San Diego CA 92123		Project No.	1715100802				
Contact/PM	Chris Stransky		PO Number					
Phone Number	858-300-4350		Personal Cooler Shipped:	YES		NO		
Email Address	chris.stransky@woodplc.com		Return Requested:	YES		NO		
Sample ID	Collection Date	Collection Time	Sample Volume	Sample Type: Grab/Comp.	Sample Number (for lab use)	Receipt Temp (°C)		
B18-10115	7/19/18	0720	~7L	Comp		X		5.0
B18-10116		0855	~7L			X		5.0
B18-10114		1030	~6L			X		5.0
B18-10029		1120	~5.5L			X		5.0
B18-10024		1255	~6L	↓		X		5.0
B18-10115 (intercal)	7/19/18	0800	~40L	Comp	CCS	X		
B18-10115 (intercal)	7/19/18	0800	~40L	Comp		X		8.0
Additional Comments: 4x10L bags for slight 18. Toxicity intercal. Included full volume of 64 bags. Two 10L grab made.						Samples Shipped via:		
Relinquished/Shipped By: <u>Shorely</u>						Condition Upon Receipt:		
Signature: <u>Shorely</u>						Received By:		
Print Name: <u>Shorely</u>						Signature:		
Date/Time: <u>1510 7/19/18</u>						Print Name:		
Date/Time: <u>7/19/18 1510</u>						Date/Time:		

Test Codes (marine):

Mp-c: Chronic Kelp
Hr-dv: Chronic Abalone
Aa-a: Acute Topsmelt
Aa-c: Chronic Topsmelt

Test Codes (freshwater):

Sc-c: Chronic Green Algae
Cd-a: Acute Ceriodaphnia
Cd-c: Chronic Ceriodaphnia
Pp-a: Acute Fathead Minnow
Pp-c: Chronic Fathead Minnow

Sp-c: Chronic Urchin Fertilization
Sp-dv: Chronic Urchin Development
Ms-dv: Chronic Mussel Development
Other: Write out the test organism



Wood Environmental Toxicology Lab
4905 Morena Blvd, Ste. 1304
San Diego, CA 92117
Phone: (858) 299-5368

Chain of Custody Form

Page 1 of 1

Client/Send Report To:				Project Information (if needed):				Analysis Requested (write out or use codes below)			
Company: Wood Environmental & Infrastructure Address: 9210 Sky Park Court Suite 200 San Diego CA 92123 Contact/PM: Chris Stransky Phone Number: 858-300-4350 Email Address: chris.stransky@woodplc.com				Project Name: 2018 Regional Harbor Monitoring Program Project No.: 1715100802 PO Number: _____ Personal Cooler Shipped: YES _____ NO _____ Return Requested: YES _____ NO _____				Ms-dv Ab-a Ha-a Pp-a Pp-c			
Sample ID	Collection Date	Collection Time	Sample Volume	Sample Type: Grab/Comp.	Sample Number (for lab use)	Receipt Temp (°C)					
B18-10031	07/20/18	1035	8L	Comp.		4.0					
B18-10032	07/20/18	1410	5.5L	Comp.		4.0					
B18-10119	07/20/18	0740	7L	Comp.		4.0					
B18-10121	07/20/18	0840	8L	Comp.		4.0					
B18-10123	07/20/18	0935	9L	Comp.		4.0					
B18-10178	07/20/18	1135	7.5L	Comp.		4.0					
Additional Comments:											
Samples Collected By: Wood											
Samples Shipped via: Condition Upon Receipt:											
Relinquished/Shipped By: <u>Chris Stransky</u>											
Signature: <u>[Signature]</u>											
Print Name: <u>Chris Stransky</u>											
Date/Time: <u>7/20/18 1700</u>											
Received By: <u>[Signature]</u>											
Signature: <u>[Signature]</u>											
Print Name: <u>[Signature]</u>											
Date/Time: <u>[Signature]</u>											

Test Codes (marine):
Mp-c: Chronic Kelp
Hr-dv: Chronic Abalone
Aa-a: Acute Topsmelt
Aa-c: Chronic Topsmelt
Mb-a: Acute Menidia/Silverside
Mb-c: Chronic Menidia/Silverside
Ab-a: Acute Mysid Shrimp
Ab-c: Chronic Mysid Shrimp
Sp-c: Chronic Urchin Fertilization
Sp-dv: Chronic Urchin Development
Ms-dv: Chronic Mussel Development
Other: Write out the test organism

Test Codes (freshwater):
Cd-a: Acute Ceriodaphnia
Cd-c: Chronic Ceriodaphnia
Pp-a: Acute Fathead Minnow
Pp-c: Chronic Fathead Minnow
T-22: CA Title 22 Hazardous Waste

Amec Foster Wheeler - Environmental Lab
4905 Morena Blvd, Ste. 1304
San Diego, CA 92117

Client: AMEC/wood
Project Name: RAMP pkb
Test ID Numbers: 8-08-0081 to - 0085 18-08-0025 to - 0026
Test Type/Organism: Amphipods + mussels

[illegible]

Samples checked-in by: 3C/6/6/6
 Samples shipped via: Wob control sed
 Control sediment used: 201r
 Samples seized by: Wob control sed
 Date: 8/1/03 Screen Size: mm

Additional Analysis:
Porewater: N#3
Ammonia:
Other:

Test Organism	Supplier	Receipt Date	Condition	Initials
Mussels	Local Diver	June/July	Fair	SC
Amphipods	New Aquatics	8/1/83	good	ATG

Additional Comments:

Initial QC: AD 11/5/18
Final Review: W 11/21/18

Sample Check-In: Sediments

Anec Foster Wheeler - Environmental Lab
4905 Morena Blvd, Ste. 1304
San Diego, CA 92117

Client: AMEC/Wood
Project Name: RTMP
Test ID Numbers: 18-08-006 to 18-08-030
Test Type/Organism: muscle & amphipods
-039
-041

Sample ID	Sample Number	Collection Date/Time	Receipt Date/Time	Total Volume	Receipt Temp.	Sample Description	Porewater Analyses	
							Salinity (ppt)	pH (units)
B18-10136	808-50078	7/27/18 0810	7/27/18 1620	6L	9.0°C	Brown sediment	33.1	7.43
B18-10137	-50079	↓ 0725	↓	↓	↓	↓	34.8	7.59
B18-10139	-50080	↓ 0905	↓	↓	↓	↓	34.8	7.51
B18-10140	-50081	↓ 1010	↓	↓	↓	↓	34.9	7.51
B18-10141	-50082	↓ 1240	↓	↓	↓	↓	34.9	7.78
B18-10142	-50083	↓ 1110	↓	↓	↓	↓	34.7	7.75
B18-10034	208-30084	7/30/18 1331	7/30/18 1620	2L	11.0°C	Brown sediment	35.0	7.65
↓ -10035	-30085	↓ 1245	↓	↓	↓	↓	34.9	7.67
↓ -10036	-30086	↓ 1100	↓	↓	↓	↓	35.3	7.37
↓ -10037	-30087	↓ 0737	↓	↓	↓	↓	35.1	7.44
↓ -10038	-30088	↓ 0900	↓	↓	↓	↓	35.2	7.62
↓ -10039	-30089	↓ 1000	↓	↓	↓	↓	35.1	7.48

Samples checked-in by: AD/SC
 Samples shipped via: Wood
 Control sediment used: 20m control sed
 Samples seized by: Wood Date: 8/1/18 Screen Size: 1mm

Additional Analysis:

Porewater: NH3
 Ammonia:
 Other:

Test Organism	Supplier	Receipt Date	Condition	Initials
Mussels	Local Divers	2007/07/18	Fair	SC
Amphipods	NW Aquatics	8/1/18	good	AG

Additional Comments:

Initial QC: AD 11/16/18
 Final Review: SW 1/21/19



Wood Environmental Toxicology Lab
4905 Morena Blvd, Ste. 1304
San Diego, CA 92117
Phone: (858) 299-5368

Chain of Custody Form

Page 1 of 1

Client/Send Report To:				Project Information (if needed):				Analysis Requested (write out or use codes below)					
Company	Wood Environmental+Infrastructure Solutions, Inc.			Project Name	2018 Regional Harbor Monitoring Program			10 day Marine amphipod Ms-dv					
Address	9210 Sky Park Court, Suite 200 Inc. San Diego, CA 92123			Project No.	1715100802								
Contact/PM	Chris Stransky			PO Number									
Phone Number	858-300-4350			Personal Cooler Shipped:	Return Requested: YES NO								
Email Address	chris.stransky@woodplc.com			Sample Volume	Sample Type: Grab/Comp.	Sample Number (for lab use)							
B18-10124	Collection Date	07/26/18	Collection Time	0930	↓	Comp	X	X	10°C				
B18-10126	07/26/18	1245											
B18-10127	07/26/18	1055											
B18-10132	07/26/18	1345											
B18-10133	07/26/18	0800											
B18-10133	07/26/18												
Samples Collected By: Tyler Huff, Kate Buckley, Jeremy Burns				Additional Comments:				Samples Shipped via: Condition Upon Receipt:					
Relinquished/Shipped By: Signature:				Received By: Signature:				Received By: Signature: _____					
Print Name: Steve Carlson				Print Name: Steve Carlson				Print Name: _____					
Date/Time: 7/26/18 1700				Date/Time: 7/26/18 1700				Date/Time: _____					

Test Codes (marine): Mp-c: Chronic Kelp Mb-a: Acute Menidia/Silverside Sp-c: Chronic Urchin Fertilization Hr-dv: Chronic Abalone Mb-c: Chronic Menidia/Silverside Sp-dv: Chronic Urchin Development Aa-a: Acute Topsmelt Ab-a: Acute Mysid Shrimp Ms-dv: Chronic Mussel Development Aa-c: Chronic Topsmelt Ab-c: Chronic Mysid Shrimp Other: Write out the test organism

Test Codes (freshwater): Cd-a: Acute Ceriodaphnia Sc-c: Chronic Green Algae Cd-c: Chronic Ceriodaphnia Ha-a: Acute Hyalella amphipod Pp-a: Acute Fathead Minnow Ha-c: Chronic Hyalella amphipod Pp-c: Chronic Fathead Minnow T-22: CA Title 22 Hazardous Waste

wood.

Client/Send Report To:

Company	Wood Environmental & Infrastructure
Address	9210 Sky Park Court Suite 200 San Diego CA 92123
Contact/PM	Chris Stransky
Phone Number	858-300-4350
Email Address	chris.stransky@woodpic.com

Project Information (if needed):

Project Name 2018 Regional Harbor Monitoring Program

Project No. 1715100802

PO Number

Personal Cooler Shipped:

Return Requested: YES NO

Analysis Requested

(write out or use codes below)

[illegible]**Samples Collected By:**

CCS/TH/JR

Relinquished/Shipped By:

Signature: _____

Print Name: _____

Date/Time:

Additional Comments:

Received By:

Signature: _____

Print Name _____

Relinquished By:

Signature:

Print Name: _____

Date/Time:

Received By:

Signature: _____

Print Name: _____

Date/Time:

Test Codes (marine):

Mb-c: Chronic Kelp

Hr-dv: Chronic Abalone

Aa-a: Acute Topsmelt

Aa-c: Chronic Topsmelt

Mb-a: Acute Menidia/Silverside **Sp-c:** Chronic Urchin Fertilization

Mb-c: Chronic Menidia/Silverside **Sp-dv:** Chronic Urchin Development

Ab-a: Acute Mysid Shrimp

Ab-c: Chronic Mysid Shrimp

Test Codes (freshwater):

Cd-a: Acute Ceriodaphnia

Cd-c: Chronic Ceriodaphnia

Pp-a: Acute Fathead Minnow

Pp-c: Chronic Fathead Minnow

Sc-c: Chronic Green Algae

Ha-a: Acute Hyalella amphipod

Ha-c: Chronic Hyalella amphipod

T-22: CA Title 22 Hazardous Waste



Wood Environmental Toxicology Lab
4905 Morena Blvd, Ste. 1304
San Diego, CA 92117
Phone: (858) 299-5368

Chain of Custody Form

Page 1 of 1

Client/Send Report To:				Project Information (if needed):				Analysis Requested (write out or use codes below)			
Company: Wood Environmental & Infrastructure Address: 9210 Sky Park Court Suite 200 San Diego CA 92123 Contact/PM: Chris Stransky Phone Number: 858-300-4350 Email Address: chris.stransky@woodplc.com				Project Name: 2018 Regional Harbor Monitoring Program Project No.: 1715100802 PO Number: _____ Personal Cooler Shipped: YES _____ NO _____ Return Requested: YES _____ NO _____				Ms-dv Ab-a 10 day marine amphipod			
Sample ID	Collection Date	Collection Time	Sample Volume	Sample Type: Grab/Comp.	Sample Number (for lab use)	Receipt Temp (°C)					
B18-10136	07/27/18	0810	6L	Comp		90c					
B18-10137	07/27/18	0725	6L	Comp							
B18-10139	07/27/18	0905	6L	Comp							
B18-10140	07/27/18	1010	6L	Comp							
B18-10141	07/27/18	1240	6L	Comp							
B18-10142	07/27/18	1110	6L	Comp							
Additional Comments:							Samples Shipped via:				
Samples Collected By: TH, JB, MS							Condition Upon Receipt:				
Relinquished/Shipped By: <u>Corley Stransky</u>							Received By: _____				
Signature: _____							Signature: _____				
Print Name: <u>Corley Stransky</u>							Print Name: _____				
Date/Time: <u>7/27/18 1630</u>							Date/Time: _____				

Test Codes (marine):
Mp-c: Chronic Kelp
Hr-dv: Chronic Abalone
Aa-a: Acute Topsmelt
Aa-c: Chronic Topsmelt
Mb-a: Acute Menidia/Silverside
Mb-c: Chronic Menidia/Silverside
Ab-a: Acute Mysid Shrimp
Ab-c: Chronic Mysid Shrimp
Sp-c: Chronic Urchin Fertilization
Sp-dv: Chronic Urchin Development
Ms-dv: Chronic Mussel Development
Other: Write out the test organism

Test Codes (freshwater):
Cd-a: Acute Ceriodaphnia
Cd-c: Chronic Ceriodaphnia
Pp-a: Acute Fathead Minnow
Pp-c: Chronic Fathead Minnow
Sc-c: Chronic Green Algae
Ha-a: Acute Hyalella amphipod
Ha-c: Chronic Hyalella amphipod
T-22: CA Title 22 Hazardous Waste

Ammonia Subsample Analysis

Client: Amec FW
Project ID: RHMP - Porewater
Test No.: 18-08-025 to - 041
DI Blank: 0-0 mg/L

Test Species: *E. estuarius*, *M. galloprovincialis* *circis*
 Start Date: 8/3/2018, 8/2/18
 End Date: 8/13/2018, 8/4/18

10 mg/L Ammonia Stock: 8-4 mg/L as NH₃

[illegible]

QC Check: AD 11/16/18

Final Review: JW 1/21/19

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~~Final Reviewed~~ Final Review: 11/2/19

Sample Check-In: Sediments

Amec Foster Wheeler - Environmental Lab
4905 Morena Blvd, Ste. 1304
San Diego, CA 92117

Client: Amec/Wood
Project Name: RMP
Test ID Numbers: 18-08-012 to 18-08-013
Test Type/Organism: Amphipods & mussels

Sample ID	Sample Number	Collection Date/Time	Receipt Date/Time	Total Volume	Receipt Temp.	Sample Description	Salinity (ppt)	pH (units)
B18-10037	2018-50043	7/31/18 1035	7/31/18 1600	~4L	4.0	Brown/grey	35.3	7.45
B18-10038	2018-50044	1125					35.3	7.57
B18-10041	2018-50045	1250					35.0	7.47
B18-10176	2018-50096	0945					35.2	7.57
B18-10180	2018-50097	0845					35.2	7.33
B18-10181	2018-50098	0753					35.8	7.34
B18-10042	2018-50100	8/1/18 1215	8/1/18 1530	~4L	12.0		35.8	7.34
B18-10085	2018-50101	0755			12.0		35.0	7.81
B18-10086	2018-50102	0843			12.0		35.1	7.74
B18-10087	2018-50103	1043			12.0		35.2	7.65
B18-10088	2018-50104	0925			12.0		35.1	7.50

Samples checked-in by: BCS, CS, JV
 Samples shipped via: wood
 Control sediment used: 2018 control 30d
 Samples seized by: wood Date: 8/13/18 Screen Size: 1mm

Additional Analysis:
 Porewater: NT3
 Ammonia:
 Other:

Test Organism	Supplier	Receipt Date	Condition	Initials
Amphipod	NW Regatta	8/13/18	good	JW
Mussels	local diver	June/July/August	good	BCS, JV

Additional Comments:

Initial QC: AD 11/14/18
 Final Review: JW 1/18/19

Final Reviewed: on 1/18/19

Ammonia Subsample Analysis

Client: Amec FW

Project ID: RHMP - Powerwater

Test No.: 18-08-053 to -063

Test Species: E. estuarius , M. gallops unciolis

Start Date: 8/10/18 8/14/18

End Date: 8/20/18, 8/16/18

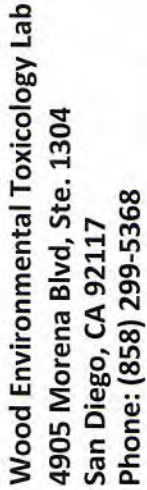
DI Blank: 0.0

10 mg/L Ammonia Stock: 5.4 mg/L as NH_3

[illegible]

QC Check: AD 11/14/18

Final Review: 22 1/18/14



Page ____ of ____

Test Codes (marine):		Test Codes (freshwater):	
Mp-c: Chronic Kelp	Mb-a: Acute Menidia/Silverside	Sp-c: Chronic Urchin Fertilization	Cd-a: Acute Ceriodaphnia
Hr-dv: Chronic Abalone	Mb-c: Chronic Menidia/Silverside	Sp-dv: Chronic Urchin Development	Cd-c: Chronic Ceriodaphnia
Aa-a: Acute Topsmelt	Ab-a: Acute Mysid Shrimp	Mg-dv: Chronic Mussel Development	Pp-a: Acute Fathead Minnow
Aa-c: Chronic Topsmelt	Ab-c: Chronic Mysid Shrimp	Other: Write out the test organism	Pp-c: Chronic Fathead Minnow

* not signed upon Relinquishment



Wood Environmental Toxicology Lab
4905 Morena Blvd, Ste. 1304
San Diego, CA 92117
Phone: (858) 299-5368

Chain of Custody Form

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Client/Send Report To:			Project Information (if needed):			Analysis Requested (write out or use codes below)		
Company <u>Wood</u>	Project Name <u>Regional Harbor Monitoring</u>		Project No. <u>Program</u>	Sample Type: Grab/Comp.	Sample Number (for lab use)			
Address <u>9210 Sky Park Ct</u>	PO Number							
Contact/PM <u>Chris Strinsky / Corey Shandy</u>	Personal Cooler Shipped: Return Requested: YES <input type="checkbox"/> NO <input type="checkbox"/>							
Phone Number <u>858-300-4350</u>								
Email Address								
Sample ID	Collection Date	Collection Time	Sample Volume	Sample Type: Grab/Comp.	Sample Number (for lab use)			Receipt Temp (°C)
B18 - 10042	8/1/18	1215	~4L			X	X	12.0
B18 - 10085		0755						12.0
B18 - 10086		0843						12.0
B18 - 10087		1043						12.0
B18 - 10088		0925						12.0
Additional Comments:						Samples Shipped via:		
Samples Collected By: <u>Tyler Huff, John Rudolph, Mansa Swiderst.</u>						Condition Upon Receipt:		
Relinquished/Shipped By: <u>Corey Shandy</u>						Received By:		
Signature: <u>Corey Shandy</u>						Signature: _____		
Print Name: <u>Corey Shandy</u>						Print Name: _____		
Date/Time: <u>8/1/2018 01530</u>						Date/Time: _____		

Test Codes (marine):
Mp-c: Chronic Kelp Mb-a: Acute Menidia/Silverside Sp-c: Chronic Urchin Fertilization
Hr-dv: Chronic Abalone Mb-c: Chronic Menidia/Silverside Sp-dv: Chronic Urchin Development
Aa-a: Acute Topsmelt Ab-a: Acute Mysid Shrimp Ms-dv: Chronic Mussel Development
Aa-c: Chronic Topsmelt Ab-c: Chronic Mysid Shrimp Other: Write out the test organism

Test Codes (freshwater):
Cd-a: Acute Ceriodaphnia Sc-c: Chronic Green Algae
Cd-c: Chronic Ceriodaphnia Ha-a: Acute Hyalella amphipod
Pp-a: Acute Fathead Minnow Ha-c: Chronic Hyalella amphipod
Pp-c: Chronic Fathead Minnow T-22: CA Title 22 Hazardous Waste

Amec Foster Wheeler - Environmental Lab
4905 Morena Blvd, Ste. 1304
San Diego, CA 92117

Client: Amec/Wood
Project Name: RHMP
Test ID Numbers: 18-08-014 to 017
Test Type/Organism: Amphipods 21M

18-08-082
to - 084
S/S

[illegible]

Samples checked-in by: WJ/SC
 Samples shipped via: wood
 Control sediment used: 201 control sed.
 Samples seized by: wood Date: 8/16/03 Screen Size: 1mm

Additional Analysis:
Porewater: n/a
Ammonia:
Other:

Test Organism	Supplier	Receipt Date	Condition	Initials
Parapipid	NW Aquatics	8/16/18	good	NW
Mussels	local diver	June - August	good	AKG, NW

Additional Comments:

Initial QC: ARO 11/14/18
Final Review: SW 1/17/19

Ammonia Subsample Analysis

Client: Amec FW
Project ID: RAMP - Porewater
Test No.: 18-08-082 to -0834 AD
18-08-074 to -076
DI Blank: 0.0

Test Species: E. estuarius , M. g. g. provincialis
 Start Date: 8/22/2018 , 8/17/18
 End Date: 8/26/2018 , 8/19/18
 ADG/111
 ammonia Stock: 88 mg/L as NH₃

[illegible]

QC Check: AD 11/14/18

Final Review: 2w 1/17/19

Page 1

Final Revised: JW 1/17/19

wood.

Client/Send Report To:

Company	Wood Environmental & Infrastructure
Address	9210 Sky Park Court Suite 200 San Diego CA 92123
Contact/PM	Chris Stransky
Phone Number	858-300-4350
Email Address	chris.stransky@woodplc.com

Project Information (if needed):

Project Name 2018 Regional Harbor Monitoring Program

Project No. 1715100802

PO Number

Personal Cooler Shipped:

Return Requested: YES NO

Analysis Requested

(write out or use codes below)

[illegible]

Samples Collected By: T. L. G. V. P. W. Additional Comments:

Samples Shipped via:
Condition Upon Receipt:

Relinquished/Shipped By:

Signature: <u>Corey Shundy</u>	Signature: <u>Steele Carlson</u>
Print Name: <u>Corey Shundy</u>	Print Name: <u>Steele Carlson</u>
Date/Time: <u>8/14/2014^{5c} 1620</u>	Date/Time: <u>8/14/18 1620</u>

Relinquished By:

Signature: _____

Print Name: _____

Date/Time: _____

Received By:

Signature: _____

Print Name: _____

Date/Time: _____

Test Codes (marine):

Mp-c: Chronic Kelp	Mb-a: Acute Menidia/Silverside	Sp-c: Chronic Urchin Fertilization
Hr-dv: Chronic Abalone	Mb-c: Chronic Menidia/Silverside	Sp-dv: Chronic Urchin Development
Aa-a: Acute Topsmelt	Ab-a: Acute Mysid Shrimp	Ms-dv: Chronic Mussel Development
Aa-c: Chronic Topsmelt	Ab-c: Chronic Mysid Shrimp	Other: Write out the test organism

Test Codes (freshwater):

Cd-a: Acute Ceriodaphnia **Sc-c:** Chronic Green Algae
Cd-c: Chronic Ceriodaphnia **Ha-a:** Acute Hyalella amphipod
Pp-a: Acute Fathead Minnow **Ha-c:** Chronic Hyalella amphipod
Pp-c: Chronic Fathead Minnow **T-22:** CA Title 22 Hazardous Waste

* Replicate station collected here (sub in case 10043 is insufficient.

B18-20043). Extra volume provided

**Amec Foster Wheeler - Environmental Lab
4905 Morena Blvd, Ste. 1304
San Diego, CA 92117**

Client: AMEE FW / Wood
Project Name: RAMP
Test ID Numbers: 18-09-015; 18-09-020
Test Type/Organism: Amphipod emus324

[illegible]

Samples checked-in by: aw
 Samples shipped via: Wood
 Control sediment used: Can control sed
 Samples seived by: Wood Date: 9/13/18 Screen Size: 1mm

Additional Analysis:

Porewater:	NH ₃
Ammonia:	
Other:	

Test Organism	Supplier	Receipt Date	Condition	Initials
Amphipod	NW Aquatic	16/9/18	good	AD
Mussels	Local Diver	29th July	good	AG, JW

Additional Comments:

Initial QC: AD 11/14/18
Final Review: Juv 1/17/19

Parameter - check in

Log Number	Beaker	Day	Dilution	Unionized Ammonia Calculation for Pressure of 1 atm										Beaker Num.	Station		
				Input 'Shaded' data													
B18-10200																	

Final Reviewed: 2017/1/17/19

Ammonia Subsample Analysis

Client: Amec FW - RHMP
Project ID: Porewater
Test No.: 18-09-015

Test Species: M. galloprovincialis, E. estuarius
Start Date: 9/14/2018, 10/10/18
End Date: 9/16/2018, 10/20/18

DI Blank: 0.0

10 mg/L Ammonia Stock: 8.1

[illegible]

QC Check: AD 11/14/18

Final Review: JW 1/17/19

AD

Chain of Custody Form

[illegible]

Test Codes (marine):

Mp-c: Chronic Kelp

Hr-dv: Chronic Abalone

Aa-a: Acute Topsmen

Aa-c: Chronic Topsmelt

Mb-a: Acute Menidia/Silverside **Sp-c:** Chronic Urchin Fertilization

Mb-c: Chronic Meningitis/Silver Side **Sp-dv:** Chronic Urchin Development

Ab-a: Acute Mysid Shrimp
Ms-dv: Chronic Mussel Development

Ab-c: Chronic Mysid Shrimp

Test Codes (freshwater):

Cd-a: Acute Ceriodaphnia

Cd-c: Chronic Ceriodaphnia

Pp-a: Acute Fathead Minnow

Pp-c: Chronic Fathead Minn

Sc-c: Chronic Green Algae

Ha-a: Acute Hvalella amphipod

Ha-c: Chronic Hyalella amphipod

T-22: CA Title 22 Hazardous Waste

APPENDIX B

Statistical Analyses and Raw Data Packages for Amphipod (*Eohaustorius*)

Amphipod Batch #1

7/13/18

Survival Counts for 10 day Amphipod Test

Client: AMEC/WOOD

Project ID: RHMP - Dana Point and Oceanside

Species *Eohaustorius estuarius*

Test No. ~~18-07-007 to 18-07-010~~ ^{18-07-003 to 18-07-006} ~~18-07-011 to 18-07-014~~ ^{18-07-011 to 18-07-014}

Sample ID	Rand #	Survival Counts		% Survival	Mean % Survival
		Number Added	Number Alive (Day 10)		
Lab Control	45	20	20	100	97.0
	23	20	19	95	
	31	20	18	90	
	30	20	20	100	
	37	20	20	100	
Grain Size Control	25	20	20	100	97.0
	32	20	19	95	
	49	20	19	95	
	36	20	20	100	
	47	20	19	95	
B18-10065	33	20	20	100	89.0
	5	20	17	85	
	42	20	18	90	
	46	20	18	90	
	35	20	16	80	
B18-10066	1	20	19	95	96.0
	29	20	19	95	
	18	20	20	100	
	12	20	19	95	
	19	20	19	95	
B18-10067	50	20	20	100	93.0
	20	20	18	90	
	13	20	20	100	
	41	20	17	85	
	38	20	18	90	
B18-10068	24	20	18	90	95.0
	40	20	19	95	
	39	20	20	100	
	10	20	18	90	
	44	20	20	100	
B18-10069	11	20	20	100	99.0
	9	20	20	100	
	26	20	20	100	
	22	20	20	100	
	27	20	19	95	

QC Check: AD 11/9/18

Final Review: JW 12/26/18

Survival Counts for 10 day Amphipod Test

Client: AMEC/WOOD

Project ID: RHMP - Dana Point and Oceanside

Species *Eohaustorius estuarius*

Test No. ~~18-07-001 to 18-07-019~~ 15-07-003 to 18-07-006 18-07-011 to 18-07-014

Sample ID	Rand #	Survival Counts		% Survival	Mean % Survival
		Number Added	Number Alive (Day 10)		
B18-10070	2	20	20	100	97.0
	16	20	20	100	
	43	20	18	90	
	3	20	19	95	
	34	20	20	100	
B18-10071	48	20	20	100	95.0
	8	20	16	80	
	15	20	20	100	
	14	20	20	100	
	17	20	19	95	
B18-10072	21	20	14	70	70.0
	7	20	12	60	
	28	20	12	60	
	4	20	17	85	
	6	20	15	75	

QC Check: AD 11/9/18

Final Review: JW 12/26/18

Unpaired t test	
1	Table Analyzed
2	Transform of RHMP 7.13 Amphipod
3	Column A
4	vs.
5	Column B
6	Grain Size Control
7	Unpaired t test
8	P value
9	P value summary
10	Significantly different (P < 0.05)?
11	One- or two-tailed P value?
12	t, df
13	
14	How big is the difference?
15	Mean ± SEM of column A
16	Mean ± SEM of column B
17	Difference between means
18	95% confidence interval
19	R squared (eta squared)
20	
21	F test to compare variances
22	F, DF _n , D _{df}
23	P value
24	P value summary
25	Significantly different (P < 0.05)?

Unpaired t test	
1	Table Analyzed
2	Transform of RHMP 7.13 Amphipod
3	Column A
4	vs.
5	Column C
6	B18-10065
7	Unpaired t test
8	P value
9	P value summary
10	Significantly different (P < 0.05)?
11	One- or two-tailed P value?
12	t, df
13	
14	How big is the difference?
15	Mean ± SEM of column A
16	Mean ± SEM of column C
17	Difference between means
18	95% confidence interval
19	R squared (eta squared)
20	
21	F test to compare variances
22	F, DF _n , D _{df}
23	P value
24	P value summary
25	Significantly different (P < 0.05)?

Unpaired t test	
1	Table Analyzed
2	Transform of RHMP 7.13 Amphipod
3	Column A
4	vs.
5	Column D
6	B18-10066
7	Unpaired t test
8	P value
9	P value summary
10	Significantly different (P < 0.05)?
11	One- or two-tailed P value?
12	t, df
13	
14	How big is the difference?
15	Mean ± SEM of column A
16	Mean ± SEM of column D
17	Difference between means
18	95% confidence interval
19	R squared (eta squared)
20	
21	F test to compare variances
22	F, DF _n , D _{df}
23	P value
24	P value summary
25	Significantly different (P < 0.05)?

Unpaired t test	
1	Table Analyzed
2	Transform of RHMP 7.13 Amphipod
3	Column A
4	vs.
5	Column E
6	B18-10067
7	Unpaired t test
8	P value
9	P value summary
10	Significantly different (P < 0.05)?
11	One- or two-tailed P value?
12	t, df
13	
14	How big is the difference?
15	Mean ± SEM of column A
16	Mean ± SEM of column E
17	Difference between means
18	95% confidence interval
19	R squared (eta squared)
20	
21	F test to compare variances
22	F, DF _n , D _{df}
23	P value
24	P value summary
25	Significantly different (P < 0.05)?

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.13 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column F	B18-10068
6		
7	Unpaired t test	
8	P value	0.2691
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.643 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.455 ± 0.06634, n=5
16	Mean ± SEM of column F	1.393 ± 0.07072, n=5
17	Difference between means	0.06235 ± 0.09697
18	95% confidence interval	-0.1613 to 0.286
19	R squared (eta squared)	0.04914
20		
21	F test to compare variances	
22	F, DFn, Dfd	1.136, 4, 4
23	P value	0.9044
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.13 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column G	B18-10069
6		
7	Unpaired t test	
8	P value	0.2267
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.7881 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.455 ± 0.06634, n=5
16	Mean ± SEM of column G	1.518 ± 0.0431, n=5
17	Difference between means	-0.06235 ± 0.07912
18	95% confidence interval	-0.2448 to 0.1201
19	R squared (eta squared)	0.07204
20		
21	F test to compare variances	
22	F, DFn, Dfd	2.369, 4, 4
23	P value	0.4240
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.13 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column H	B18-10070
6		
7	Unpaired t test	
8	P value	0.5000
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.455 ± 0.06634, n=5
16	Mean ± SEM of column H	1.455 ± 0.06634, n=5
17	Difference between means	0 ± 0.09383
18	95% confidence interval	-0.2164 to 0.2164
19	R squared (eta squared)	0
20		
21	F test to compare variances	
22	F, DFn, Dfd	1, 4, 4
23	P value	>0.9999
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.13 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column I	B18-10071
6		
7	Unpaired t test	
8	P value	0.4031
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.2535 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.455 ± 0.06634, n=5
16	Mean ± SEM of column I	1.427 ± 0.09019, n=5
17	Difference between means	0.02838 ± 0.112
18	95% confidence interval	-0.2298 to 0.2866
19	R squared (eta squared)	0.007967
20		
21	F test to compare variances	
22	F, DFn, Dfd	1.848, 4, 4
23	P value	0.5666
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.13 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column J	B18-10072
6		
7	Unpaired t test	
8	P value	0.0003
9	P value summary	***
10	Significantly different (P < 0.05)?	Yes
11	One- or two-tailed P value?	One-tailed
12	t, df	t=5.364 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.455 ± 0.06634, n=5
16	Mean ± SEM of column J	0.9967 ± 0.05393, n=5
17	Difference between means	0.4586 ± 0.0855
18	95% confidence interval	0.2615 to 0.6558
19	R squared (eta squared)	0.7824
20		
21	F test to compare variances	
22	F, DFn, Dfd	1.513, 4, 4
23	P value	0.6979
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Survival Counts for 10day Amphipod Test

Client: Amec FW

Test Species: *E. estuarius*

Project ID: RHMP

Start Date/Time: 7/13/2018 1500

Test No: ~~18-07-007 to 18-07-014~~
SW 014

End Date/Time: 7/23/2018 1400

Test No: 18-07-003 to
18-07-006;
18-07-011 to
18-07-014

Rand #	Survival Counts		Final Weights (Growth) AD		
	Start (Day 0)	End (Day 10)	Pan Weight AD	Pan + Organism Weight	Final Weight (per organism)
1	20	19			
2	20	20			
3	20	19			
4	20	17	19		
5	20	17			
6	20	15			
7	20	12			
8	20	16			
9	20	20			
10	20	18			
11	20	20			
12	20	19	19		
13	20	20			
14	20	20			
15	20	20			
16	20	20			
17	20	19	19		
18	20	20			
19	20	19			
20	20	18			
21	20	19			
22	20	20			
23	20	19			
24	20	18			
25	20	20			
26	20	20	20		
27	20	19			
28	20	12			
29	20	19			
30	20	20			
31	20	18			
32	20	19			
33	20	20			
34	20	20			
35	20	16			
Tech Initials:			AD	AB	AD

Ammonia Collected: Test Start: SW

Test End: AD

Comments:

QC Check: AB 8/9/18

Final Review: SW 12/26/18

Survival Counts for 10day Amphipod Test

Client: Amec FW

Test Species: *E. estuarius*

Project ID: RHMP

Start Date/Time: 7/13/2018 1500

Test No. ~~18-07-007 10 18-07-011~~

End Date/Time: 7/23/2018 1400

Test No: 18-07-003 to
18-07-006;
18-07-011 to
18-07-014

[illegible]

Ammonia Collected: Test Start: 2W

Test End: AD

Comments:

QC Check: 10 8 | 9 | 8

Final Review: SW 12/26/18

**Amec FW
RHMP Sediment Testing
Random Numbers**

SAMPLE ID	Rand#
Lab Control	45
	23
	31
	30
	37
Grain Size Control	25
	32
	49
	36
	47
B18-10065	33
	5
	42
	46
B18-10066	35
	1
	29
	18
B18-10067	12
	19
	50
	20
B18-10068	13
	41
	38
	24
B18-10069	40
	39
	10
	44
B18-10070	11
	9
	26
	22
B18-10071	27
	2
	16
	43
B18-10072	3
	34
	48
	8
	15
	14
	17
	21
	7
	28
	4
	6

QC Check - Amphipod: AD

Final Review: [signature]

Water Quality for 10day Amphipod Test

Client: Amec FW

Test Species: *E. estuarius*

Project ID: RHMP Dana Point/Oceanside

Start Date/Time: 7/13/2018 1500

Test No. ~~18-07-003 to 18-07-014~~ ^{2w}

End Date/Time: 7/23/2018 1400

~~18-07-003 to 18-07-006 ; 18-07-011 to 18-07-014~~

Sample ID	Water Quality Measurements (Day)											
	Parameter	0	1	2	3	4	5	6	7	8	9	10
Lab Control	Temp. (°C)	15.5	15.5	15.0	15.9	15.6	15.1	15.0	14.9	15.2	15.4	15.5
	Salinity (ppt)	31.9	31.8	32.2	32.0	31.8	32.1	32.0	32.0	32.0	31.5	31.9
	pH (units)	7.75	7.68	7.79	7.61	7.64	7.60	7.69	7.91	7.73	7.65	7.70
	DO (mg/L)	8.2	8.0	8.4	8.2	8.2	8.3	8.3	8.4	8.1	7.9	8.1
Grain Size Control	Temp. (°C)	15.2	15.3	15.1	15.4	15.2	15.0	14.8	14.8	15.0	15.0	14.9
	Salinity (ppt)	32.3	32.2	32.4	32.4	32.4	32.4	32.5	32.4	32.5	32.3	32.5
	pH (units)	7.74	7.70	7.90	7.68	7.71	7.68	7.80	7.90	7.85	7.95	7.97
	DO (mg/L)	8.1	8.1	8.2	8.2	8.2	8.3	8.3	8.3	8.0	8.1	8.0
B18-10065	Temp. (°C)	15.3	15.4	15.0	15.5	15.1	15.0	14.8	14.8	14.9	14.9	14.9
	Salinity (ppt)	32.2	32.1	32.3	32.2	32.2	32.2	32.2	32.2	32.2	32.1	32.2
	pH (units)	7.74	7.73	7.89	7.68	7.70	7.68	7.78	7.81	7.85	7.91	7.90
	DO (mg/L)	8.1	8.1	8.2	8.2	8.2	8.2	8.3	8.3	8.0	8.1	8.0
B18-10066	Temp. (°C)	15.2	15.3	15.1	15.5	15.1	14.9	14.8	14.8	14.9	14.8	14.8
	Salinity (ppt)	32.2	32.2	32.4	32.3	32.3	32.4	32.4	32.3	32.4	32.3	32.4
	pH (units)	7.76	7.72	7.90	7.66	7.74	7.65	7.76	7.80	7.84	7.88	7.81
	DO (mg/L)	8.2	8.1	8.3	8.1	8.2	8.2	8.3	8.3	8.0	8.1	8.0
B18-10067	Temp. (°C)	15.1	15.2	15.0	15.4	14.9	14.9	14.8	14.8	14.9	14.8	14.8
	Salinity (ppt)	32.2	32.2	32.4	32.3	32.3	32.3	32.3	32.3	32.4	32.3	32.4
	pH (units)	7.75	7.71	7.90	7.67	7.71	7.60	7.74	7.78	7.80	7.83	7.86
	DO (mg/L)	8.2	8.1	8.3	8.2	8.3	8.3	8.3	8.3	8.0	8.1	8.1
B18-10068	Temp. (°C)	15.0	15.2	15.1	15.4	15.0	14.8	14.7	14.7	14.8	14.7	14.7
	Salinity (ppt)	31.9	31.9	32.1	32.0	32.0	32.0	32.0	32.0	32.1	32.0	32.1
	pH (units)	7.76	7.73	7.90	7.68	7.70	7.61	7.73	7.78	7.79	7.82	7.81
	DO (mg/L)	8.3	8.2	8.3	8.2	8.3	8.3	8.3	8.3	8.1	8.1	8.1
Tech Initials (Initial):		AD	AD	AD	AD	AD	AD	AD	AD	AD	AD	AD

Date Animals Received: 7/11/18

Age or Size of Animals: 3-5mm

Comments:

QC Check: AD 8/9/18

Final Review: AD 12/24/18

Water Quality for 10day Amphipod Test

Client: Amec FW

Test Species: *E. estuarius*

Project ID: RHMP Dana Point/Oceanside

Start Date/Time: 7/13/2018 1500

Test No. ~~18-07-001 to 18-07-014~~ on
18-07-003 to 18-07-006, 18-07-011 to 18-07-014

End Date/Time: 7/23/2018 1400

Sample ID	Water Quality Measurements (Day)											
	Parameter	0	1	2	3	4	5	6	7	8	9	10
B18-10069	Temp. (°C)	15.6	15.1	15.1	15.2	14.9	14.8	14.7	14.7	14.8	14.7	14.7
	Salinity (ppt)	31.9	31.9	32.0	32.0	32.0	32.1	32.1	32.0	32.1	32.1	32.1
	pH (units)	7.77	7.73 ^{AD}	7.92	7.68	7.72	7.60	7.72	7.77	7.79	7.79	7.77
	DO (mg/L)	8.3	8.2	8.3	8.2	8.3	8.3	8.3	8.3	8.1	8.2	8.1
B18-10070	Temp. (°C)	15.0	15.0	15.0	15.2	14.9	14.7	14.7	14.6	14.7	14.6	14.6
	Salinity (ppt)	32.0	32.1	32.2	32.2	32.2	32.2	32.2	32.2	32.3	32.3	32.3
	pH (units)	7.76	7.74	7.92	7.66	7.71	7.57	7.70	7.75	7.78	7.77	7.76
	DO (mg/L)	8.3	8.2	8.3	8.2	8.3	8.3	8.3	8.3	8.1	8.2	8.2
B18-10071	Temp. (°C)	14.9	15.0	14.9	15.1	14.8	14.6	14.7	14.5	14.7	14.6	14.6
	Salinity (ppt)	32.1	32.2	32.3	32.3	32.3	32.3	32.4	32.4	32.4	32.4	32.4
	pH (units)	7.76	7.73	7.91	7.68	7.68	7.53	7.74	7.78	7.82	7.83	7.95
	DO (mg/L)	8.3	8.2	8.3	8.3	8.3	8.4	8.4	8.3	8.1	8.2	8.1
B18-10072	Temp. (°C)	14.7	15.0	14.8	15.1	14.7	14.5	14.5	14.5	14.6	14.5	14.5
	Salinity (ppt)	31.8	31.9	32.0	32.0	32.1	32.1	32.1	32.1	32.2 ^{AD}	32.2	32.2
	pH (units)	7.79	7.75	7.94	7.68	7.73	7.60	7.74	7.79	7.84 ^{AD}	7.85	7.77
	DO (mg/L)	8.3	8.3	8.3	8.2	8.3	8.4	8.4	8.4	8.1	8.2	8.2
	Temp. (°C)											
	Salinity (ppt)											
	pH (units)											
	DO (mg/L)											
	Temp. (°C)											
	Salinity (ppt)											
	pH (units)											
	DO (mg/L)											

Tech Initials (Initial): AD AD JW AP JW AD AG AD AD JW AD

Date Animals Received: 7/11/18

Age or Size of Animals: 3-5mm

Comments:

QC Check: 8/9/18 AD

Final Review: JW 12/26/18

Overlying Water

Unionized Ammonia Calculation for Pressure of 1 atm
Input 'Shaded' data

I	pK
1	9.26
2	9.27
3	9.28
4	9.29
5	9.30
6	9.32
7	9.33
8	9.34

Log Number	Beaker	Day	Dilution	Total Ammonia (mg/L)	Temp (C)	Salinity (ppt)	pH	Temp (K)	I	I Rounded	pK	Unionized Ammonia	D.O. (mg/L)	Beaker Num.	Station
Lab Control			0	0.6	15.5	31.9	7.75	288.66	7.07	7	9.33	0.008		0	
Grain Size Control			0	1.1	15.2	32.3	7.74	288.36	7.15	7	9.33	0.014		0	
B18-10065			0	2.3	15.3	32.2	7.74	288.46	7.13	7	9.33	0.029		0	
B18-10066			0	0.5	15.2	32.2	7.76	288.36	7.13	7	9.33	0.006		0	
B18-10067			0	< 0.5	15.1	32.2	7.75	288.26	7.13	7	9.33	< 0.006		0	
B18-10068			0	0.7	15	31.9	7.76	288.16	7.07	7	9.33	0.009		0	
B18-10069			0	2.6	15	31.9	7.77	288.16	7.07	7	9.33	0.034		0	
B18-10070			0	0.7	15	32.0	7.76	288.16	7.09	7	9.33	0.009		0	
B18-10071			0	0.6	14.9	32.1	7.76	288.06	7.11	7	9.33	0.008		0	
B18-10072			0	< 0.5	14.7	31.8	7.79	287.86	7.05	7	9.33	< 0.007		0	
Lab Control			10	0.6	15.5	31.9	7.70	288.66	7.07	7	9.33	0.007		0	
Grain Size Control			10	1.7	14.9	32.5	7.97	288.06	7.20	7	9.33	0.035		0	
B18-10065			10	4.3	14.9	32.2	7.90	288.06	7.13	7	9.33	0.075		0	
B18-10066			10	< 0.5	14.8	32.4	7.81	287.96	7.17	7	9.33	0.007		0	
B18-10067			10	0.5	14.8	32.4	7.86	287.96	7.17	7	9.33	0.008		0	
B18-10068			10	0.9	14.7	32.1	7.81	287.86	7.11	7	9.33	0.013		0	
B18-10069			10	0.5	14.7	32.1	7.77	287.86	7.11	7	9.33	0.006		0	
B18-10070			10	< 0.5	14.6	32.3	7.76	287.76	7.15	7	9.33	< 0.006		0	
B18-10071			10	2.8	14.6	32.4	7.95	287.76	7.17	7	9.33	0.053		0	
B18-10072			10	2.6	14.5	32.2	7.77	287.66	7.13	7	9.33	0.033		0	

Porewater - Day 0

Unionized Ammonia Calculation for Pressure of 1 atm
Input 'Shaded' data

I	pK
1	9.26
2	9.27
3	9.28
4	9.29
5	9.30
6	9.32
7	9.33
8	9.34

Log Number	Beaker	Day	Dilution	Total Ammonia (mg/L)	Temp (C)	Salinity (ppt)	pH	Temp (K)	I	I Rounded	pK	Unionized Ammonia (mg/L)	D.O. (mg/L)	Beaker Num.	Station
B18-10065	0		PW	8.4	15.3	30.9	7.25	288.46	7	6.85	9.33	0.034		0	
B18-10066	0		PW	3.7	15.2	32.8	7.33	288.36	7	7.26	9.33	0.018		0	
B18-10067	0		PW	3.5	15.1	33.2	7.34	288.26	7	7.34	9.33	0.017		0	
B18-10068	0		PW	6.6	15.0	33.1	7.19	288.16	7	7.32	9.33	0.023		0	
B18-10169	0		PW	3.7	15.0	33.0	7.26	288.16	7	7.30	9.33	0.015		0	
B18-10070	0		PW	4	15.0	33.4	7.21	288.16	7	7.39	9.33	0.015		0	
B18-10071	0		PW	8.4	14.9	33.7	7.10	288.06	7	7.45	9.33	0.023		0	
B18-10072	0		PW	4	14.7	33.3	7.28	287.86	7	7.37	9.33	0.017		0	

Sample Check-In: ^{Day 0} Perimeter Effluent/Water

Amec Foster Wheeler - Environmental Lab
4905 Morena Blvd, Ste. 1304
San Diego, CA 92117

Client: Amec/Wood

Project Name: RAMP 18-07-001

Test ID Numbers: 18-07-03 to 18-07-014

Sample ID:	1318-10065	1318-10066	1318-10067	1318-10068	1318-10069	1318-10070	1318-10071	1318-10072
Sample Number:	2018-50024	2018-50025	2018-50026	2018-50027	2018-50028	2018-50029	2018-50030	2018-50031
Collection Date/Time:	7/10/18 0914	7/10/18 1238	7/10/18 1155	7/10/18 1345	7/11/18 1210	7/11/18 1055	7/11/18 1200	7/11/18 1345
Receipt Date/Time:	7/11/18 0935	7/11/18 0935	7/11/18 0935	7/11/18 0935	7/11/18 1600	7/11/18 1600	7/11/18 1600	7/11/18 1600
Total Sample Volume:	4L	4L	4L	4L	4L	4L	4L	4L
Receipt Temperature:	6°C	6°C	8°C	8°C	4°C	8°C	8°C	4°C
Appropriate Temp (Y/N) ¹ :	Y	Y	Y	Y	Y	Y	Y	Y
pH (units):	7.25	7.33	7.34	7.19	7.26	7.21	7.10	7.28
DO (mg/L):	-	-	-	-	-	-	-	-
Conductivity (µS/cm) ² :	-	-	-	-	-	-	-	-
Salinity (ppt):	30.9	32.8	33.2	33.1	33.0	33.4	33.7	33.3
Alkalinity (mg/L):	-	-	-	-	-	-	-	-
Hardness (mg/L) ² :	-	-	-	-	-	-	-	-
Total Chlorine (mg/L) ³ :	-	-	-	-	-	-	-	-
Free Chlorine (mg/L) ³ :	-	-	-	-	-	-	-	-
Technician Initials:	JW	JW	JW	JW	JW	JW	JW	JW

Notes:

¹ Temperature should be 0 - 6°C if received > 24 hours past collection

² Only measured on samples with less than 3 ppt salinity

³ If total chlorine is above 0.10 mg/L, the free chlorine will be measured

⁴ Debris, odor, and color is described only if observed in the sample

Sample Descriptions⁴:

Pore Water

Test Organism: N/A

Dilution Water: Lab SW, Art SW, RW, DMW, Other

Salinity 32 ppt

Additional Control:

Salinity

Initial QC: AD 11/9/18

Final Review: JW 12/26/18

Ammonia Subsample Analysis

Client: Amec FW

Project ID: RHMP - Porewater

Test No.: 18-07-063 to 18-07-006

Test No.: 18-07-063 to 18-07-
18-07-011 to 18-07-014

DI Blank: 0.0

Test Species: *E. estuarius*

Start Date: 7/13/2018

End Date: 7/23/2018

10 mg/L Ammonia Stock: 8.3 mg/L as NH_3

[illegible]

QC Check: AD 11/9/18

Final Review: 2w 12/26/18

Ammonia Subsample Analysis

Client: Amec FW
Project ID: RHMP - Overlying Water
Test No.: 18-07-003 to -004

Test Species: *E. estuarius*

Start Date: 7/13/2018

End Date: 7/23/2018

DI Blank: 0.0

10 mg/L Ammonia Stock: $8.0 \times 1.22 = 9.8 \text{ mg/L as } \text{NH}_3$

[illegible]

QC Check: AB 11/9/18

Final Review: SW 12/26/18

Amphipod Batch #2

7/17/18

Survival Counts for 10 day Amphipod Test

Client: AMEC/WOOD

Project ID: RHMP - Mission Bay 7/17/18

Species *Eohaustorius estuarius*

Test No. 18-07-019 to -027

Sample ID	Rand #	Survival Counts		% Survival	Mean % Survival
		Number Added	Number Alive (Day 10)		
Lab Control	102	20	19	95	95.0
	86	20	20	100	
	60	20	19	95	
	68	20	19	95	
	74	20	18	90	
B18-10015	73	20	17	85	93.0
	63	20	20	100	
	72	20	19	95	
	57	20	20	100	
	80	20	17	85	
B18-10016	78	20	20	100	95.0
	71	20	20	100	
	84	20	17	85	
	83	20	20	100	
	87	20	18	90	
B18-10017	98	20	15	75	81.0
	96	20	15	75	
	101	20	16	80	
	56	20	17	85	
	99	20	18	90	
B18-10438	88	20	19	95	95.0
	75	20	18	90	
	79	20	19	95	
	94	20	19	95	
	61	20	20	100	
B18-10019	97	20	20	100	96.0
	76	20	20	100	
	85	20	20	100	
	89	20	18	90	
	93	20	18	90	
B18-10020	95	20	19	95	98.0
	82	20	20	100	
	69	20	20	100	
	64	20	19	95	
	105	20	20	100	

QC Check: SC 8/6/18

Final Review: 1/2/19

Survival Counts for 10 day Amphipod Test

Client: AMEC/WOOD

Project ID: RHMP - Mission Bay 7/17/18

Species *Eohaustorius estuarius*

Test No. 18-07-019 to -027

Sample ID	Rand #	Survival Counts		% Survival	Mean % Survival
		Number Added	Number Alive (Day 10)		
B18-10073	65	20	20	100	98.0
	62	20	18	90	
	90	20	20	100	
	58	20	20	100	
	67	20	20	100	
B18-10074	59	20	19	95	98.0
	81	20	20	100	
	70	20	20	100	
	104	20	19	95	
	91	20	20	100	
B18-10075	100	20	19	95	96.0
	77	20	19	95	
	92	20	19	95	
	66	20	20	100	
	103	20	19	95	
Grain Size Control	A	20	20	100	95.0
	B	20	19	95	
	C	20	17	85	
	D	20	19	95	
	E	20	20	100	

QC Check: SC 8/6/18

Final Review: sw 1/2/19

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.17 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column B	B18-10015
6		
7	Unpaired t test	
8	P value	0.4750
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.06467 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.369 ± 0.05141, n=5
16	Mean ± SEM of column B	1.363 ± 0.0868, n=5
17	Difference between means	0.006524 ± 0.1009
18	95% confidence interval	-0.2261 to 0.2392
19	R squared (eta squared)	0.0005225
20		
21	F test to compare variances	
22	F, DFn, Dfd	2.851, 4, 4
23	P value	0.3346
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.17 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column C	B18-10016
6		
7	Unpaired t test	
8	P value	0.3104
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.5145 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.369 ± 0.05141, n=5
16	Mean ± SEM of column C	1.421 ± 0.0865, n=5
17	Difference between means	-0.05177 ± 0.1006
18	95% confidence interval	-0.2838 to 0.1803
19	R squared (eta squared)	0.03202
20		
21	F test to compare variances	
22	F, DFn, Dfd	2.831, 4, 4
23	P value	0.3377
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.17 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column D	B18-10017
6		
7	Unpaired t test	
8	P value	0.0026
9	P value summary	**
10	Significantly different (P < 0.05)?	Yes
11	One- or two-tailed P value?	One-tailed
12	t, df	t=3.794 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.369 ± 0.05141, n=5
16	Mean ± SEM of column D	1.125 ± 0.03881, n=5
17	Difference between means	0.2444 ± 0.06442
18	95% confidence interval	0.09586 to 0.3929
19	R squared (eta squared)	0.6428
20		
21	F test to compare variances	
22	F, DFn, Dfd	1.755, 4, 4
23	P value	0.5993
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.17 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column E	B18-10438
6		
7	Unpaired t test	
8	P value	0.5000
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.369 ± 0.05141, n=5
16	Mean ± SEM of column E	1.369 ± 0.05141, n=5
17	Difference between means	0 ± 0.07271
18	95% confidence interval	-0.1677 to 0.1677
19	R squared (eta squared)	0
20		
21	F test to compare variances	
22	F, DFn, Dfd	1, 4, 4
23	P value	>0.9999
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.17 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column F	B18-10019
6		
7	Unpaired t test	
8	P value	0.2439
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.7274 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.369 ± 0.05141, n=5
16	Mean ± SEM of column F	1.436 ± 0.07636, n=5
17	Difference between means	-0.06696 ± 0.09206
18	95% confidence interval	-0.2792 to 0.1453
19	R squared (eta squared)	0.06203
20		
21	F test to compare variances	
22	F, DFn, Dfd	2.206, 4, 4
23	P value	0.4623
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.17 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column G	B18-10020
6		
7	Unpaired t test	
8	P value	0.0951
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=1.431 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.369 ± 0.05141, n=5
16	Mean ± SEM of column G	1.475 ± 0.05279, n=5
17	Difference between means	-0.1055 ± 0.07369
18	95% confidence interval	-0.2754 to 0.06447
19	R squared (eta squared)	0.2038
20		
21	F test to compare variances	
22	F, DFn, Dfd	1.054, 4, 4
23	P value	0.9603
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.17 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column H	B18-10073
6		
7	Unpaired t test	
8	P value	0.0741
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=1.6 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.369 ± 0.05141, n=5
16	Mean ± SEM of column H	1.498 ± 0.06235, n=5
17	Difference between means	-0.1293 ± 0.08081
18	95% confidence interval	-0.3157 to 0.05705
19	R squared (eta squared)	0.2424
20		
21	F test to compare variances	
22	F, DFn, Dfd	1.471, 4, 4
23	P value	0.7176
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.17 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column I	B18-10074
6		
7	Unpaired t test	
8	P value	0.0951
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=1.431 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.369 ± 0.05141, n=5
16	Mean ± SEM of column I	1.475 ± 0.05279, n=5
17	Difference between means	-0.1055 ± 0.07369
18	95% confidence interval	-0.2754 to 0.06447
19	R squared (eta squared)	0.2038
20		
21	F test to compare variances	
22	F, DFn, Dfd	1.054, 4, 4
23	P value	0.9603
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.17 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column J	B18-10075
6		
7	Unpaired t test	
8	P value	0.3907
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.2869 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.369 ± 0.05141, n=5
16	Mean ± SEM of column J	1.388 ± 0.0431, n=5
17	Difference between means	-0.01925 ± 0.06709
18	95% confidence interval	-0.174 to 0.1355
19	R squared (eta squared)	0.01018
20		
21	F test to compare variances	
22	F, DFn, Dfd	1.423, 4, 4
23	P value	0.7410
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.17 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column K	Grain Size Control
6		
7	Unpaired t test	
8	P value	0.3822
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.3101 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.369 ± 0.05141, n=5
16	Mean ± SEM of column K	1.397 ± 0.07387, n=5
17	Difference between means	-0.02791 ± 0.09
18	95% confidence interval	-0.2355 to 0.1796
19	R squared (eta squared)	0.01188
20		
21	F test to compare variances	
22	F, DFn, Dfd	2.065, 4, 4
23	P value	0.4999
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Survival Counts for 10day Amphipod Test

Client: Amec FW
 Project ID: RHMP
 Test No. 18-07-019 to 036 027
 Test Species: E. estuarius
 Start Date/Time: 7/17/2018 13:15
 End Date/Time: 7/27/2018 1100

Rand #	Survival Counts		Final Weights (Growth)		
	Start (Day 0)	End (Day 10)	Pan Weight	Pan + Organism Weight	Final Weight (per organism)
56	20	16			
57	20	20			
58	20	20	20		
59	20	19			
60	20	19			
61	20	20			
62	20	18			
63	20	20			
64	20	19			
65	20	20			
66	20	20			
67	20	20	20		
68	20	19			
69	20	20			
70	20	20			
71	20	20			
72	20	19	19		
73	20	17			
74	20	18			
75	20	18			
76	20	20			
77	20	19			
78	20	20			
79	20	19			
80	20	17			
81	20	20	20		
82	20	20			
83	20	20			
84	20	17			
85	20	20			
86	20	20			
87	20	18			
88	20	19			
89	20	18	18		
90	20	20			
Tech Initials:	JR	AG/AD	SC		

Ammonia Collected: Test Start: AD Test End: AD

Comments: _____

QC Check: AG 8/22/18 Final Review: JW 1/2/19

Survival Counts for 10day Amphipod Test

Client: Amec FW

Test Species: *E. estuarius*

Project ID: RHMP

Start Date/Time: 7/17/2018 1315

Test No. 18-07-019 to 027

End Date/Time: 7/27/2018 1100

[illegible]Ammonia Collected: Test Start: AD

Test End: AD

Comments:

QC Check: AB 8/22/9

Final Review: 2w 1/2/19

Amec FW
RHMP Sediment Testing
Random Numbers

SAMPLE ID	Rand#
Lab Control	102
	86
	60
	68
	74
B18-10015	73
	63
	72
	57
	80
B18-10016	78
	71
	84
	83
	87
B18-10017	98
	96
	101
	56
	99
-10438 B18-10018 sw	88
	75
	79
	94
	61
B18-10019	97
	76
	85
	89
	93

QC Check - Amphipod: AD

Amec FW
RHMP Sediment Testing
Random Numbers

SAMPLE ID	Rand#
B18-10020	95
	82
	69
	64
	105
B18-10073	65
	62
	90
	58
	67
B18-10074	59
	81
	70
	104
	91
B18-10075	100
	77
	92
	66
	103
Grain Size Control	A
	B
	C
	D
	E

QC Check - Amphipod: AD

Water Quality for 10day Amphipod Test

Client: Amec FW

Test Species: *E. estuarius*

Project ID: RHMP - Mission Bay

Start Date/Time: 7/17/2018 1315

Test No. 18-07-019 to 036027

End Date/Time: 7/27/2018 1100

Sample ID	Water Quality Measurements (Day)											
	Parameter	0	1	2	3	4	5	6	7	8	9	10
Lab Control	Temp. (°C)	15.6	15.5	15.7	15.0	15.1	15.0	15.1	15.3	15.4	15.1	15.5
	Salinity (ppt)	31.3	32.1	31.9	32.1	32.1	32.2	32.1	32.0	31.9	31.9	31.6
	pH (units)	7.66	7.61	7.59	7.68	7.72	7.81	7.68	7.65	7.60	7.68	7.55
	DO (mg/L)	7.8	8.2	8.1	8.3	8.0	8.2	8.1	7.9	8.0	8.1	7.8
B18-10015	Temp. (°C)	15.5	15.3	15.4	15.0	15.2	15.0	15.1	15.1	15.4	15.0	15.1
	Salinity (ppt)	32.0	32.5	32.5	32.6	32.6	32.7	32.7	32.7	32.6	32.7	32.5
	pH (units)	7.64	7.58	7.64	7.70	7.73	7.80	7.69	7.69	7.61	7.70	7.61
	DO (mg/L)	8.1	8.2	8.2	8.3	8.0	8.2	8.1	8.0	7.9	8.1	8.0
B18-10016	Temp. (°C)	15.4	15.2	15.2	15.0	15.1	15.0	15.0	15.1	15.2	14.7	14.9
	Salinity (ppt)	31.9	32.2	32.2	32.2	32.2	32.3	32.3	32.3	32.2	32.3	32.1
	pH (units)	7.65	7.59	7.65	7.72	7.75	7.81	7.73	7.72	7.68	7.77	7.65
	DO (mg/L)	8.1	8.2	8.2	8.2	8.0	8.0	8.1	8.0	7.9	8.1	8.1
B18-10017	Temp. (°C)	15.4	15.3	15.2	15.0	15.1	15.0	15.1	15.1	15.1	14.7	14.8
	Salinity (ppt)	32.1	32.4	32.4	32.5	32.5	32.6	32.5	32.5	32.5	32.6	32.4
	pH (units)	7.66	7.61	7.67	7.73	7.76	7.79	7.70	7.69	7.69	7.64	7.66
	DO (mg/L)	8.2	8.1	8.2	8.2	8.0	8.1	8.1	8.0	7.9	7.7	8.0
B18-10018 10438	Temp. (°C)	15.5	15.3	15.2	15.1	15.2	15.1	15.2	15.2	15.1	14.7	14.8
	Salinity (ppt)	32.5	32.7	32.7	32.7	32.8	32.9	32.8	32.8	32.7	32.8	32.7
	pH (units)	7.66	7.60	7.67	7.73	7.75	7.79	7.70	7.69	7.70	7.71	7.66
	DO (mg/L)	8.2	8.2	8.2	8.2	8.0	8.2	8.1	8.0	7.8	8.1	8.1
B18-10019	Temp. (°C)	15.5	15.4	15.2	15.1	15.3	15.1	15.1	15.2	15.1	15.0	14.8
	Salinity (ppt)	32.6	32.7	32.7	32.6	32.6	32.7	32.6	32.6	32.6	32.7	32.6
	pH (units)	7.67	7.60	7.70	7.73	7.77	7.81	7.74	7.70	7.74	7.73	7.61
	DO (mg/L)	8.2	8.2	8.2	8.3	8.0	8.1	8.1	8.1	7.9	8.2	8.2
B18-10020	Temp. (°C)	15.3	15.3	15.2	15.2	15.3	15.1	15.2	15.3	15.1	14.8	14.8
	Salinity (ppt)	32.6	32.7	32.7	32.6	32.6	32.7	32.6	32.6	32.7	32.7	32.6
	pH (units)	7.66	7.62	7.70	7.77	7.79	7.86	7.83	7.79	7.82	7.79	7.65
	DO (mg/L)	8.2	8.2	8.2	8.3	8.1	8.2	8.2	8.0	8.1	8.2	8.2
Tech Initials (Initial):		JW	AD	AG	AD	AD	JW	AD	AD	AG	AD	JW

Date Animals Received: 7/11/18

Age or Size of Animals: 3-5mm

Comments:

QC Check: AG 8/22/18

Final Review: JW 11/2/18

Water Quality for 10day Amphipod Test

Client: Amec FW

Test Species: *E. estuarius*

Project ID: RHMP - Mission Bay

Start Date/Time: 7/17/2018 1315

Test No. 18-07-019 to 026027
AB

End Date/Time: 7/27/2018 1100

Sample ID	Water Quality Measurements (Day)											
	Parameter	0	1	2	3	4	5	6	7	8	9	10
B18-10073	Temp. (°C)	15.5	15.3	15.2	15.1	15.3	15.0	15.1	15.3	15.1	14.7	14.7
	Salinity (ppt)	32.8	32.9	32.9	32.9	32.9	33.0	33.0	33.0	33.0	33.1	33.0
	pH (units)	7.67	7.60	7.70	7.77	7.80	7.87	7.78	7.79	7.85	7.86	7.76
	DO (mg/L)	8.1	8.1	8.2	8.2	8.0	8.2	8.0	7.9	8.0	8.1	8.1
B18-10074	Temp. (°C)	15.3	15.3	15.1	15.1	15.3	15.2	15.0	15.3	15.0	14.8	14.6
	Salinity (ppt)	32.7	32.9	32.9	32.9	32.9	33.0	33.0	33.0	33.0	33.0	33.0
	pH (units)	7.65	7.60	7.70	7.76	7.79	7.93	7.89	7.90	7.91	7.98	7.82
	DO (mg/L)	8.2	8.1	8.1	8.2	8.0	8.1	8.0	8.0	8.0	8.0	8.1
B18-10075	Temp. (°C)	15.4	15.2	15.1	15.1	15.3	15.1	15.2	15.4	15.1	14.6	14.7
	Salinity (ppt)	32.6	32.8	32.9	32.9	32.9	33.0	33.0	33.0	33.0	33.1	33.1
	pH (units)	7.67	7.69	7.70	7.77	7.81	7.89	7.76	7.78	7.89	7.86	7.87
	DO (mg/L)	8.1	8.2	8.2	8.2	8.0	8.1	8.1	8.0	8.0	8.0	8.1
Grain Size Control	Temp. (°C)	15.1	15.0	15.1	15.0	15.4	15.1	15.2	15.3	14.9	14.5	14.6
	Salinity (ppt)	32.7	32.9	33.0	33.1	33.1	33.2	33.2	33.3	33.3	33.4	33.4
	pH (units)	7.66	7.65	7.70	7.77	7.82	7.92	7.91	7.89	7.90	7.98	7.80
	DO (mg/L)	8.2	8.2	8.2	8.3	8.0	8.1	8.0	7.9	7.9	8.1	8.2
	Temp. (°C)											
	Salinity (ppt)											
	pH (units)											
	DO (mg/L)											
	Temp. (°C)											
	Salinity (ppt)											
	pH (units)											
	DO (mg/L)											
	Temp. (°C)											
	Salinity (ppt)											
	pH (units)											
	DO (mg/L)											
Tech Initials (Initial):		JW	AD	AB	AD	AD	JW	AD	AD	AB	AD	JW

Date Animals Received: 7/11/18

Age or Size of Animals: 35mm

Comments:

QC Check: AB 8/22/18

Final Review: JW 11/2/18

Only 1/3 water

Unionized Ammonia Calculation for Pressure of 1 atm										
Input 'Shaded' data										
Log Number	Beaker	Day	Dilution	Total Ammonia (mg/L)	Temp (C)	Salinity (ppt)	pH	Temp (K)	I	
									Rounded	pK
Lab Control										
Grain Size Control										
B18-10015										
B18-10016										
B18-10017										
B18-10438										
B18-10019										
B18-10020										
B18-10073										
B18-10074										
B18-10075										
Lab Control										
Grain Size Control										
B18-10015										
B18-10016										
B18-10017										
B18-10438										
B18-10019										
B18-10020										
B18-10073										
B18-10074										
B18-10075										

Ammonia Subsample Analysis

Client: Amec FW
Project ID: RHMP - Overlying Water
Test No.: 18-07-019 to 18-07-027

Test Species: *E. estuarius*
Start Date: 7/17/2018
End Date: 7/27/2018

DI Blank: 0.0

10 mg/L Ammonia Stock: 8.2 mg/L as NH_3

[illegible]

QC Check: AG 8/22/16

Final Review: 2w 1/2/19

Analyst: AD

Day 0 Pure water Sample Check-In: Effluent/Water

Amec Foster Wheeler - Environmental Lab
4905 Morena Blvd, Ste. 1304
San Diego, CA 92117

Client: Amec/Wood

Project Name: KHMP

18-07-019 to 18-07-014 to 18-07-011, 18-07-008, 18-07-005, 18-07-002

Test ID Numbers: 18-07-019 to 18-07-014 to 18-07-011, 18-07-008, 18-07-005, 18-07-002

Sample ID:	1318-10015	1318-10016	1318-10017	1318-10018	1318-10019	1318-10020	1318-10021	1318-10022	1318-10023	1318-10024
Sample Number:	2018-50036	2018-50037	2018-50041	2018-50039	2018-50042	2018-50038	2018-50033	2018-50034	2018-50035	2018-50036
Collection Date/Time:	7/12/18 1400	7/12/18 1215	7/13/18 0830	7/12/18 1557	7/13/18 0655	7/12/18 0715	7/12/18 1108	7/12/18 0952	7/12/18 0952	7/12/18 0952
Receipt Date/Time:	7/12/18 1730	7/13/18 1358	7/13/18 1358	7/12/18 1730	7/13/18 1358	7/12/18 1730	7/12/18 1730	7/12/18 1730	7/12/18 1730	7/12/18 1730
Total Sample Volume:	~4L									
Receipt Temperature:	7.0	7.0	10.0	6.0	10.0	8.0	9.0	9.0	9.0	9.0
Appropriate Temp (Y/N) ¹ :	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
pH (units):	7.30	7.27	7.26	7.15	7.43	7.50	7.44	7.20	7.20	7.20
DO (mg/L):	-	-	-	-	-	-	-	-	-	-
Conductivity (µS/cm) ² :	-	-	-	-	-	-	-	-	-	-
Salinity (ppt):	34.3	33.2	34.1	33.5	29.7	32.3	32.3	33.0	33.0	33.0
Alkalinity (mg/L):	-	-	-	-	-	-	-	-	-	-
Hardness (mg/L) ² :	-	-	-	-	-	-	-	-	-	-
Total Chlorine (mg/L) ³ :	-	-	-	-	-	-	-	-	-	-
Free Chlorine (mg/L) ³ :	-	-	-	-	-	-	-	-	-	-
Technician Initials:	sw									

Notes:	Sample Descriptions ⁴ :
¹ Temperature should be 0 - 6°C if received > 24 hours past collection	<u>Pore water</u>
² Only measured on samples with less than 3 ppt salinity	<u>sw</u>
³ If total chlorine is above 0.10 mg/L, the free chlorine will be measured	
⁴ Debris, odor, and color is described only if observed in the sample	

Test Organism: Lab SW Dilution Water: Lab SW Art SW, RW, DMW, Other: Salinity 32 Initial QC: 18-08-22/18
Additional Control: N/A Final Review: 18-12-19

⑤ insufficient volume for reading

Amec Foster Wheeler - Environmental Lab
4905 Morena Blvd, Ste. 1304
San Diego, CA 92117

Test ID Numbers: ~~18-07-025~~ 18-07-01A to 18-07-027

Notes:	Sample Descriptions ⁴ :
¹ Temperature should be 0 - 6°C if received > 24 hours past collection	
² Only measured on samples with less than 3 ppt salinity	
³ If total chlorine is above 0.10 mg/L, the free chlorine will be measured	
⁴ Debris, odor, and color is described only if observed in the sample	

Test Organism: N/A Dilution Water: Lab SW, Art SW, RW, DMW, Other _____ Salinity 32 ppt
Additional Control: _____ Salinity _____

Initial QC: AO 11/9/18
Final Review: sw 11/2/19

Input 'Shaded' data

I	pK
1	9.26
2	9.27
3	9.28
4	9.29
5	9.30
6	9.32
7	9.33
8	9.34

Log Number	Beaker	Day	Dilution	Total Ammonia			pH	Temp (K)	I		pK	Unionized Ammonia	D.O. (mg/L)	Beaker Num.
				Ammonia (mg/L)	Temp (C)	Salinity (ppt)			I	Rounded				
B18-10015	0	PW	0	5.7	15.5	34.3	7.30	288.66	7.58	8	9.34	0.026	0	
B18-10016	0	PW	0	7	15.4	33.2	7.27	288.56	7.34	7	9.33	0.030	0	
B18-10017	0	PW	0	5.2	15.4	34.1	7.26	288.56	7.54	8	9.34	0.021	0	
B18-10438	0	PW	0	4.6	15.5	33.5	7.15	288.66	7.41	7	9.33	0.015	0	
B18-10019	0	PW	0	4.4	15.5	29.7	7.43	288.66	6.60	7	9.33	0.027	0	
B18-10020	0	PW	0	10.9	15.3	N/A	7.50	288.46	#VALUE!	#VALUE!	#VALUE!	#VALUE!	0	
B18-10073	0	PW	0	7.6	15.5	32.3	7.44	288.66	7.15	7	9.33	0.048	0	
B18-10074	0	PW	0	6.1	15.3	33.0	7.20	288.46	7.30	7	9.33	0.022	0	
B18-10075	0	PW	0	3.7	15.4	33.5	7.22	288.56	7.41	7	9.33	0.014	0	

Ammonia Subsample Analysis

Client: Amec FW
Project ID: RHMP - Porewater
Test No.: 18-07-019 to -0

Test Species: *E. estuarius*
Start Date: 7/17/2018
End Date: 7/27/2018

DI Blank: 0.0

10 mg/L Ammonia Stock: 8.3 mg/L as NH_3

[illegible]

QC Check: AD 11/9/18

Final Review: SW 1/2/19

Amphipod Batch #3

7/24/18

Survival Counts for 10 day Amphipod Test

Client: AMEC/WOOD

Project ID: RHMP - North SD Bay

Species *Eohaustorius estuarius*

Test No. 18-07-053 to 18-07-065

Sample ID	Rand #	Survival Counts		% Survival	Mean % Survival
		Number Added	Number Alive (Day 10)		
Lab Control	32	20	20	100	99.0
	55	20	20	100	
	68	20	20	100	
	62	20	19	95	
	60	20	20	100	
B18-10023	63	20	19	95	98.0
	29	20	19	95	
	25	20	20	100	
	38	20	20	100	
	18	20	20	100	
B18-10030	39	20	20	100	99.0
	17	20	20	100	
	27	20	20	100	
	51	20	19	95	
	48	20	20	100	
B18-10078	26	20	19	95	98.0
	70	20	19	95	
	52	20	20	100	
	37	20	20	100	
	40	20	20	100	
B18-10079	53	20	20	100	99.0
	61	20	20	100	
	47	20	19	95	
	36	20	20	100	
	21	20	20	100	
B18-10117	22	20	20	100	93.0
	67	20	19	95	
	31	20	19	95	
	14	20	17	85	
	33	20	18	90	
B18-10080	16	20	19	95	94.0
	41	20	17	85	
	43	20	20	100	
	8	20	19	95	
	46	20	19	95	

QC Check: SC 8/6/18

Final Review: SW 1/2/19

Survival Counts for 10 day Amphipod Test

Client: AMEC/WOOD

Project ID: RHMP - North SD Bay

Species *Eohaustorius estuarius*

Test No. 18-07-053 to 18-07-065

Sample ID	Rand #	Survival Counts		% Survival	Mean % Survival
		Number Added	Number Alive (Day 10)		
B18-10081	23	20	18	90	98.0
	2	20	20	100	
	9	20	20	100	
	42	20	20	100	
	30	20	20	100	
B18-10082	34	20	18	90	97.0
	10	20	20	100	
	6	20	20	100	
	64	20	20	100	
	5	20	19	95	
B18-10083	69	20	20	100	97.0
	54	20	19	95	
	59	20	19	95	
	66	20	20	100	
	11	20	19	95	
B18-10084	49	20	20	100	97.0
	19	20	19	95	
	35	20	20	100	
	3	20	18	90	
	7	20	20	100	
B18-10022	45	20	20	100	98.0
	20	20	19	95	
	58	20	19	95	
	24	20	20	100	
	44	20	20	100	
B18-10076	50	20	20	100	100.0
	12	20	20	100	
	15	20	20	100	
	1	20	20	100	
	13	20	20	100	
B18-10077	65	20	19	95	98.0
	4	20	20	100	
	57	20	20	100	
	56	20	20	100	
	28	20	19	95	

QC Check: SC 8/6/18

Final Review: 1/2/19

Survival Counts for 10 day Amphipod Test

Client: AMEC/WOOD

Project ID: RHMP - North SD Bay

Species *Eohaustorius estuarius*

Test No. 18-07-053 to 18-070-065

Sample ID	Rand #	Survival Counts		% Survival	Mean % Survival
		Number Added	Number Alive (Day 10)		
Grain Size Control	A	20	20	100	99.0
	B	20	19	95	
	C	20	20	100	
	D	20	20	100	
	E	20	20	100	

QC Check: SC 8/6/18

Final Review:

sw 1/2/14

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.24 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column B	B18-10023
6		
7	Unpaired t test	
8	P value	0.2724
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.6325 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.518 ± 0.0431, n=5
16	Mean ± SEM of column B	1.475 ± 0.05279, n=5
17	Difference between means	0.0431 ± 0.06815
18	95% confidence interval	-0.1141 to 0.2003
19	R squared (eta squared)	0.04762
20		
21	F test to compare variances	
22	F, DFn, Dfd	1.5, 4, 4
23	P value	0.7040
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.24 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column C	B18-10030
6		
7	Unpaired t test	
8	P value	0.5000
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.518 ± 0.0431, n=5
16	Mean ± SEM of column C	1.518 ± 0.0431, n=5
17	Difference between means	0 ± 0.06096
18	95% confidence interval	-0.1406 to 0.1406
19	R squared (eta squared)	0
20		
21	F test to compare variances	
22	F, DFn, Dfd	1, 4, 4
23	P value	>0.9999
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.24 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column D	B18-10078
6		
7	Unpaired t test	
8	P value	0.2724
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.6325 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.518 ± 0.0431, n=5
16	Mean ± SEM of column D	1.475 ± 0.05279, n=5
17	Difference between means	0.0431 ± 0.06815
18	95% confidence interval	-0.1141 to 0.2003
19	R squared (eta squared)	0.04762
20		
21	F test to compare variances	
22	F, DFn, Dfd	1.5, 4, 4
23	P value	0.7040
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.24 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column E	B18-10079
6		
7	Unpaired t test	
8	P value	0.5000
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.518 ± 0.0431, n=5
16	Mean ± SEM of column E	1.518 ± 0.0431, n=5
17	Difference between means	0 ± 0.06096
18	95% confidence interval	-0.1406 to 0.1406
19	R squared (eta squared)	0
20		
21	F test to compare variances	
22	F, DFn, Dfd	1, 4, 4
23	P value	>0.9999
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.24 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column F	B18-10117
6		
7	Unpaired t test	
8	P value	0.0236
9	P value summary	*
10	Significantly different (P < 0.05)?	Yes
11	One- or two-tailed P value?	One-tailed
12	t, df	t=2.343 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.518 ± 0.0431, n=5
16	Mean ± SEM of column F	1.335 ± 0.06511, n=5
17	Difference between means	0.183 ± 0.07809
18	95% confidence interval	0.002923 to 0.3631
19	R squared (eta squared)	0.407
20		
21	F test to compare variances	
22	F, DFn, Dfd	2.282, 4, 4
23	P value	0.4439
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.24 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column G	B18-10080
6		
7	Unpaired t test	
8	P value	0.0304
9	P value summary	*
10	Significantly different (P < 0.05)?	Yes
11	One- or two-tailed P value?	One-tailed
12	t, df	t=2.18 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.518 ± 0.0431, n=5
16	Mean ± SEM of column G	1.354 ± 0.06153, n=5
17	Difference between means	0.1637 ± 0.07512
18	95% confidence interval	-0.009493 to 0.337
19	R squared (eta squared)	0.3726
20		
21	F test to compare variances	
22	F, DFn, Dfd	2.038, 4, 4
23	P value	0.5075
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.24 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column H	B18-10081
6		
7	Unpaired t test	
8	P value	0.4030
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.2539 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.518 ± 0.0431, n=5
16	Mean ± SEM of column H	1.498 ± 0.06235, n=5
17	Difference between means	0.01925 ± 0.0758
18	95% confidence interval	-0.1555 to 0.194
19	R squared (eta squared)	0.007996
20		
21	F test to compare variances	
22	F, DFn, Dfd	2.093, 4, 4
23	P value	0.4921
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.24 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column I	B18-10082
6		
7	Unpaired t test	
8	P value	0.2267
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.7881 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.518 ± 0.0431, n=5
16	Mean ± SEM of column I	1.455 ± 0.06634, n=5
17	Difference between means	0.06235 ± 0.07912
18	95% confidence interval	-0.1201 to 0.2448
19	R squared (eta squared)	0.07204
20		
21	F test to compare variances	
22	F, DFn, Dfd	2.369, 4, 4
23	P value	0.4240
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.24 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column J	B18-10083
6		
7	Unpaired t test	
8	P value	0.1208
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=1.265 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.518 ± 0.0431, n=5
16	Mean ± SEM of column J	1.431 ± 0.05279, n=5
17	Difference between means	0.08621 ± 0.06815
18	95% confidence interval	-0.07095 to 0.2434
19	R squared (eta squared)	0.1667
20		
21	F test to compare variances	
22	F, DFn, Dfd	1.5, 4, 4
23	P value	0.7040
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.24 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column K	B18-10084
6		
7	Unpaired t test	
8	P value	0.2267
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.7881 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.518 ± 0.0431, n=5
16	Mean ± SEM of column K	1.455 ± 0.06634, n=5
17	Difference between means	0.06235 ± 0.07912
18	95% confidence interval	-0.1201 to 0.2448
19	R squared (eta squared)	0.07204
20		
21	F test to compare variances	
22	F, DFn, Dfd	2.369, 4, 4
23	P value	0.4240
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.24 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column L	B18-10022
6		
7	Unpaired t test	
8	P value	0.2724
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.6325 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.518 ± 0.0431, n=5
16	Mean ± SEM of column L	1.475 ± 0.05279, n=5
17	Difference between means	0.0431 ± 0.06815
18	95% confidence interval	-0.1141 to 0.2003
19	R squared (eta squared)	0.04762
20		
21	F test to compare variances	
22	F, DFn, Dfd	1.5, 4, 4
23	P value	0.7040
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.24 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column M	B18-10076
6		
7	Unpaired t test	
8	P value	0.1733
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=1 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.518 ± 0.0431, n=5
16	Mean ± SEM of column M	1.561 ± 0, n=5
17	Difference between means	-0.0431 ± 0.0431
18	95% confidence interval	-0.1425 to 0.05629
19	R squared (eta squared)	0.1111
20		
21	F test to compare variances	
22	F, DFn, Dfd	Infinity, 4, 4
23	P value	<0.0001
24	P value summary	****
25	Significantly different (P < 0.05)?	Yes

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.24 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column N	B18-10077
6		
7	Unpaired t test	
8	P value	0.2724
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.6325 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.518 ± 0.0431, n=5
16	Mean ± SEM of column N	1.475 ± 0.05279, n=5
17	Difference between means	0.0431 ± 0.06815
18	95% confidence interval	-0.1141 to 0.2003
19	R squared (eta squared)	0.04762
20		
21	F test to compare variances	
22	F, DF _n , Df _d	1.5, 4, 4
23	P value	0.7040
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.24 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column O	Grain Size Control
6		
7	Unpaired t test	
8	P value	0.5000
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.518 ± 0.0431, n=5
16	Mean ± SEM of column O	1.518 ± 0.0431, n=5
17	Difference between means	0 ± 0.06096
18	95% confidence interval	-0.1406 to 0.1406
19	R squared (eta squared)	0
20		
21	F test to compare variances	
22	F, DF _n , Df _d	1, 4, 4
23	P value	>0.9999
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Survival Counts for 10day Amphipod Test

Client: Amec FW
 Project ID: RHMP - SD Bay North
 Test No. 18-07-053 to 18-07-065
 Test Species: *E. estuarius*
 Start Date/Time: 7/24/2018 1400
 End Date/Time: 8/3/2018 1100

Rand #	Survival Counts		QC Final Weights (Growth)		
	Start (Day 0)	End (Day 10)	Pan Weight	Pan + Organism Weight	Final Weight (per organism)
1	20	20			
2	20	20			
3	20	18			
4	20	20	20		
5	20	19			
6	20	20			
7	20	20			
8	20	19			
9	20	20			
10	20	20			
11	20	19	19		
12	20	20			
13	20	20			
14	20	17			
15	20	20			
16	20	19			
17	20	20			
18	20	20	20		
19	20	19			
20	20	19			
21	20	20			
22	20	20			
23	20	18			
24	20	20			
25	20	20	20		
26	20	19			
27	20	20			
28	20	19			
29	20	19			
30	20	20			
31	20	19			
32	20	20			
33	20	18			
34	20	18	18		
35	20	20			
Tech Initials: AD			20	50	

Ammonia Collected: Test Start: AD Test End: AD

Comments:

QC Check: AG 9/27/18 Final Review: JW 1/2/19

Survival Counts for 10day Amphipod Test

Client: Amec FW
 Project ID: RHMP-SD Bay North
 Test No. 18-07-053 to 18-07-065

Test Species: *E. estuarius*
 Start Date/Time: 7/24/2018 1400
 End Date/Time: 8/3/2018 1100

Rand #	Survival Counts		QC Final Weights (Growth)		
	Start (Day 0)	End (Day 10)	Pan Weight	Pan + Organism Weight	Final Weight (per organism)
36	20	20			
37	20	20			
38	20	20			
39	20	20	20		
40	20	20			
41	20	19			
42	20	20			
43	20	20			
44	20	20			
45	20	20	20		
46	20	19			
47	20	19			
48	20	20			
49	20	20			
50	20	20			
51	20	19	19		
52	20	20			
53	20	20			
54	20	19			
55	20	20			
56	20	20			
57	20	20			
58	20	19	19		
59	20	19			
60	20	20			
61	20	20			
62	20	19			
63	20	19			
64	20	20			
65	20	19			
66	20	20	20		
67	20	19			
68	20	20			
69	20	20			
70	20	19			
Tech Initials: AD / AP			SC		

Ammonia Collected: Test Start: AD Test End: AD

Comments:

QC Check: AG 9/27/18

Final Review: Jm 11/2/19

Survival Counts for 10day Amphipod Test

Client: Amec FW

Test Species: *E. estuarius*

Project ID: RHMP - Grain Size Control

Start Date/Time: 7/24/2018 1400

Test No. 18-07-053 to 18-07-065

End Date/Time: 8/3/2018 11:00

[illegible]Ammonia Collected: Test Start: AD

Test End: 10

Comments:

QC Check: *AG 9/27/18*

Final Review: SW 1/2/19

**Amec FW
RHMP Sediment Testing
Random Numbers**

SAMPLE ID	Rand#
Lab Control	32 55 68 62 60
B18-10023	63 29 25 38 18
B18-10030	39 17 27 51 48
B18-10078	26 70 52 37 40
B18-10079	53 61 47 36 21
B18-10117	22 67 31 14 33

QC Check - Amphipod: AD

Final Review: Jan 11/2/19

**Amec FW
RHMP Sediment Testing
Random Numbers**

SAMPLE ID	Rand#
B18-10080	16 41 43 8 46
B18-10081	23 2 9 42 30
B18-10082	34 10 6 64 5
B18-10083	69 54 59 66 11
B18-10084	49 19 35 3 7
B18-10022	45 20 58 24 44

QC Check - Amphipod: AB

Amec FW
RHMP Sediment Testing
Random Numbers

SAMPLE ID	Rand#
B18-10076	50 12 15 1 13
B18-10077	65 4 57 56 28
Grain Size Control	A B C D E

QC Check - Amphipod: Ab

Water Quality for 10day Amphipod Test

Client: Amec FW

Test Species: *E. estuarius*

Project ID: RHMP - SD Bay North ⁰⁶⁵

Start Date/Time: 7/24/2018 1400

Test No. 18-07-053 to 18-07-058 ^{AG}

End Date/Time: 8/3/2018 1100

Sample ID	Water Quality Measurements (Day)											
	Parameter	0	1	2	3	4	5	6	7	8	9	10
Lab Control	Temp. (°C)	15.3	14.9	15.0	15.3	14.8	15.7	15.4	15.0	15.9	15.0	15.0
	Salinity (ppt)	31.4	31.5	31.4	31.3	31.5	31.4	31.3	31.3	31.4	31.5	31.4
	pH (units)	7.63	7.68	7.58	7.52	7.76	7.71	7.61	7.74	7.67	7.61	7.49
	DO (mg/L)	8.0	8.1	8.2	7.9	8.2	7.9	8.2	8.2	8.1	8.3	8.2
B18-10023	Temp. (°C)	15.0	14.9	14.7	15.5	14.8	15.3	15.0	14.5	15.8	14.8	14.9
	Salinity (ppt)	31.9	31.8	31.8	31.8	31.9	31.7	31.9	32.0	32.0	32.0	31.9
	pH (units)	7.64	7.67	7.64	7.55	7.77	7.66	7.69	7.76	7.69	7.60	7.50
	DO (mg/L)	8.1	8.1	8.1	8.0	8.2	8.2	8.2	8.3	8.1	7.7	8.2
B18-10030	Temp. (°C)	15.3	15.0	14.7	15.4	14.8	15.0	14.8	14.5	15.6	14.8	14.7
	Salinity (ppt)	31.9	31.8	31.8	31.7	31.8	31.6	31.8	31.9	31.9	31.9	31.9
	pH (units)	7.66	7.69	7.69	7.64	7.87	7.66	7.77	7.78	7.74	7.67	7.66
	DO (mg/L)	8.0	8.1	8.2	8.1	8.2	8.2	8.3	8.3	8.1	8.1	8.2
B18-10078	Temp. (°C)	15.3	15.0	14.8	15.3	14.8	14.9	14.9	14.5	15.7	14.8	14.7
	Salinity (ppt)	32.0	31.9	32.0	32.0	32.1	32.0	32.1	32.2	32.2	32.2	32.2
	pH (units)	7.65	7.71	7.66	7.71	7.83	7.72	7.77	7.78	7.72	7.65	7.64
	DO (mg/L)	8.0	8.0	8.1	8.1	8.2	8.2	8.3	8.3	8.1	8.2	8.2
B18-10079	Temp. (°C)	15.4	15.0	14.8	15.2	14.8	14.9	14.9	14.5	15.6	14.9	14.6
	Salinity (ppt)	32.3	32.1	32.2	32.2	32.3	32.2	32.3	32.4	32.4	32.4	32.4
	pH (units)	7.66	7.70	7.65	7.70	7.83	7.72	7.72	7.76	7.69	7.62	7.60
	DO (mg/L)	8.0	8.0	8.0	8.1	8.2	8.2	8.2	8.3	8.1	8.2	8.2
B18-10117	Temp. (°C)	15.4	15.0	14.8	15.1	14.9	14.9	14.8	14.7	15.6	14.8	14.6
	Salinity (ppt)	32.3	32.2	32.2	32.3	32.3	32.3	32.3	32.4	32.5	32.5	32.4
	pH (units)	7.64	7.67	7.64	7.69	7.86	7.72	7.73	7.81	7.79	7.68	7.72
	DO (mg/L)	7.9	7.9	7.6	8.1	8.2	8.2	8.2	8.2	8.1	8.2	8.1
B18-10080	Temp. (°C)	15.5	15.0	14.8	15.2	14.8	14.9	14.9	14.7	15.6	14.7	14.7
	Salinity (ppt)	32.3	32.2	32.3	32.3	32.3	32.3	32.3	32.3	32.3	32.4	32.4
	pH (units)	7.68	7.70	7.68	7.75	7.80	7.80	7.76	7.82	7.80	7.68	7.68
	DO (mg/L)	7.9	8.0	8.1	8.1	8.2	8.2	8.2	8.3	8.1	8.2	8.2
Tech Initials (Initial):		AD	AG	AD	AD	AD	AD	AD	AD	AD	AG	AD

Date Animals Received: 7/20/18

Age or Size of Animals: 3-5mm

Comments:

QC Check: AG 9/27/18

Final Review: AD 1/2/19

Water Quality for 10day Amphipod Test

Client: Amec FW

Test Species: *E. estuarius*

Project ID: RHMP - 50 Bay North

Start Date/Time: 7/17/2018 1400

Test No. 18-07-059 to 18-07-065

End Date/Time: 7/27/2018 1600

Sample ID	Water Quality Measurements (Day)											
	Parameter	0	1	2	3	4	5	6	7	8	9	10
B18-10081	Temp. (°C)	15.4	15.0	15.0	15.2	14.9	14.9	14.8	14.7	15.7	14.9	14.7
	Salinity (ppt)	32.3	32.2	32.1	32.3	32.2	32.9	32.3	32.4	32.4	32.5	32.4
	pH (units)	7.67	7.69	7.66	7.73	7.79	7.77	7.77	7.77	7.69	7.63	7.62
	DO (mg/L)	8.0	8.0	8.1	8.1	8.2	8.2	8.3	8.3	8.1	8.2	8.2
B18-10082	Temp. (°C)	15.1	14.8	14.8	15.1	14.8	14.9	14.9	14.9	15.6	14.9	15.0
	Salinity (ppt)	32.0	31.9	32.0	32.1	32.0	32.1	32.1	32.2	32.2	32.2	32.1
	pH (units)	7.67	7.70	7.69	7.72	7.80	7.76	7.73	7.76	7.69	7.62	7.61
	DO (mg/L)	8.0	8.1	8.2	8.1	8.2	8.2	8.2	8.2	8.1	8.2	8.2
B18-10083	Temp. (°C)	15.4	14.7	14.7	15.0	14.8	14.9	14.9	14.8	15.7	14.7	15.0
	Salinity (ppt)	32.0	32.0	32.1	32.2	32.1	32.2	32.2	32.3	32.3	32.3	32.2
	pH (units)	7.67	7.70	7.69	7.70	7.78	7.76	7.72	7.76	7.69	7.61	7.62
	DO (mg/L)	7.9	8.0	8.2	8.1	8.2	8.2	8.2	8.2	8.1	8.2	8.2
B18-10084	Temp. (°C)	15.0	14.7	14.8	15.0	14.8	14.9	14.7	14.8	15.6	14.7	15.0
	Salinity (ppt)	32.0	32.0	32.0	32.1	32.0	32.1	32.1	32.1	32.2	32.2	32.1
	pH (units)	7.67	7.70	7.66	7.70	7.78	7.77	7.72	7.77	7.69	7.61	7.60
	DO (mg/L)	8.0	8.1	8.1	8.1	8.2	8.2	8.2	8.2	8.1	8.2	8.2
B18-10022	Temp. (°C)	14.9	14.7	14.7	14.9	14.8	14.8	14.7	14.7	15.6	14.7	14.9
	Salinity (ppt)	32.0	32.0	32.1	32.2	32.1	32.1	32.2	32.2	32.2	32.2	32.2
	pH (units)	7.67	7.69	7.68	7.67	7.79	7.73	7.70	7.76	7.67	7.60	7.65
	DO (mg/L)	8.1	8.1	8.2	8.1	8.2	8.2	8.2	8.2	8.1	8.2	8.2
B18-10076	Temp. (°C)	14.9	14.5	14.8	14.7	14.6	14.7	14.8	14.4	15.5	14.8	14.9
	Salinity (ppt)	31.8	31.8	31.9	32.1	32.0	32.0	32.1	32.2	32.2	32.2	32.1
	pH (units)	7.66	7.70	7.68	7.72	7.80	7.78	7.74	7.80	7.69	7.61	7.63
	DO (mg/L)	8.0	8.1	8.1	8.2	8.2	8.2	8.3	8.3	8.1	8.2	8.2
B18-10077	Temp. (°C)	14.8	14.4	14.6	14.7	14.6	14.7	14.7	14.6	15.6	14.8	14.6
	Salinity (ppt)	32.0	32.0	32.1	32.2	32.1	32.1	32.2	32.2	32.3	32.3	32.3
	pH (units)	7.66	7.70	7.68	7.70	7.80	7.76	7.73	7.78	7.71	7.62	7.65
	DO (mg/L)	8.1	8.0	8.2	8.2	8.3	8.3	8.3	8.3	8.1	8.2	8.2
Tech Initials (Initial):		AD	AD	AD	AD	AD	AD	AD	AD	AD	AD	AD

Date Animals Received: 7/20/18

Age or Size of Animals: 3-5mm

Comments:

QC Check: AB 9/21/18

Final Review: JW 1/2/19

Water Quality for 10day Amphipod Test

Client: Amec FW

Test Species: *E. estuarius*

Project ID: RHMP - SD Bay North

Start Date/Time: 7/17/2018 1400

Test No. 18-07-053 to 18-07-065

End Date/Time: 7/27/2018 1100

Sample ID	Water Quality Measurements (Day)											
	Parameter	0	1	2	3	4	5	6	7	8	9	10
Grain Size Control	Temp. (°C)	14.8	14.3	14.4	14.5	14.4	14.5	14.6	14.4	15.6	14.7	14.5
	Salinity (ppt)	32.0	32.1	32.1	32.1	32.2	32.2	32.1	32.3	32.3	32.3	32.3
	pH (units)	7.67	7.71	7.68	7.72	7.80	7.79	7.78	7.84	7.77	7.68	7.72
	DO (mg/L)	8.0	8.1	8.2	8.2	8.2	8.3	8.2	8.3	8.1	8.2	8.2
	Temp. (°C)											
	Salinity (ppt)											
	pH (units)											
	DO (mg/L)											
	Temp. (°C)											
	Salinity (ppt)											
	pH (units)											
	DO (mg/L)											
	Temp. (°C)											
	Salinity (ppt)											
	pH (units)											
	DO (mg/L)											
	Temp. (°C)											
	Salinity (ppt)											
	pH (units)											
	DO (mg/L)											
	Temp. (°C)											
	Salinity (ppt)											
	pH (units)											
	DO (mg/L)											
	Temp. (°C)											
	Salinity (ppt)											
	pH (units)											
	DO (mg/L)											
Tech Initials (Initial):		AD	AG	AD	AD	AD	AD	AD	AD	AD	AD	AD

Date Animals Received: 7/20/18

Age or Size of Animals: 3-5mm

Comments:

QC Check: AG 9/27/18

Final Review: JWR 1/2/19

Input 'Shaded' data

Log Number	Beaker	Day	Dilution	Total Ammonia (mg/L)		Temp (C)	Salinity (ppt)		pH	Temp (K)	I		pK	Unionized Ammonia	D.O. (mg/L)	Beaker Num.	Station
				Ammonia							I	Rounded					
Lab Control		0		< 0.5	15.3	31.4	7.63	288.46	6.96	7	9.33	< 0.005			0		
Grain Size Control		0		1.5	14.8	32	7.67	288.26	7.09	7	9.33	0.016			0		
B18-10023		0		< 0.5	15	31.9	7.64	288.16	7.07	7	9.33	< 0.005			0		
B18-10030		0		1.1	15.3	31.9	7.66	288.46	7.07	7	9.33	0.011			0		
B18-10078		0		< 0.5	15.3	32.0	7.65	288.46	7.09	7	9.33	< 0.005			0		
B18-10079		0		< 0.5	15.4	32.3	7.66	288.56	7.15	7	9.33	< 0.005			0		
B18-10117		0		< 0.5	15.4	32.3	7.64	288.56	7.15	7	9.33	< 0.005			0		
B18-10080		0		< 0.5	15.5	32.3	7.68	288.66	7.15	7	9.33	< 0.006			0		
B18-10081		0		0.9	15.4	32.3	7.67	288.56	7.15	7	9.33	0.010			0		
B18-10082		0		1.2	15.1	32.0	7.67	288.26	7.09	7	9.33	0.013			0		
B18-10083		0		1.0	15.4	32.0	7.67	288.56	7.09	7	9.33	0.011			0		
B18-10084		0		< 0.5	15	32.0	7.67	288.16	7.09	7	9.33	< 0.005			0		
B18-10022		0		1.0	14.9	32	7.67	288.06	7.09	7	9.33	0.010			0		
B18-10076		0		0.6	14.9	31.80	7.66	288.06	7.05	7	9.33	0.006			0		
B18-10077		0		1.6	14.8	32	7.66	287.96	7.09	7	9.33	0.016			0		
Lab Control		10		< 0.5	15	31.4	7.49	288.16	6.96	7	9.33	< 0.003			0		
Grain Size Control		10		2.3	14.5	32.3	7.72	287.66	7.15	7	9.33	0.026			0		
B18-10023		10		2.4	14.9	31.9	7.62	288.06	7.07	7	9.33	0.022			0		
B18-10030		10		2.8	14.7	31.9	7.66	287.86	7.07	7	9.33	0.028			0		
B18-10078		10		0.7	14.7	32.2	7.61	287.86	7.13	7	9.33	0.006			0		
B18-10079		10		0.7	14.6	32.4	7.60	287.76	7.17	7	9.33	0.006			0		
B18-10117		10		2.1	14.6	32.4	7.72	287.76	7.17	7	9.33	0.024			0		
B18-10080		10		< 0.5	14.7	32.4	7.68	287.86	7.17	7	9.33	< 0.005			0		
B18-10081		10		0.7	14.7	32.4	7.62	287.86	7.17	7	9.33	0.006			0		
B18-10082		10		1.0	15	32.1	7.61	288.16	7.11	7	9.33	0.009			0		
B18-10083		10		1.1	15	32.2	7.62	288.16	7.13	7	9.33	0.010			0		
B18-10084		10		0.7	15	32.1	7.60	288.16	7.11	7	9.33	0.006			0		
B18-10022		10		3.4	14.9	32.2	7.65	288.06	7.13	7	9.33	0.033			0		
B18-10076		10		1.0	14.9	32.1	7.63	288.06	7.11	7	9.33	0.009			0		
B18-10077		10		3.7	14.6	32.3	7.65	287.76	7.15	7	9.33	0.036			0		

Ammonia Subsample Analysis

Client: Amec FW
 Project ID: RHMP - Overlying Water
 Test No.: 18-07-053 to 18-07-058 065
 K6

Test Species: *E. estuarius*
 Start Date: 7/24/2018
 End Date: 8/3/2018

DI Blank: 0.0

10 mg/L Ammonia Stock: 8.3 mg/L as NH_3

Sample ID	Test Day	Vial #	Ammonia (mg/L as N)	Ammonia (mg/L as NH_3)	Notes
Lab Control	0	1	0.5 <0.4	<0.5	
B18-10023	0	2	0.5 <0.4	<0.5	
B18-10030	0	3	0.9	1.1	
B18-10078	0	4	0.5 <0.4	<0.5	
B18-10079	0	5	0.5 <0.4	<0.5	
B18-10117	0	6	0.5 <0.4	<0.5	
B18-10080	0	7	0.5 <0.4	<0.5	
B18-10081	0	8	0.7	0.9	
B18-10082	0	9	1.0	1.2	
B18-10083	0	10	0.8	1.0	
B18-10084	0	11	0.5 <0.4	<0.5	
B18-10022	0	12	0.8	1.0	
B18-10076	0	13	0.5	0.6	
B18-10077	0	14	1.3	1.6	
Grain Size Control	0	15	1.2	1.5	
Lab Control	10	16	0.5 <0.4	<0.5	
B18-10023	10	17	2.0	2.4	
B18-10030	10	18	2.3	2.8	
B18-10078	10	19	0.6	0.7	
B18-10079	10	20	0.6	0.7	
B18-10117	10	21	1.7	2.1	
B18-10080	10	22	0.5 <0.4	<0.5	
B18-10081	10	23	0.6	0.7	
B18-10082	10	24	0.8	1.0	
B18-10083	10	25	0.9	1.1	
B18-10084	10	26	0.6	0.7	
B18-10022	10	27	2.8	3.4	
B18-10076	10	28	0.8	1.0	
B18-10077	10	29	3.0	3.7	
Grain Size Control	10	30	1.9	2.3	AG 8/21/18

QC Check: AG 9/27/18

Final Review: JW 1/2/19

Rework - Day 0

Unionized Ammonia Calculation for Pressure of 1 atm

Input 'Shaded' data

I pK

1 9.26

2 9.27

3 9.28

4 9.29

5 9.30

6 9.32

7 9.33

8 9.34

Log Number	Beaker	Day	Dilution	Total Ammonia (mg/L)	Temp (C)	Salinity (ppt)	pH	Temp (K)	I	I Rounded	pK	Unionized Ammonia	D.O. (mg/L)	Beaker Num.	Station
B18-10023	0		PW	10.7	15.0	32.3	7.67	288.16	7.15	7	9.33	0.111		0	
B18-10030	0		PW	14.2	15.3	33.5	7.82	288.46	7.41	7	9.33	0.212		0	
B18-10078	0		PW	6	15.3	33.5	7.49	288.46	7.41	7	9.33	0.042		0	
B18-10079	0		PW	7.8	15.4	33.1	7.27	288.56	7.32	7	9.33	0.033		0	
B18-10117	0		PW	8.2	15.4	33.6	7.13	288.56	7.43	7	9.33	0.025		0	
B18-10080	0		PW	1.6	15.5	33.6	7.44	288.66	7.43	7	9.33	0.010		0	
B18-10081	0		PW	3.5	15.4	33.3	7.32	288.56	7.37	7	9.33	0.017		0	
B18-10082	0		PW	4	15.1	32.6	7.24	288.26	7.22	7	9.33	0.016		0	
B18-10083	0		PW	5.6	15.4	32.8	7.29	288.56	7.26	7	9.33	0.025		0	
B18-10084	0		PW	2.7	15.0	32.8	7.27	288.16	7.26	7	9.33	0.011		0	
B18-10022	0		PW	10	14.9	32.1	7.52	288.06	7.11	7	9.33	0.073		0	
B18-10076	0		PW	4.60	14.9	32.5	7.26	288.06	7.20	7	9.33	0.019		0	
B18-10077	0		PW	11.10	14.8	31.0	7.36	287.96	6.88	7	9.33	0.056		0	

Ammonia Subsample Analysis

Client: Amec FW
Project ID: RHMP - Porewater
Test No.: 18-07-053 to 18-07-10458

Test Species: *E. estuarius*
Start Date: 7/24/2018
End Date: 8/3/2018

DI Blank: 0.0

10 mg/L Ammonia Stock: 8.3 mg/L as NH_3

[illegible]

QC Check: AG 9/27/18

Final Review: 2w 1/2/19

Day 0 Percuwater Sample Check-In: Effluent/Water

Wood Environmental Toxicology Lab
4905 Morena Blvd, Ste. 1304
San Diego, CA 92117

Client: Amec/wood
Project Name: RMP
Test ID Numbers: 18-07-053 to 18-07-065

Sample ID:	B18-10023	B18-10030	B18-10078	B18-10079	B18-10117	B18-10080	B18-10081	B18-10082
Sample Number:	2018-50046	2018-50047	2018-50048	2018-50049	2018-50050	2018-50051	2018-50052	2018-50053
Collection Date/Time:	7/16/18 1230	7/16/18 1437	7/16/18 1024	7/16/18 0424	7/16/18 0734	7/17/18 0815	7/17/18 0722	7/17/18 0920
Receipt Date/Time:	7/16/18 1650	7/16/18 1650	7/16/18 1215	7/16/18 1215	7/16/18 1215	7/17/18 1300	7/17/18 1300	7/17/18 1300
Total Sample Volume (L):	-	-	-	-	-	-	-	-
Receipt Temp (°C):	-	-	-	-	-	-	-	-
Appropriate Temp (V/N) ¹ :	-	-	-	-	-	-	-	-
pH (units):	7.67	7.82	7.49	7.27	7.13	7.44	7.32	7.24
DO (mg/L):	-	-	-	-	-	-	-	-
Conductivity (µS/cm) ² :	-	-	-	-	-	-	-	-
Salinity (ppt):	32.3	33.5	33.5	33.1	33.6	33.6	33.3	32.6
Alkalinity (mg/L):	-	-	-	-	-	-	-	-
Hardness (mg/L) ² :	-	-	-	-	-	-	-	-
Total Chlorine (mg/L) ³ :	-	-	-	-	-	-	-	-
Free Chlorine (mg/L) ³ :	-	-	-	-	-	-	-	-
Technician Initials:	SW	SW	SW	SW	SW	SW	SW	SW

Notes:

- Temperature should be 0 - 6°C if received > 24 hours past collection
- Only measured on samples with less than 3 ppt salinity
- If total chlorine is above 0.10 mg/L, the free chlorine will be measured
- Debris, odor, and color is described only if observed in the sample

Sample Descriptions⁴:

Percuwater

Test Organism: N/A Dilution Water: Nat-SW, Art-SW, RW, DMW, Other Salinity: 32 ppt
Initial QC: 18-07-053 to 18-07-065
Final Review: SW 12/19

Day 0 Percuwater Sample Check-In: Effluent/Water

Wood Environmental Toxicology Lab
4905 Morena Blvd, Ste. 1304
San Diego, CA 92117

Client: Amec / Wood
Project Name: RAMP
Test ID Numbers: 18-07-053 to 18-07-065

Sample ID:	1318-10083	1318-10084	1318-10085	1318-10086	1318-10087		
Sample Number:	2018-30051	2018-30052	2018-30053	2018-30054	2018-30055		
Collection Date/Time:	7/17/18 1320	7/17/18 1115	7/18/18 0515	7/18/18 0420	7/18/18 0720		
Receipt Date/Time:	7/17/18 1320	7/17/18 1320	7/18/18 1411	7/18/18 1411	7/18/18 1411		
Total Sample Volume (L):	-	-	-	-	-		
Receipt Temp (°C):	-	-	-	-	-		
Appropriate Temp (Y/N) ¹ :	-	-	-	-	-		
pH (units):	7.29	7.27	7.52	7.26	7.36		
DO (mg/L):	-	-	-	-	-		
Conductivity (µS/cm) ² :	-	-	-	-	-		
Salinity (ppt):	32.8	32.8	32.1	32.5	31.0		
Alkalinity (mg/L):	-	-	-	-	-		
Hardness (mg/L) ² :	-	-	-	-	-		
Total Chlorine (mg/L) ³ :	-	-	-	-	-		
Free Chlorine (mg/L) ³ :	-	-	-	-	-		
Technician Initials:	SW	SW	SW	SW	SW		

Notes:

- Temperature should be 0 - 6°C if received > 24 hours past collection
- Only measured on samples with less than 3 ppt salinity
- If total chlorine is above 0.10 mg/L, the free chlorine will be measured
- Debris, odor, and color is described only if observed in the sample

Sample Descriptions⁴:

Percuwater 3

Test Organism: NA

Dilution Water: Nat-SW, Art-SW, RW, DMW, Other

Salinity: 32 ppt

Initial QC: AD 11/9/18

Additional Control: _____

Salinity: _____

Final Review: SW 1/2/19

Amphipod Batch #4

7/26/18

Survival Counts for 10 day Amphipod Test

Client: AMEC/WOOD

Project ID: RHMP - North and Central SD Bay 7/26/18

Species *Eohaustorius estuarius*

Test No. 18-07-066 to 18-07-078

Sample ID	Rand #	Survival Counts		% Survival	Mean % Survival
		Number Added	Number Alive (Day 10)		
Lab Control	80	20	20	100	99.0
	111	20	20	100	
	124	20	20	100	
	138	20	20	100	
	82	20	19	95	
B18-10112	92	20	20	100	97.0
	114	20	19	95	
	93	20	19	95	
	100	20	19	95	
	137	20	20	100	
B18-10113	88	20	19	95	97.0
	135	20	19	95	
	133	20	20	100	
	75	20	20	100	
	108	20	19	95	
B18-10024	126	20	20	100	98.0
	77	20	19	95	
	79	20	19	95	
	112	20	20	100	
	97	20	20	100	
B18-10029	105	20	18	90	97.0
	132	20	20	100	
	140	20	19	95	
	99	20	20	100	
	95	20	20	100	
B18-10114	131	20	20	100	96.0
	115	20	19	95	
	98	20	19	95	
	129	20	19	95	
	125	20	19	95	
B18-10115	74	20	19	95	94.0
	94	20	20	100	
	83	20	18	90	
	90	20	18	90	
	81	20	19	95	

QC Check: SC 8/6/18

Final Review: JW 1/3/19

Survival Counts for 10 day Amphipod Test

Client: AMEC/WOOD

Project ID: RHMP - North and Central SD Bay 7/26/18

Species *Eohaustorius estuarius*

Test No. 18-07-066 to 18-07-078

Sample ID	Rand #	Survival Counts		% Survival	Mean % Survival
		Number Added	Number Alive (Day 10)		
B18-10116	101	20	19	95	95.0
	122	20	19	95	
	78	20	19	95	
	128	20	19	95	
	110	20	19	95	
B18-10031	118	20	19	95	98.0
	121	20	20	100	
	134	20	20	100	
	102	20	20	100	
	136	20	19	95	
B18-10032	139	20	19	95	95.0
	85	20	20	100	
	119	20	20	100	
	73	20	19	95	
	117	20	17	85	
B18-10119	120	20	18	90	90.0
	113	20	17	85	
	130	20	17	85	
	71	20	19	95	
	87	20	19	95	
B18-10121	116	20	18	90	96.0
	104	20	18	90	
	89	20	20	100	
	86	20	20	100	
	106	20	20	100	
B18-10123	127	20	20	100	92.0
	123	20	18	90	
	76	20	19	95	
	96	20	17	85	
	107	20	18	90	
B18-10178	84	20	18	90	84.0
	72	20	14	70	
	103	20	18	90	
	109	20	19	95	
	91	20	15	75	

QC Check: SC 8/6/18

Final Review: JW 1/3/19

Survival Counts for 10 day Amphipod Test

Client: AMEC/WOOD

Project ID: RHMP - North and Central SD Bay 7/26/18

Species *Eohaustorius estuarius*

Test No. 18-07-066 to 18-07-078

Sample ID	Rand #	Survival Counts		% Survival	Mean % Survival
		Number Added	Number Alive (Day 10)		
Grain Size Control	A	20	19	95	92.0
	B	20	18	90	
	C	20	17	85	
	D	20	20	100	
	E	20	18	90	

QC Check: SC 8/6/18

Final Review: 2w 1/3/19

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.26 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column B	B18-10112
6		
7	Unpaired t test	
8	P value	0.0647
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=1.69 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.518 ± 0.0431, n=5
16	Mean ± SEM of column B	1.413 ± 0.04411, n=5
17	Difference between means	0.1042 ± 0.06168
18	95% confidence interval	-0.03799 to 0.2465
19	R squared (eta squared)	0.2631
20		
21	F test to compare variances	
22	F, DFn, Dfd	1.047, 4, 4
23	P value	0.9652
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.26 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column C	B18-10113
6		
7	Unpaired t test	
8	P value	0.2724
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.6325 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.518 ± 0.0431, n=5
16	Mean ± SEM of column C	1.475 ± 0.05279, n=5
17	Difference between means	0.0431 ± 0.06815
18	95% confidence interval	-0.1141 to 0.2003
19	R squared (eta squared)	0.04762
20		
21	F test to compare variances	
22	F, DFn, Dfd	1.5, 4, 4
23	P value	0.7040
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.26 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column D	B18-10024
6		
7	Unpaired t test	
8	P value	0.2724
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.6325 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.518 ± 0.0431, n=5
16	Mean ± SEM of column D	1.475 ± 0.05279, n=5
17	Difference between means	0.0431 ± 0.06815
18	95% confidence interval	-0.1141 to 0.2003
19	R squared (eta squared)	0.04762
20		
21	F test to compare variances	
22	F, DFn, Dfd	1.5, 4, 4
23	P value	0.7040
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.26 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column E	B18-10029
6		
7	Unpaired t test	
8	P value	0.2267
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.7881 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.518 ± 0.0431, n=5
16	Mean ± SEM of column E	1.455 ± 0.06634, n=5
17	Difference between means	0.06235 ± 0.07912
18	95% confidence interval	-0.1201 to 0.2448
19	R squared (eta squared)	0.07204
20		
21	F test to compare variances	
22	F, DFn, Dfd	2.369, 4, 4
23	P value	0.4240
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.26 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column F	B18-10114
6		
7	Unpaired t test	
8	P value	0.0333
9	P value summary	*
10	Significantly different (P < 0.05)?	Yes
11	One- or two-tailed P value?	One-tailed
12	t, df	t=2.121 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.518 ± 0.0431, n=5
16	Mean ± SEM of column F	1.388 ± 0.0431, n=5
17	Difference between means	0.1293 ± 0.06096
18	95% confidence interval	-0.01126 to 0.2699
19	R squared (eta squared)	0.36
20		
21	F test to compare variances	
22	F, DFn, Dfd	1, 4, 4
23	P value	>0.9999
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.26 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column G	B18-10115
6		
7	Unpaired t test	
8	P value	0.0234
9	P value summary	*
10	Significantly different (P < 0.05)?	Yes
11	One- or two-tailed P value?	One-tailed
12	t, df	t=2.349 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.518 ± 0.0431, n=5
16	Mean ± SEM of column G	1.35 ± 0.05695, n=5
17	Difference between means	0.1678 ± 0.07142
18	95% confidence interval	0.003105 to 0.3325
19	R squared (eta squared)	0.4083
20		
21	F test to compare variances	
22	F, DFn, Dfd	1.746, 4, 4
23	P value	0.6026
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.26 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column H	B18-10116
6		
7	Unpaired t test	
8	P value	0.0020
9	P value summary	**
10	Significantly different (P < 0.05)?	Yes
11	One- or two-tailed P value?	One-tailed
12	t, df	t=4 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.518 ± 0.0431, n=5
16	Mean ± SEM of column H	1.345 ± 0, n=5
17	Difference between means	0.1724 ± 0.0431
18	95% confidence interval	0.07302 to 0.2718
19	R squared (eta squared)	0.6667
20		
21	F test to compare variances	
22	F, DFn, Dfd	Infinity, 4, 4
23	P value	<0.0001
24	P value summary	****
25	Significantly different (P < 0.05)?	Yes

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.26 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column I	B18-10031
6		
7	Unpaired t test	
8	P value	0.2724
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.6325 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.518 ± 0.0431, n=5
16	Mean ± SEM of column I	1.475 ± 0.05279, n=5
17	Difference between means	0.0431 ± 0.06815
18	95% confidence interval	-0.1141 to 0.2003
19	R squared (eta squared)	0.04762
20		
21	F test to compare variances	
22	F, DFn, Dfd	1.5, 4, 4
23	P value	0.7040
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.26 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column J	B18-10032
6		
7	Unpaired t test	
8	P value	0.0980
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=1.411 df=8
13		
14	How big is the difference?	
15	Mean \pm SEM of column A	1.518 \pm 0.0431, n=5
16	Mean \pm SEM of column J	1.397 \pm 0.07387, n=5
17	Difference between means	0.1206 \pm 0.08553
18	95% confidence interval	-0.07658 to 0.3179
19	R squared (eta squared)	0.1992
20		
21	F test to compare variances	
22	F, DFn, Dfd	2.937, 4, 4
23	P value	0.3215
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.26 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column K	B18-10119
6		
7	Unpaired t test	
8	P value	0.0010
9	P value summary	***
10	Significantly different (P < 0.05)?	Yes
11	One- or two-tailed P value?	One-tailed
12	t, df	t=4.505 df=8
13		
14	How big is the difference?	
15	Mean \pm SEM of column A	1.518 \pm 0.0431, n=5
16	Mean \pm SEM of column K	1.257 \pm 0.03856, n=5
17	Difference between means	0.2605 \pm 0.05783
18	95% confidence interval	0.1272 to 0.3939
19	R squared (eta squared)	0.7173
20		
21	F test to compare variances	
22	F, DFn, Dfd	1.25, 4, 4
23	P value	0.8341
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.26 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column L	B18-10121
6		
7	Unpaired t test	
8	P value	0.1897
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.9305 df=8
13		
14	How big is the difference?	
15	Mean \pm SEM of column A	1.518 \pm 0.0431, n=5
16	Mean \pm SEM of column L	1.436 \pm 0.07636, n=5
17	Difference between means	0.0816 \pm 0.08769
18	95% confidence interval	-0.1206 to 0.2838
19	R squared (eta squared)	0.09767
20		
21	F test to compare variances	
22	F, DFn, Dfd	3.139, 4, 4
23	P value	0.2939
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.26 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column M	B18-10123
6		
7	Unpaired t test	
8	P value	0.0175
9	P value summary	*
10	Significantly different (P < 0.05)?	Yes
11	One- or two-tailed P value?	One-tailed
12	t, df	t=2.535 df=8
13		
14	How big is the difference?	
15	Mean \pm SEM of column A	1.518 \pm 0.0431, n=5
16	Mean \pm SEM of column M	1.315 \pm 0.06714, n=5
17	Difference between means	0.2022 \pm 0.07979
18	95% confidence interval	0.01825 to 0.3862
19	R squared (eta squared)	0.4454
20		
21	F test to compare variances	
22	F, DFn, Dfd	2.427, 4, 4
23	P value	0.4116
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.26 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column N	B18-10178
6		
7	Unpaired t test	
8	P value	0.0013
9	P value summary	**
10	Significantly different (P < 0.05)?	Yes
11	One- or two-tailed P value?	One-tailed
12	t, df	t=4.28 df=8
13		
14	How big is the difference?	
15	Mean \pm SEM of column A	1.518 \pm 0.0431, n=5
16	Mean \pm SEM of column N	1.176 \pm 0.06711, n=5
17	Difference between means	0.3413 \pm 0.07976
18	95% confidence interval	0.1574 to 0.5253
19	R squared (eta squared)	0.696
20		
21	F test to compare variances	
22	F, DFn, Dfd	2.424, 4, 4
23	P value	0.4120
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.26 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column O	Grain Size Control
6		
7	Unpaired t test	
8	P value	0.0175
9	P value summary	*
10	Significantly different (P < 0.05)?	Yes
11	One- or two-tailed P value?	One-tailed
12	t, df	t=2.535 df=8
13		
14	How big is the difference?	
15	Mean \pm SEM of column A	1.518 \pm 0.0431, n=5
16	Mean \pm SEM of column O	1.315 \pm 0.06714, n=5
17	Difference between means	0.2022 \pm 0.07979
18	95% confidence interval	0.01825 to 0.3862
19	R squared (eta squared)	0.4454
20		
21	F test to compare variances	
22	F, DFn, Dfd	2.427, 4, 4
23	P value	0.4116
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Survival Counts for 10day Amphipod Test

Client: Amec FW
 Project ID: RHMP-SD Bay North Central
 Test No. 18-07-066 to 18-07-078
 Test Species: *E. estuarius*
 Start Date/Time: 7/26/2018 1530
 End Date/Time: 8/5/2018 1230

Rand #	Survival Counts		QC Final Weights (Growth)		
	Start (Day 0)	End (Day 10)	Pan Weight	Pan + Organism Weight	Final Weight (per organism)
71	20	19			
72	20	14			
73	20	19			
74	20	19	19		
75	20	20			
76	20	19			
77	20	19			
78	20	19			
79	20	19			
80	20	20	20		
81	20	19			
82	20	19			
83	20	18			
84	20	18			
85	20	20			
86	20	20	20		
87	20	19			
88	20	19			
89	20	20			
90	20	18			
91	20	18			
92	20	20			
93	20	19			
94	20	20			
95	20	20	20		
96	20	17			
97	20	20			
98	20	19			
99	20	20			
100	20	19			
101	20	19			
102	20	20			
103	20	18			
104	20	18	18		
105	20	18			
Tech Initials: AD ABJSV			SC		

Ammonia Collected: Test Start: AD Test End: JW

Comments:

QC Check: AG 9/27/18 Final Review: JW 1/3/19

Survival Counts for 10day Amphipod Test

Client: Amec FW

Test Species: *E. estuarius*

Project ID: RHMP-SD Bay North Central

Start Date/Time: 7/26/2018 1530

Test No. 18-07-066 to 18-07-078

End Date/Time: 8/5/2018 1230

Rand #	Survival Counts		QC Final Weights (Growth)		
	Start (Day 0)	End (Day 10)	Pan Weight	Pan + Organism Weight	Final Weight (per organism)
106	20	20			
107	20	18			
108	20	19	19		
109	20	19			
110	20	19			
111	20	20			
112	20	20			
113	20	17			
114	20	19			
115	20	19			
116	20	18	18		
117	20	17			
118	20	19			
119	20	18-20			
120	20	18			
121	20	20			
122	20	19	19		
123	20	18			
124	20	20			
125	20	19			
126	20	20			
127	20	20			
128	20	19			
129	20	19	19		
130	20	17			
131	20	20			
132	20	20			
133	20	20			
134	20	20			
135	20	19			
136	20	19			
137	20	20			
138	20	20			
139	20	19	19		
140	20	19			
Tech Initials:	AD	AG/SW	SC		

Ammonia Collected: Test Start: AP

Test End: SW

Comments:

QC Check: AG 9/27/18

Final Review: SW 1/3/19

Survival Counts for 10day Amphipod Test

Client: Amec FW

Test Species: *E. estuarius*

Project ID: RHMP - Grain Size Control

Start Date/Time: 7/26/2018 1530

Test No. 18-07-066 to 18-07-078

End Date/Time: 8/5/2018 1230

[illegible]Ammonia Collected: Test Start: AD

Test End: *SW*

Comments:

QC Check: AB 9/27/18

Final Review: 200 1/3/19

Amec FW
RHMP Sediment Testing
Random Numbers

SAMPLE ID	Rand#
Lab Control	80
	111
	124
	138
	82
B18-10112	92
	114
	93
	100
	137
B18-10113	88
	135
	133
	75
	108
B18-10024	126
	77
	79
	112
	97
B18-10029	105
	132
	140
	99
	95
B18-10114	131
	115
	98
	129
	125

QC Check - Amphipod: AL

Amec FW
RHMP Sediment Testing
Random Numbers

SAMPLE ID	Rand#
B18-10115	74
	94
	83
	90
	81
B18-10116	101
	122
	78
	128
	110
B18-10031	118
	121
	134
	102
	136
B18-10032	139
	85
	119
	73
	117
B18-10119	120
	113
	130
	71
	87
B18-10121	116
	104
	89
	86
	106

QC Check - Amphipod: sw/Al

Water Quality for 10day Amphipod Test

Client: Amec FW

Test Species: *E. estuarius*

Project ID: RHMP-^{30 Bay}North Central

Start Date/Time: 7/26/2018 1530

Test No. 18-07-060 to 18-07-078

End Date/Time: 8/5/2018 1230

Sample ID	Water Quality Measurements (Day)											
	Parameter	0	1	2	3	4	5	6	7	8	9	10
Lab Control	Temp. (°C)	15.7	16.0	16.0	15.8	15.8	16.1	16.0	15.3	15.1	15.8	15.5
	Salinity (ppt)	32.2	32.5	32.3	32.4	32.2	32.0	32.3	32.3	32.5	32.3	32.3
	pH (units)	7.83	7.60	7.82	7.73	7.71	7.66	7.70	7.58	7.57	7.74	7.57
	DO (mg/L)	8.1	7.9	8.1	8.2	8.1	8.0	8.0	8.3	8.3	8.1	7.9
B18-10112	Temp. (°C)	15.7	15.9	16.0	15.8	16.0	16.1	16.0	15.4	15.2	15.5	15.7
	Salinity (ppt)	32.2	32.8	32.8	32.9	32.9	32.7	32.9	32.9	33.0	32.9	32.7
	pH (units)	7.78	7.61	7.81	7.72	7.71	7.65	7.68	7.59	7.59	7.82	7.71
	DO (mg/L)	7.9	7.9	7.8	8.2	8.0	8.0	8.0	8.1	8.2	8.3	8.5
B18-10113	Temp. (°C)	15.9	16.0	16.0	16.0	16.0	16.1	16.0	15.4	15.3	15.4	15.7
	Salinity (ppt)	32.4	32.7	32.8	32.9	32.8	32.7	32.9	32.9	33.0	33.1	33.0
	pH (units)	7.76	7.64	7.81	7.73	7.71	7.68	7.70	7.62	7.65	7.86	7.75
	DO (mg/L)	7.8	7.9	7.9	8.0	7.9	7.8	8.0	8.2	8.2	8.3	8.3
B18-10024	Temp. (°C)	15.8	16.0	16.0	16.0	16.0	15.9	15.8	15.4	15.3	15.4	15.7
	Salinity (ppt)	32.4	32.5	32.5	32.6	32.6	32.6	32.7	32.8	32.9	32.9	33.0
	pH (units)	7.77	7.65	7.81	7.74	7.72	7.70	7.71	7.61	7.64	7.82	7.76
	DO (mg/L)	7.9	7.9	7.9	7.9	7.9	8.0	8.0	8.2	8.2	8.3	8.2
B18-10029	Temp. (°C)	15.5	16.0	15.7	15.9	16.0	15.7	15.8	15.7	15.5	15.6	15.8
	Salinity (ppt)	32.8	32.9	33.0	33.0	33.1	33.1	33.2	33.3	33.4	33.4	33.3
	pH (units)	7.80	7.64	7.77	7.75	7.70	7.69	7.73	7.68	7.71	7.89	7.77
	DO (mg/L)	7.5	7.8	7.8	8.0	7.8	7.9	7.8	7.9	8.0	8.1	8.1
B18-10114	Temp. (°C)	15.0	15.8	15.7	15.8	15.6	15.5	15.7	15.5	15.5	15.5	15.7
	Salinity (ppt)	32.7	32.8	32.9	32.9	32.9	33.0	33.1	33.1	33.2	33.2	33.1
	pH (units)	7.76	7.62	7.79	7.74	7.70	7.68	7.71	7.61	7.66	7.76	7.79
	DO (mg/L)	8.0	7.9	7.9	8.0	8.0	7.9	7.9	8.0	8.0	8.1	8.0
B18-10115	Temp. (°C)	14.7	15.7	15.3	15.6	15.4	15.3	15.8	15.5	15.3	15.6	15.6
	Salinity (ppt)	32.8	32.9	32.9	33.0	33.0	33.0	33.1	33.1	33.2	33.2	33.3
	pH (units)	7.76	7.62	7.79	7.73	7.70	7.69	7.69	7.62	7.63	7.77	7.72
	DO (mg/L)	8.0	8.0	8.0	8.1	8.0	8.0	8.0	8.0	8.0	8.1	8.0
Tech Initials (Initial):		AD	AD	AD	AD	AD	AD	AD	AD	AD	AD	AD

Date Animals Received: 7/24/18

Age or Size of Animals: 3-5mm

Comments: Temp out of recommended range; fish placed near test.

QC Check: AG 7/27/18

Final Review: JW 1/3/19

Water Quality for 10day Amphipod Test

Client: Amec FW

Test Species: *E. estuarius*

Project ID: RHMP-SD Bay North & Central

Start Date/Time: 7/26/2018 1530

Test No. 18-07-066 to 18-07-078

End Date/Time: 8/5/2018 1230

Sample ID	Water Quality Measurements (Day)											
	Parameter	0	1	2	3	4	5	6	7	8	9	10
B18-10116	Temp. (°C)	14.5	15.4	15.4	15.1	15.2	15.3	15.5	15.5	15.3	15.6	15.6
	Salinity (ppt)	32.7	32.8	32.8	32.9	32.8	32.8	33.0	33.0	33.1	33.0	33.1
	pH (units)	7.76	7.66	7.82	7.77	7.74	7.73	7.72	7.63	7.63	7.80	7.74
	DO (mg/L)	8.2	8.1	8.1	8.2	8.1	8.2	8.1	8.1	8.2	8.1	8.1
B18-10031	Temp. (°C)	14.5	15.3	15.3	15.1	15.1	15.2	15.8	15.4	15.4	15.6	15.6
	Salinity (ppt)	32.5	32.6	32.7	32.8	32.8	32.8	33.0	33.0	33.2	33.1	33.2
	pH (units)	7.78	7.67	7.81	7.78	7.75	7.73	7.72	7.62	7.64	7.79	7.75
	DO (mg/L)	8.1	8.1	8.1	8.2	8.1	8.1	7.9	8.1	8.1	8.1	8.1
B18-10032	Temp. (°C)	14.4	15.3	15.3	15.2	15.4	15.2	15.6	15.2	15.2	15.6	15.6
	Salinity (ppt)	32.5	32.6	32.6	32.7	32.7	32.7	32.7	32.7	32.9	32.9	32.9
	pH (units)	7.76	7.66	7.82	7.77	7.74	7.73	7.70	7.63	7.64	7.79	7.74
	DO (mg/L)	8.1	8.1	8.1	8.1	8.1	8.1	8.0	8.1	8.1	8.1	8.1
B18-10119	Temp. (°C)	14.5	15.2	15.2	15.2	15.1	15.0	15.2	15.2	15.4	15.4	15.6
	Salinity (ppt)	32.5	32.6	32.6	32.7	32.7	32.7	32.8	32.8	32.9	33.0	33.1
	pH (units)	7.75	7.66	7.81	7.79	7.75	7.74	7.73	7.63	7.63	7.80	7.75
	DO (mg/L)	8.1	8.1	8.1	8.1	8.1	8.2	8.0	8.1	8.1	8.1	8.1
B18-10121	Temp. (°C)	14.5	15.1	15.3	15.2	15.1	15.3	15.8	15.4	15.4	15.3	15.3
	Salinity (ppt)	32.5	32.7	32.6	32.7	32.8	32.8	32.8	32.9	33.0	33.2	33.4
	pH (units)	7.76	7.67	7.80	7.78	7.73	7.72	7.71	7.61	7.62	7.76	7.73
	DO (mg/L)	8.1	8.1	8.1	8.2	8.1	8.1	8.0	8.1	8.2	8.2	8.1
B18-10123	Temp. (°C)	14.6	15.3	15.3	15.2	15.1	15.2	15.7	15.4	15.4	15.5	15.4
	Salinity (ppt)	32.5	32.7	32.7	32.8	32.7	32.8	32.9	33.0	33.1	33.1	33.2
	pH (units)	7.75	7.70	7.79	7.77	7.73	7.72	7.70	7.61	7.62	7.78	7.71
	DO (mg/L)	8.1	8.0	8.1	8.2	8.1	8.1	8.0	8.1	8.1	8.1	8.2
B18-10178	Temp. (°C)	14.7	15.4	15.4	15.2	15.5	15.4	15.1	15.3	15.2	15.5	15.6
	Salinity (ppt)	32.6	32.8	32.8	32.9	32.9	33.0	33.0	33.1	33.2	33.2	33.3
	pH (units)	7.73	7.68	7.78	7.76	7.72	7.74	7.73	7.66	7.71	7.98	7.88
	DO (mg/L)	8.0	7.9	8.0	8.1	7.8	8.1	7.9	8.0	8.0	8.1	8.0
Tech Initials (Initial):		AD	JW	AD	JW	AD	AD	AD	AD	AD	AD	JW

Date Animals Received: 7/24/18

Age or Size of Animals: 3-5mm

Comments:

QC Check: AG 4/27/18

Final Review: JW 1/3/19

Water Quality for 10day Amphipod Test

Client: Amec FW

Test Species: *E. estuarius*

Project ID: RHMP - SD Bay North & Central

Start Date/Time: 7/26/2018 1530

Test No. 18-07-066 to 18-07-078

End Date/Time: 8/5/2018 1230

Sample ID	Water Quality Measurements (Day)											
	Parameter	0	1	2	3	4	5	6	7	8	9	10
Grain Size Control	Temp. (°C)	14.8	15.4	15.4	15.2	15.5	15.4	15.6	15.5	15.5	15.6	15.7
	Salinity (ppt)	32.4	32.5	32.6	32.7	32.6	32.6	32.8	32.8	32.8	32.8	32.9
	pH (units)	7.74	7.67	7.79	7.77	7.74	7.71	7.80	7.72	7.78	7.94	7.8
	DO (mg/L)	8.0	8.0	8.0	8.1	7.7	7.8	7.9	8.0	8.0	8.1	8.0
	Temp. (°C)											AD
	Salinity (ppt)											
	pH (units)											
	DO (mg/L)											
	Temp. (°C)											
	Salinity (ppt)											
	pH (units)											
	DO (mg/L)											
	Temp. (°C)											
	Salinity (ppt)											
	pH (units)											
	DO (mg/L)											
	Temp. (°C)											
	Salinity (ppt)											
	pH (units)											
	DO (mg/L)											
	Temp. (°C)											
	Salinity (ppt)											
	pH (units)											
	DO (mg/L)											
	Temp. (°C)											
	Salinity (ppt)											
	pH (units)											
	DO (mg/L)											
Tech Initials (Initial):		AD	JW	AD	JW	AD	AD	AD	AD	AD	JW	JW

Date Animals Received: 7/24/18

Age or Size of Animals: 3-5mm

Comments:

QC Check: AG 7/27/18

Final Review: JW 1/3/19

Ammonia Subsample Analysis

Client: Amec FW
Project ID: RHMP - Porewater
Test No.: 18-07-066 to 18-07-078

Test Species: *E. estuarius*
Start Date: 7/26/2018 1530
End Date: 8/5/2018 1230

DI Blank: 0.0

10 mg/L Ammonia Stock: 8.3 mg/L as NH_3

[illegible]

QC Check: AG 2/27/18

Final Review: 2w 1/3/19

Overlying ^{new} water

Unionized Ammonia Calculation for Pressure of 1 atm

Input 'Shaded' data

I	pK
1	9.26
2	9.27
3	9.28
4	9.29
5	9.30
6	9.32
7	9.33
8	9.34

Log Number	Beaker	Day	Dilution	Total Ammonia (mg/L)	Temp (C)	Salinity (ppt)	pH	Temp (K)	I	Rounded	pK	Unionized Ammonia (mg/L)	D.O. (mg/L)	Beaker Num.	Station
Lab Control			0	< 0.5	15.7	32.2	7.83	288.86	7.13	7	9.33	< 0.008		0	
Grain Size Control			0	< 0.5	14.8	32.4	7.74	288.86	7.17	7	9.33	< 0.006		0	
B18-10112			0	< 0.5	15.7	32.2	7.78	289.06	7.13	7	9.33	< 0.007		0	
B18-10113			0	< 0.5	15.9	32.4	7.76	288.96	7.17	7	9.33	< 0.007		0	
B18-10024			0	< 0.5	15.8	32.4	7.77	288.66	7.17	7	9.33	< 0.007		0	
B18-10029			0	< 0.5	15.5	32.8	7.80	288.16	7.26	7	9.33	< 0.007		0	
B18-10114			0	< 0.5	15	32.7	7.76	287.86	7.24	7	9.33	< 0.006		0	
B18-10115			0	1.3	14.7	32.8	7.76	287.66	7.26	7	9.33	0.016		0	
B18-10116			0	< 0.5	14.5	32.7	7.76	287.66	7.24	7	9.33	< 0.006		0	
B18-10031			0	< 0.5	14.5	32.5	7.78	287.56	7.20	7	9.33	< 0.006		0	
B18-10032			0	0.5	14.4	32.5	7.76	287.66	7.20	7	9.33	0.006		0	
B18-10119			0	0.5	14.5	32.5	7.75	287.66	7.20	7	9.33	0.006		0	
B18-10121			0	< 0.5	14.5	32.5	7.76	287.76	7.20	7	9.33	< 0.006		0	
B18-10123			0	< 0.5	14.6	32.5	7.75	287.86	7.20	7	9.33	< 0.006		0	
B18-10178			0	< 0.5	14.7	32.6	7.73	273.16	7	7	9.33	< 0.002		0	
Lab Control			10	0.5	15.5	32.3	7.57	288.76	7.15	7	9.33	0.004		0	
Grain Size Control			10	1.2	15.6	32.9	7.92	288.86	7.28	7	9.33	0.023		0	
B18-10112			10	< 0.5	15.7	32.7	7.71	288.86	7.24	7	9.33	< 0.006		0	
B18-10113			10	0.5	15.7	33.0	7.75	288.86	7.30	7	9.33	0.007		0	
B18-10024			10	0.6	15.7	33.0	7.76	288.96	7.30	7	9.33	0.008		0	
B18-10029			10	< 0.5	15.8	33.3	7.77	288.86	7.37	7	9.33	< 0.007		0	
B18-10114			10	< 0.5	15.7	33.1	7.79	288.76	7.32	7	9.33	< 0.007		0	
B18-10115			10	< 0.5	15.6	33.3	7.72	288.76	7.37	7	9.33	< 0.006		0	
B18-10116			10	< 0.5	15.6	33.1	7.74	288.76	7.32	7	9.33	< 0.006		0	
B18-10031			10	2.0	15.6	33.2	7.75	288.76	7.34	7	9.33	< 0.006		0	
B18-10032			10	< 0.5	15.6	32.9	7.74	288.76	7.28	7	9.33	< 0.006		0	
B18-10119			10	< 0.5	15.6	33.1	7.75	288.46	7.32	7	9.33	< 0.006		0	
B18-10121			10	1.7	15.3	33.4	7.73	288.56	7.39	7	9.33	0.021		0	
B18-10123			10	< 0.5	15.4	33.2	7.71	288.76	7.34	7	9.33	< 0.006		0	
B18-10178			10	< 0.5	15.6	33.3	7.88	273.16	7.37	7	9.33	< 0.003		0	

Ammonia Subsample Analysis

Client: Amec FW
 Project ID: RHMP - Overlying Water
 Test No.: 18-07-066 to 18-07-078

Test Species: *E. estuarius*
 Start Date: 7/26/2018 1530
 End Date: 8/5/2018 1230

DI Blank: 0.0

10 mg/L Ammonia Stock: 8.2 mg/L as NH_3

Sample ID	Test Day	Vial #	Ammonia (mg/L as N)	Ammonia (mg/L as NH_3)	Notes
Lab Control	0	1	<0.4	<0.5	
B18-10112	0	2	<0.4	<0.5	
B18-10113	0	3	<0.4	<0.5	
B18-10024	0	4	<0.4	<0.5	
B18-10029	0	5	0.4	0.5	
B18-10114	0	6	<0.4	<0.5	
B18-10115	0	7	1.1	1.3	
B18-10116	0	8	<0.4	<0.5	
B18-10031	0	9	<0.4	<0.5	
B18-10032	0	10	0.4	0.5	
B18-10119	0	11	0.4	0.5	
B18-10121	0	12	<0.4	<0.5	
B18-10123	0	13	<0.4	<0.5	
B18-10178	0	14	<0.4	<0.5 AP	
Grain Size Control	0	15	<0.4	<0.45	
Lab Control	10	16	0.4	0.5 AP	
B18-10112	10	17	<0.4	<0.45	
B18-10113	10	18	0.4	0.5	
B18-10024	10	19	0.5	0.6 AP	
B18-10029	10	20	<0.4	<0.45	
B18-10114	10	21	<0.4	<0.5	
B18-10115	10	22	<0.4	<0.5	
B18-10116	10	23	<0.4	<0.5	
B18-10031	10	24	1.6	2.0	
B18-10032	10	25	<0.4	<0.5	
B18-10119	10	26	<0.4	<0.5	
B18-10121	10	27	1.4	1.7	
B18-10123	10	28	<0.4	<0.4 <0.5	
B18-10178	10	29	<0.4	<0.5	
Grain Size Control	10	30	1.0	1.2	

QC Check: No 9/27/18

Final Review: JW 1/3/19

Input 'Shaded' data

I	pK
1	9.26
2	9.27
3	9.28
4	9.29
5	9.30
6	9.32
7	9.33
8	9.34

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Final Review: ~ 1/8/19

Day 0 Porewater Sample Check-In: Effluent/Water

Wood Environmental Toxicology Lab
4905 Morena Blvd, Ste. 1304
San Diego, CA 92117

Client: Amec / Wood
Project Name: RMA
Test ID Numbers: 18-07-066 to 18-07-078

Sample ID:	1318-10117	1318-10113	1318-10024	1318-10029	1318-10114	1318-10115	1318-10116	1318-10031
Sample Number:	2018-30056	2018-30057	2018-30062	2018-30061	2018-30060	2018-30058	2018-30059	2018-30064
Collection Date/Time:	7/18/18 1030	7/18/18 1130	7/19/18 1255	7/19/18 1120	7/19/18 1030	7/19/18 0720	7/19/18 0855	7/20/18 1035
Receipt Date/Time:	7/18/18 1411	7/18/18 1411	7/19/18 1510	7/19/18 1510	7/19/18 1510	7/19/18 1510	7/19/18 1510	7/20/18 1703
Total Sample Volume (L):	-	-	-	-	-	-	-	-
Receipt Temp (°C):	-	-	-	-	-	-	-	-
Appropriate Temp (V/N) ¹ :	-	-	-	-	-	-	-	-
pH (units):	7.46	7.28	7.22	7.23	7.20	7.22	7.49	7.51
DO (mg/L):	-	-	-	-	-	-	-	-
Conductivity (µS/cm) ² :	-	-	-	-	-	-	-	-
Salinity (ppt):	32.8	33.0	32.3	33.2	32.9	33.1	31.5	32.8
Alkalinity (mg/L):	-	-	-	-	-	-	-	-
Hardness (mg/L) ² :	-	-	-	-	-	-	-	-
Total Chlorine (mg/L) ³ :	-	-	-	-	-	-	-	-
Free Chlorine (mg/L) ³ :	-	-	-	-	-	-	-	-
Technician Initials:	JW	JW	JW	JW	JW	JW	JW	JW

Notes:

- Temperature should be 0 - 6°C if received > 24 hours past collection
- Only measured on samples with less than 3 ppt salinity
- If total chlorine is above 0.10 mg/L, the free chlorine will be measured
- Debris, odor, and color is described only if observed in the sample

Sample Descriptions⁴:

Porewater

Initial QC: 18011918
Final Review: JW 1/3/19

Test Organism: N/A Dilution Water: Nat-SW, Art-SW, RW, DMW, Other Salinity: 30 ppt
Additional Control: _____ Salinity: _____

Wood Environmental Toxicology Lab
4905 Morena Blvd, Ste. 1304
San Diego, CA 92117

Client: Amel / wood
Project Name: RMIP
Test ID Numbers: 18-07-066 to 18-07-078

Sample ID:	B318-10114	B318-10121	B318-10123	B318-10178	
Sample Number:	2018-50065	2018-50067	2018-50068	2018-50069	
Collection Date/Time:	7/20/18 1410	7/20/18 0740	7/20/18 0935	7/20/18 1135	
Receipt Date/Time:	7/20/18 1700	7/20/18 1700	7/20/18 1700	7/20/18 1700	
Total Sample Volume (L):	-	-	-	-	
Receipt Temp (°C):	-	-	-	-	
Appropriate Temp (V/N)¹:	-	-	-	-	
pH (units):	7.57	7.47	7.24	7.15	
DO (mg/L):	-	-	-	-	
Conductivity (µS/cm)²:	-	-	-	-	
Salinity (ppt):	30.3	33.2	33.4	33.6	
Alkalinity (mg/L):	-	-	-	-	
Hardness (mg/L)²:	-	-	-	-	
Total Chlorine (mg/L)³:	-	-	-	-	
Free Chlorine (mg/L)³:	-	-	-	-	
Technician Initials:	gsw	gsw	gsw	gsw	

Sample Descriptions⁴:

¹ Temperature should be 0 - 6°C if received > 24 hours past collection² Only measured on samples with less than 3 ppt salinity

³ If total chlorine is above 0.10 mg/L, the free chlorine will be measured

⁴ Debris, odor, and color is described only if observed in the sample

Test Organism: N/A

Dilution Water: Nat-SW, Art-SW, RW, DMW, Other

Additional Control:

32 pp

Salinity

Initial QC: As 11/9/18

Final Review: Jun 1/3/19

Amphipod Batch #5

8/3/18

Survival Counts for 10 day Amphipod Test

Client: AMEC/WOOD

Project ID: RHMP - Central SD Bay 8/3/18

Species *Eohaustorius estuarius*

Test No. 18-08-025 to 18-08-041

Sample ID	Rand #	Survival Counts		% Survival	Mean % Survival
		Number Added	Number Alive (Day 10)		
Lab Control	16	20	20	100	96.0
	71	20	20	100	
	75	20	20	100	
	49	20	16	80	
	84	20	20	100	
B18-10124	18	20	17	85	87.0
	73	20	14	70	
	33	20	19	95	
	60	20	19	95	
	30	20	18	90	
B18-10126	68	20	20	100	92.0
	88	20	17	85	
	81	20	19	95	
	76	20	18	90	
	64	20	18	90	
B18-10127	80	20	19	95	96.0
	29	20	20	100	
	41	20	20	100	
	85	20	18	90	
	78	20	19	95	
B18-10132	19	20	20	100	93.0
	54	20	20	100	
	13	20	17	85	
	90	20	18	90	
	32	20	18	90	
B18-10133	59	20	17	85	89.0
	44	20	18	90	
	5	20	17	85	
	87	20	19	95	
	48	20	18	90	
B18-10136	8	20	17	85	91.0
	72	20	20	100	
	9	20	18	90	
	36	20	19	95	
	23	20	17	85	

Comments: B18-10124 surrogate test chamber terminated; 95% survival in surrogate

B18-10133 surrogate test chamber terminated; 85% survival in surrogate

QC Check: SC 10/26/18

Final Review: SW 1/21/19

Amec Foster Wheeler Environmental Lab, 4905 Morena Blvd, Ste. 1304, San Diego, CA 92117

Survival Counts for 10 day Amphipod Test

Client: AMEC/WOOD

Project ID: RHMP - Central SD Bay 8/3/18

Species *Eohaustorius estuarius*

Test No. 18-08-025 to 18-08-041

Sample ID	Rand #	Survival Counts		% Survival	Mean % Survival
		Number Added	Number Alive (Day 10)		
B18-10137	55	20	19	95	90.0
	52	20	17	85	
	45	20	18	90	
	14	20	17	85	
	37	20	19	95	
B18-10139	40	20	20	100	94.0
	57	20	20	100	
	70	20	18	90	
	77	20	18	90	
	51	20	18	90	
B18-10140	22	20	17	85	95.0
	82	20	19	95	
	24	20	20	100	
	42	20	20	100	
	20	20	19	95	
B18-10141	46	20	20	100	96.0
	56	20	20	100	
	79	20	17	85	
	17	20	20	100	
	67	20	19	95	
B18-10142	6	20	18	90	92.0
	74	20	20	100	
	3	20	16	80	
	15	20	18	90	
	2	20	20	100	
B18-10034	26	20	18	90	96.0
	69	20	20	100	
	21	20	18	90	
	86	20	20	100	
	65	20	20	100	
B18-10035	58	20	18	90	95.0
	12	20	20	100	
	28	20	19	95	
	39	20	19	95	
	38	20	19	95	

QC Check: Sc 10/26/18

Final Review: sw 11/21/19

Survival Counts for 10 day Amphipod Test

Client: AMEC/WOOD

Project ID: RHMP - Central SD Bay 8/3/18

Species *Eohaustorius estuarius*

Test No. 18-08-025 to 18-08-041

Sample ID	Rand #	Survival Counts		% Survival	Mean % Survival
		Number Added	Number Alive (Day 10)		
B18-10036	25	20	19	95	86.0
	47	20	17	85	
	10	20	19	95	
	53	20	15	75	
	4	20	16	80	
B18-10143	50	20	18	90	94.0
	89	20	20	100	
	83	20	19	95	
	35	20	19	95	
	43	20	18	90	
B18-10144	7	20	19	95	95.0
	34	20	18	90	
	27	20	20	100	
	63	20	19	95	
	62	20	19	95	
B18-10039	61	20	19	95	92.0
	31	20	18	90	
	11	20	19	95	
	66	20	19	95	
	1	20	17	85	
Grain Size Control	A	20	19	95	90.0
	B	20	17	85	
	C	20	17	85	
	D	20	20	100	
	E	20	17	85	

Comments: B18-10036 surrogate test chamber terminated; 70% survival in surrogate

QC check: JC 10/26/18

Final Review: JWC 11/21/18

Unpaired t test		
1	Table Analyzed	Transform of RHMP 8.3 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column B	B18-10124
6		
7	Unpaired t test	
8	P value	0.0284
9	P value summary	*
10	Significantly different (P < 0.05)?	Yes
11	One- or two-tailed P value?	One-tailed
12	t, df	t=2.223 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.47 ± 0.09073, n=5
16	Mean ± SEM of column B	1.221 ± 0.06588, n=5
17	Difference between means	0.2493 ± 0.1121
18	95% confidence interval	-0.009266 to 0.5079
19	R squared (eta squared)	0.3819
20		
21	F test to compare variances	
22	F, DFn, Dfd	1.897, 4, 4
23	P value	0.5505
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 8.3 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column C	B18-10126
6		
7	Unpaired t test	
8	P value	0.1040
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=1.37 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.47 ± 0.09073, n=5
16	Mean ± SEM of column C	1.315 ± 0.06714, n=5
17	Difference between means	0.1546 ± 0.1129
18	95% confidence interval	-0.1057 to 0.4149
19	R squared (eta squared)	0.19
20		
21	F test to compare variances	
22	F, DFn, Dfd	1.826, 4, 4
23	P value	0.5741
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 8.3 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column D	B18-10127
6		
7	Unpaired t test	
8	P value	0.3075
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.5231 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.47 ± 0.09073, n=5
16	Mean ± SEM of column D	1.412 ± 0.06314, n=5
17	Difference between means	0.05783 ± 0.1105
18	95% confidence interval	-0.1971 to 0.3127
19	R squared (eta squared)	0.03308
20		
21	F test to compare variances	
22	F, DFn, Dfd	2.065, 4, 4
23	P value	0.4998
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 8.3 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column E	B18-10132
6		
7	Unpaired t test	
8	P value	0.1964
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.9033 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.47 ± 0.09073, n=5
16	Mean ± SEM of column E	1.359 ± 0.08372, n=5
17	Difference between means	0.1115 ± 0.1235
18	95% confidence interval	-0.1732 to 0.3962
19	R squared (eta squared)	0.09255
20		
21	F test to compare variances	
22	F, DFn, Dfd	1.174, 4, 4
23	P value	0.8799
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 8.3 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column F	B18-10133
6		
7	Unpaired t test	
8	P value	0.0211
9	P value summary	*
10	Significantly different (P < 0.05)?	Yes
11	One- or two-tailed P value?	One-tailed
12	t, df	t=2.415 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.47 ± 0.09073, n=5
16	Mean ± SEM of column F	1.238 ± 0.03176, n=5
17	Difference between means	0.2322 ± 0.09613
18	95% confidence interval	0.01048 to 0.4538
19	R squared (eta squared)	0.4216
20		
21	F test to compare variances	
22	F, DFn, Dfd	8.159, 4, 4
23	P value	0.0663
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 8.3 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column G	B18-10136
6		
7	Unpaired t test	
8	P value	0.0908
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=1.463 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.47 ± 0.09073, n=5
16	Mean ± SEM of column G	1.3 ± 0.07241, n=5
17	Difference between means	0.1698 ± 0.1161
18	95% confidence interval	-0.09789 to 0.4375
19	R squared (eta squared)	0.211
20		
21	F test to compare variances	
22	F, DFn, Dfd	1.57, 4, 4
23	P value	0.6728
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 8.3 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column H	B18-10137
6		
7	Unpaired t test	
8	P value	0.0314
9	P value summary	*
10	Significantly different (P < 0.05)?	Yes
11	One- or two-tailed P value?	One-tailed
12	t, df	t=2.16 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.47 ± 0.09073, n=5
16	Mean ± SEM of column H	1.257 ± 0.03856, n=5
17	Difference between means	0.2129 ± 0.09858
18	95% confidence interval	-0.01442 to 0.4402
19	R squared (eta squared)	0.3683
20		
21	F test to compare variances	
22	F, DFn, Dfd	5.538, 4, 4
23	P value	0.1261
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 8.3 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column I	B18-10139
6		
7	Unpaired t test	
8	P value	0.2201
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.8122 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.47 ± 0.09073, n=5
16	Mean ± SEM of column I	1.374 ± 0.07636, n=5
17	Difference between means	0.09632 ± 0.1186
18	95% confidence interval	-0.1771 to 0.3698
19	R squared (eta squared)	0.07618
20		
21	F test to compare variances	
22	F, DFn, Dfd	1.412, 4, 4
23	P value	0.7464
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 8.3 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column J	B18-10140
6		
7	Unpaired t test	
8	P value	0.2750
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.6241 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.47 ± 0.09073, n=5
16	Mean ± SEM of column J	1.397 ± 0.07387, n=5
17	Difference between means	0.07302 ± 0.117
18	95% confidence interval	-0.1968 to 0.3428
19	R squared (eta squared)	0.04642
20		
21	F test to compare variances	
22	F, DFn, Dfd	1.508, 4, 4
23	P value	0.7001
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 8.3 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column K	B18-10141
6		
7	Unpaired t test	
8	P value	0.4048
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.249 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.47 ± 0.09073, n=5
16	Mean ± SEM of column K	1.44 ± 0.07873, n=5
17	Difference between means	0.02991 ± 0.1201
18	95% confidence interval	-0.2471 to 0.3069
19	R squared (eta squared)	0.007691
20		
21	F test to compare variances	
22	F, DFn, Dfd	1.328, 4, 4
23	P value	0.7901
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 8.3 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column L	B18-10142
6		
7	Unpaired t test	
8	P value	0.1810
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.9668 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.47 ± 0.09073, n=5
16	Mean ± SEM of column L	1.345 ± 0.09169, n=5
17	Difference between means	0.1247 ± 0.129
18	95% confidence interval	-0.1727 to 0.4221
19	R squared (eta squared)	0.1046
20		
21	F test to compare variances	
22	F, DFn, Dfd	1.021, 4, 4
23	P value	0.9843
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 8.3 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column M	B18-10034
6		
7	Unpaired t test	
8	P value	0.3909
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.2865 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.47 ± 0.09073, n=5
16	Mean ± SEM of column M	1.436 ± 0.07636, n=5
17	Difference between means	0.03397 ± 0.1186
18	95% confidence interval	-0.2395 to 0.3074
19	R squared (eta squared)	0.01015
20		
21	F test to compare variances	
22	F, DFn, Dfd	1.412, 4, 4
23	P value	0.7464
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 8.3 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column N	B18-10035
6		
7	Unpaired t test	
8	P value	0.1807
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.9678 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.47 ± 0.09073, n=5
16	Mean ± SEM of column N	1.369 ± 0.05141, n=5
17	Difference between means	0.1009 ± 0.1043
18	95% confidence interval	-0.1395 to 0.3414
19	R squared (eta squared)	0.1048
20		
21	F test to compare variances	
22	F, DFn, Dfd	3.114, 4, 4
23	P value	0.2970
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 8.3 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column O	B18-10036
6		
7	Unpaired t test	
8	P value	0.0204
9	P value summary	*
10	Significantly different (P < 0.05)?	Yes
11	One- or two-tailed P value?	One-tailed
12	t, df	t=2.435 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.47 ± 0.09073, n=5
16	Mean ± SEM of column O	1.204 ± 0.06117, n=5
17	Difference between means	0.2665 ± 0.1094
18	95% confidence interval	0.01413 to 0.5188
19	R squared (eta squared)	0.4257
20		
21	F test to compare variances	
22	F, DFn, Dfd	2.2, 4, 4
23	P value	0.4639
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 8.3 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column P	B18-10143
6		
7	Unpaired t test	
8	P value	0.1472
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=1.122 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.47 ± 0.09073, n=5
16	Mean ± SEM of column P	1.35 ± 0.05695, n=5
17	Difference between means	0.1202 ± 0.1071
18	95% confidence interval	-0.1268 to 0.3672
19	R squared (eta squared)	0.1359
20		
21	F test to compare variances	
22	F, DFn, Dfd	2.538, 4, 4
23	P value	0.3890
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 8.3 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column Q	B18-10144
6		
7	Unpaired t test	
8	P value	0.1807
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.9678 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.47 ± 0.09073, n=5
16	Mean ± SEM of column Q	1.369 ± 0.05141, n=5
17	Difference between means	0.1009 ± 0.1043
18	95% confidence interval	-0.1395 to 0.3414
19	R squared (eta squared)	0.1048
20		
21	F test to compare variances	
22	F, DFn, Dfd	3.114, 4, 4
23	P value	0.2970
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 8.3 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column R	B18-10039
6		
7	Unpaired t test	
8	P value	0.0519
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=1.835 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.47 ± 0.09073, n=5
16	Mean ± SEM of column R	1.292 ± 0.035, n=5
17	Difference between means	0.1785 ± 0.09725
18	95% confidence interval	-0.04578 to 0.4027
19	R squared (eta squared)	0.2963
20		
21	F test to compare variances	
22	F, DFn, Dfd	6.72, 4, 4
23	P value	0.0920
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 8.3 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column S	Grain Size Control
6		
7	Unpaired t test	
8	P value	0.0789
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=1.558 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.47 ± 0.09073, n=5
16	Mean ± SEM of column S	1.285 ± 0.07657, n=5
17	Difference between means	0.185 ± 0.1187
18	95% confidence interval	-0.08878 to 0.4588
19	R squared (eta squared)	0.2328
20		
21	F test to compare variances	
22	F, DFn, Dfd	1.404, 4, 4
23	P value	0.7503
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Survival Counts for 10day Amphipod Test

Client: Amec FW

Test Species: *E. estuarius*

Project ID: RHMP

Start Date/Time: 8/3/2018 1530

Test No. 18-08-025 to -041

End Date/Time: 8/13/2018 1000

Rand #	Survival Counts		Final Weights (Growth)		
	Start (Day 0)	End (Day 10)	Pan Weight	Pan + Organism Weight	Final Weight (per organism)
1	20	17			
2	20	20			
3	20	16	16		
4	20	16			
5	20	17			
6	20	18			
7	20	19			
8	20	17			
9	20	18			
10	20	19			
11	20	19	19		
12	20	20			
13	20	17			
14	20	17			
15	20	18			
16	20	20			
17	20	20			
18	20	17			
19	20	20	20		
20	20	19			
21	20	18			
22	20	17			
23	20	17			
24	20	20			
25	20	19			
26	20	18			
27	20	20			
28	20	19			
29	20	20			
30	20	18	18		
31	20	18			
32	20	18			
33	20	19			
34	20	18			
35	20	19			
Tech Initials: AG/AD/JVV AG/JVV			SC		

Ammonia Collected: Test Start: AD

Test End: AG

Comments:

QC Check: AD 11/16/18

Final Review: JW 1/21/19

Survival Counts for 10day Amphipod Test

Client: Amec FW

Test Species: *E. estuarius*

Project ID: RHMP

Start Date/Time: 8/3/2018 1530

Test No. 18-08-025 to -041

End Date/Time: 8/13/2018 1000

Rand #	Survival Counts		Pan Weight	Final Weights (Growth)	
	Start (Day 0)	End (Day 10)		Pan + Organism Weight	Final Weight (per organism)
36	20	19			
37	20	19			
38	20	19	19		
39	20	19			
40	20	20			
41	20	20			
42	20	20			
43	20	18			
44	20	18			
45	20	18			
46	20	20			
47	20	17			
48	20	18	18		
49	20	16			
50	20	18			
51	20	18			
52	20	17			
53	20	15			
54	20	20			
55	20	19			
56	20	20			
57	20	20			
58	20	18	18		
59	20	17			
60	20	19			
61	20	19			
62	20	19			
63	20	19			
64	20	18			
65	20	20			
66	20	19	19		
67	20	19			
68	20	20			
69	20	20			
70	20	18			
Tech Initials: AG/AD/JVV AG/JVV			SC		

Ammonia Collected: Test Start: AD

Test End: AG

Comments:

QC Check: AD 11/16/18

Final Review: JVV 11/21/18

Survival Counts for 10day Amphipod Test

Client: Amec FW

Test Species: *E. estuarius*

Project ID: RHMP

Start Date/Time: 8/3/2018 1530

Test No. 18-08-025 to -041

End Date/Time: 8/13/2018 ~~10:00~~ 1000

[illegible]

Ammonia Collected: Test Start:

Test End: AG

Comments:

QC Check: AD 11/16/18

Final Review: SW 1/21/19

**Amec FW
RHMP Sediment Testing
Random Numbers**

SAMPLE ID	Rand#
Lab Control	16 71 75 49 84
B18-10124	18 73 33 60 30
B18-10126	68 88 81 76 64
B18-10127	80 29 41 85 78
B18-10132	19 54 13 90 32
B18-10133	59 44 5 87 48

QC Check - Amphipod: KB

Amec FW
RHMP Sediment Testing
Random Numbers

SAMPLE ID	Rand#
B18-10136	8
	72
	9
	36
	23
B18-10137	55
	52
	45
	14
	37
B18-10139	40
	57
	70
	77
	51
B18-10140	22
	82
	24
	42
	20
B18-10141	46
	56
	79
	17
	67
B18-10142	6
	74
	3
	15
	2

QC Check - Amphipod: gm

**Amec FW
RHMP Sediment Testing
Random Numbers**

SAMPLE ID	Rand#
B18-10034	26 69 21 86 65
B18-10035	58 12 28 39 38
B18-10036	25 47 10 53 4
B18-10143	50 89 83 35 43
B18-10144	7 34 27 63 62
B18-10039	61 31 11 66 1

QC Check - Amphipod: 2m

Amec FW
RHMP Sediment Testing
Random Numbers

SAMPLE ID	Rand#
Grain Size Control	A B C D E

QC Check - Amphipod: 25

Water Quality for 10day Amphipod Test

Client: Amec FW

Test Species: *E. estuarius*

Project ID: RHMP

Start Date/Time: 8/3/2018 1530

Test No. 18-08-025 to -041

End Date/Time: 8/13/2018 1000

Sample ID	Water Quality Measurements (Day)											
	Parameter	0	1	2	3	4	5	6	7	8	9	10
Lab Control	Temp. (°C)	14.5	14.6	14.7	14.7	14.8	14.8	14.9	15.0	14.9	14.9	15.0
	Salinity (ppt)	32.7	32.0	32.0	32.1	32.2	32.2	31.8	31.5	32.0	32.1	31.7
	pH (units)	7.63	7.72	7.61	7.70	7.67	7.63	7.70	7.64	7.76	7.74	7.77
	DO (mg/L)	8.2	8.1	7.9	8.3	8.3	8.3	8.3	7.9	8.1	8.0	8.0
B18-10124	Temp. (°C)	14.4	14.8	14.8	14.8	14.8	14.7	14.9	15.2	14.8	14.8	15.0
	Salinity (ppt)	32.4	32.4	32.5	32.5	32.5	32.6	32.4	32.3	32.3	32.4	32.5
	pH (units)	7.62	7.74	7.64	7.72	7.67	7.63	7.71	7.66	7.73	7.71	7.74
	DO (mg/L)	8.2	8.2	8.2	8.2	8.2	8.3	8.2	8.1	8.3	8.2	8.2
B18-10126	Temp. (°C)	14.4	14.8	14.8	14.8	14.8	14.7	14.8	15.1	14.7	14.8	15.0
	Salinity (ppt)	32.3	32.4	32.5	32.6	32.6	32.7	32.6	32.4	32.5	32.6	32.6
	pH (units)	7.64	7.75	7.66	7.73	7.69	7.64	7.71	7.67	7.73	7.74	7.68
	DO (mg/L)	8.2	8.2	8.2	8.3	8.2	8.3	8.3	8.1	8.3	8.2	8.2
B18-10127	Temp. (°C)	14.4	14.7	14.7	14.7	14.7	14.7	14.8	15.0	14.7	14.8	14.7
	Salinity (ppt)	32.3	32.5	32.6	32.6	32.7	32.8	32.8	32.7	32.8	32.7	32.8
	pH (units)	7.62	7.75	7.70	7.72	7.68	7.63	7.71	7.66	7.73	7.71	7.71
	DO (mg/L)	8.1	8.2	8.2	8.2	8.2	8.3	8.2	8.2	8.3	8.2	8.2
B18-10132	Temp. (°C)	14.3	14.8	14.6	14.7	14.7	14.7	14.8	14.9	14.5	14.4	14.8
	Salinity (ppt)	32.2	32.4	32.4	32.5	32.6	32.6	32.6	32.5	32.7	32.8	32.7
	pH (units)	7.72	7.75	7.73	7.74	7.70	7.66	7.74	7.71	7.70	7.71	7.73
	DO (mg/L)	7.6	8.2	8.3	8.2	8.3	8.3	8.3	8.1	8.3	8.2	8.2
B18-10133	Temp. (°C)	14.2	14.8	14.7	14.7	14.7	14.6	14.8	14.8	14.5	14.6	14.8
	Salinity (ppt)	32.3	32.5	32.5	32.4	32.6	32.7	32.7	32.6	32.8	32.7	32.8
	pH (units)	7.65	7.74	7.66	7.73	7.71	7.69	7.76	7.70	7.74	7.72	7.76
	DO (mg/L)	8.0	8.2	8.2	8.0	8.2	8.3	8.1	8.1	8.3	8.1	8.3
B18-10136	Temp. (°C)	14.3	14.8	14.6	14.8	14.7	14.6	14.8	14.8	14.5	14.6	14.7
	Salinity (ppt)	32.2	32.4	32.4	32.5	32.5	32.6	32.6	32.5	32.6	32.5	32.6
	pH (units)	7.73	7.73	7.65	7.72	7.69	7.67	7.73	7.72	7.74	7.72	7.75
	DO (mg/L)	8.0	8.0	8.2	8.1	8.0	8.2	8.2	8.1	8.3	8.2	8.0
Tech Initials (Initial):		AD	AD	AD	AD	AD	AD	AD	AD	AD	AD	AD

Date Animals Received: 8/1/18

Age or Size of Animals: 3-5mm

Comments:

QC Check: AD 11/10/18

Final Review: AD 1/21/19

Water Quality for 10day Amphipod Test

Client: Amec FW

Test Species: *E. estuarius*

Project ID: RHMP

Start Date/Time: 8/3/2018 1530

Test No. 18-08-025 to -041

End Date/Time: 8/13/2018 1000

Sample ID	Water Quality Measurements (Day)											
	Parameter	0	1	2	3	4	5	6	7	8	9	10
B18-10137	Temp. (°C)	14.3	14.8	14.8	14.8	14.8	14.6	14.8	14.8	14.5	14.6	14.7
	Salinity (ppt)	32.2	32.4	32.5	32.5	32.5	32.6	32.6	32.6	32.7	32.6	32.7
	pH (units)	7.63	7.74	7.65	7.72	7.70	7.68	7.72	7.73	7.75	7.74	7.70
	DO (mg/L)	8.2	7.9	8.2	8.2	8.1	8.1	8.2	8.1	8.3	8.1	8.2
B18-10139	Temp. (°C)	14.3	14.8	14.7	14.8	14.8	14.7	14.8	14.8	14.5	14.6	14.7
	Salinity (ppt)	32.3	32.4	32.5	32.5	32.6	32.6	32.6	32.6	32.7	32.6	32.7
	pH (units)	7.66	7.73	7.66	7.73	7.71	7.69	7.73	7.73	7.71	7.70	7.68
	DO (mg/L)	8.0	8.1	8.2	8.1	8.2	8.0	8.0	7.9	8.2	8.1	8.2
B18-10140	Temp. (°C)	14.5	14.8	14.8	14.9	14.8	14.7	14.8	14.8	14.6	14.7	14.7
	Salinity (ppt)	32.2	32.4	32.5	32.5	32.5	32.6	32.6	32.5	32.7	32.6	32.7
	pH (units)	7.63	7.73	7.66	7.72	7.70	7.68	7.73	7.76	7.76	7.74	7.72
	DO (mg/L)	8.1	8.0	8.2	8.1	8.2	8.1	8.1	8.1	8.3	8.2	8.3
B18-10141	Temp. (°C)	14.1	14.8	14.8	14.9	14.9	14.8	14.9	14.8	14.7	14.6	14.6
	Salinity (ppt)	32.2	32.3	32.5	32.4	32.5	32.5	32.5	32.5	32.7	32.7	32.6
	pH (units)	7.63	7.74	7.67	7.72	7.71	7.69	7.73	7.76	7.75	7.73	7.73
	DO (mg/L)	8.2	8.1	8.2	8.2	8.2	8.2	8.2	7.8	8.3	8.1	8.2
B18-10142	Temp. (°C)	14.1	15.0	14.8	15.0	15.0	14.8	14.9	14.7	14.7	14.8	14.7
	Salinity (ppt)	32.3	32.4	32.5	32.5	32.5	32.6	32.6	32.6	32.7	32.8	32.7
	pH (units)	7.65	7.74	7.67	7.72	7.67	7.69	7.71	7.75	7.72	7.71	7.69
	DO (mg/L)	8.1	8.0	8.2	8.1	7.3	8.2	8.1	8.0	8.3	8.2	8.2
B18-10034	Temp. (°C)	14.1	14.7	14.9	14.9	15.0	14.8	14.8	14.8	14.8	14.7	14.6
	Salinity (ppt)	32.3	32.4	32.5	32.5	32.6	32.6	32.6	32.6	32.7	32.6	32.7
	pH (units)	7.63	7.75	7.68	7.73	7.70	7.69	7.73	7.68	7.74	7.72	7.67
	DO (mg/L)	8.2	8.1	8.2	8.2	7.9	8.1	8.1	8.1	8.3	8.1	8.2
B18-10035	Temp. (°C)	14.1	14.8	14.9	14.9	14.9	14.8	14.8	14.7	14.8	14.7	14.6
	Salinity (ppt)	32.3	32.4	32.5	32.5	32.5	32.6	32.6	32.6	32.7	32.6	32.7
	pH (units)	7.63	7.74	7.67	7.72	7.71	7.70	7.74	7.69	7.75	7.73	7.65
	DO (mg/L)	8.3	8.0	8.1	8.1	8.1	8.2	8.2	8.2	8.3	8.1	8.3
Tech Initials (Initial):		AD	AD	JW	AD	AD	AD	AD	JW	JW	AD	JW

Date Animals Received: 8/11/18

Age or Size of Animals: 3-5 mm

Comments:

QC Check: AD 11/16/18

Final Review: JW 1/21/19

Water Quality for 10day Amphipod Test

Client: Amec FW

Test Species: *E. estuarius*

Project ID: RHMP

Start Date/Time: 8/3/2018 1530

Test No. 18-08-025 to -041

End Date/Time: 8/13/2018 1000

Sample ID	Water Quality Measurements (Day)											
	Parameter	0	1	2	3	4	5	6	7	8	9	10
B18-10036	Temp. (°C)	14.1	14.6	14.8	14.9	15.0	14.8	14.8	14.8	14.6	14.5	14.6
	Salinity (ppt)	32.4	32.5	32.6	32.6	32.7	32.7	32.7	32.7	32.8	32.7	32.8
	pH (units)	7.62	7.73	7.68	7.74	7.71	7.70	7.75	7.69	7.74	7.72	7.66
	DO (mg/L)	8.3	8.0	8.2	8.0	8.0	8.2	8.2	8.2	8.3	8.1	8.2
B18-10143	Temp. (°C)	14.1	14.8	14.8	14.9	14.9	14.8	14.8	14.7	14.7	14.6	14.5
	Salinity (ppt)	32.3	32.4	32.5	32.6	32.6	32.6	32.6	32.6	32.7	32.6	32.7
	pH (units)	7.64	7.75	7.70	7.73	7.71	7.72	7.75	7.71	7.76	7.74	7.68
	DO (mg/L)	8.3	8.1	8.2	8.2	8.0	8.2	8.2	8.2	8.3	8.1	8.3
B18-10144	Temp. (°C)	14.1	14.8	14.7	14.9	14.9	14.7	14.7	14.7	14.7	14.8	14.5
	Salinity (ppt)	32.3	32.4	32.4	32.5	32.5	32.5	32.5	32.5	32.6	32.7	32.6
	pH (units)	7.63	7.74	7.70	7.71	7.71	7.70	7.74	7.69	7.75	7.72	7.66
	DO (mg/L)	8.3	8.2	8.2	8.1	8.1	8.2	8.2	8.3	8.3	8.1	8.3
B18-10039	Temp. (°C)	14.3	14.8	14.7	14.9	14.9	14.7	14.7	14.7	14.7	14.7	14.7
	Salinity (ppt)	32.4	32.6	32.7	32.7	32.7	32.8	32.8	32.8	32.8	32.8	32.8
	pH (units)	7.62	7.73	7.70	7.72	7.70	7.70	7.70	7.69	7.76	7.73	7.67
	DO (mg/L)	8.3	8.0	8.2	8.2	8.2	8.2	8.1	8.3	8.3	8.2	8.3
Grain Size Control	Temp. (°C)	14.4	14.5	14.7	14.8	14.9	14.6	14.7	14.6	14.7	14.8	14.9
	Salinity (ppt)	32.3	32.4	32.5	32.5	32.4	32.5	32.5	32.5	32.5	32.4	32.6
	pH (units)	7.75	7.72	7.69	7.71	7.68	7.70	7.74	7.68	7.73	7.71	7.63
	DO (mg/L)	7.4	7.9	8.2	8.2	8.1	8.1	8.0	8.2	8.3	8.2	8.3
	Temp. (°C)											
	Salinity (ppt)											
	pH (units)											
	DO (mg/L)											
	Temp. (°C)											
	Salinity (ppt)											
	pH (units)											
	DO (mg/L)											

Tech Initials (Initial): AD AD JW AD AD AD AD JW JW AD JW

Date Animals Received: 8/1/18

Age or Size of Animals: 3-5 mm

Comments:

QC Check: AD 11/16/18

Final Review: JW 1/21/19

Ammonia Subsample Analysis

Client: Amec FW
Project ID: RHMP - Overlying Water
Test No.: 18-08-025 to -041

Test Species: *E. estuarius*
Start Date: 8/3/2018
End Date: 8/10/2018

DI Blank: 0.0

10 mg/L Ammonia Stock: 8.7 mg/L as NH₃

Sample ID	Test Day	Vial #	Ammonia (mg/L as N)	Ammonia (mg/L as NH ₃)	Notes
Lab Control	0	1	<0.04	<0.05	
B18-10124	0	2	<0.4	<0.5	
B18-10126	0	3	<0.4	<0.5	
B18-10127	0	4	0.5 AD	0.6 AD	
B18-10132	0	5	<0.24	<0.25	
B18-10133	0	6	<0.4	<0.45	
B18-10136	0	7	0.7	0.9	
B18-10137	0	8	0.9	1.1	
B18-10139	0	9	0.9	1.1 AD	
B18-10140	0	10	<0.04	<0.05	
B18-10141	0	11	<0.04	<0.05	
B18-10142	0	12	0.4 AD	0.5	
B18-10034	0	13	0.4	0.5	
B18-10035	0	14	0.5	0.6	
B18-10036	0	15	0.4	0.5 AD	
B18-10143	0	16	<0.4	<0.45	
B18-10144	0	17	0.4 AD	0.5 AD	
B18-10039	0	18	<0.04	<0.05	
Grain Size Control	0	19	<0.04	<0.05	
Lab Control	10	20	<0.4	<0.05	
B18-10124	10	21	<0.4	<0.5	
B18-10126	10	22	<0.4 AD	<0.5	
B18-10127	10	23	<0.04	<0.05	
B18-10132	10	24	1.7 AD	2.1 AD	
B18-10133	10	25	<0.24	<0.45	
B18-10136	10	26	0.5	0.6	
B18-10137	10	27	0.4	0.5	
B18-10139	10	28	0.9 AD	1.1 AD	
B18-10140	10	29	<0.04	<0.05 AD	
B18-10141	10	30	<0.04	<0.05	
B18-10142	10	31	0.7	0.9 AD	
B18-10034	10	32	<0.4	<0.45	
B18-10035	10	33	<0.4	<0.5	
B18-10036	10	34	0.4 AD	0.5 AD	
B18-10143	10	35	<0.04	<0.45	
B18-10144	10	36	<0.4 AD	<0.5 AD	
B18-10039	10	37	<0.04	<0.05	
Grain Size Control	10	38	1.5	1.8	

QC Check: AD 11/16/18

Final Review: JW 1/21/19

Analyst: AD

Ammonia Subsample Analysis

Client: Amec FW
Project ID: RHMP - Porewater
Test No.: 18-08-025 to -041

Test Species: *E. estuarius*
Start Date: 8/3/2018
End Date: 8/10/2018

DI Blank: 0.0 mgl

10 mg/L Ammonia Stock: 8.4 mg/L as NH_3

[illegible]

QC Check: Ad 11/16/18

Final Review: ju 1/21/19

Day 0 Pore water

Sample Check-In: Effluent/Water

Wood Environmental Toxicology Lab
4905 Morena Blvd, Ste. 1304
San Diego, CA 92117

Client: Aneco/Wood
Project Name: RHMP
Test ID Numbers: 18-08-025 to -041

Sample ID:	18-10124	18-10126	18-10127	18-10132	18-10133	18-10136	18-10137	18-10139
Sample Number:	2018-30073	2018-30074	2018-30075	2018-30076	2018-30077	2018-30078	2018-30079	2018-30080
Collection Date/Time:								
Receipt Date/Time:								
Total Sample Volume (L):								
Receipt Temp (°C):								
Appropriate Temp (Y/N):								
pH (units):	7.00	7.17	7.46	7.50	7.47	7.34	7.30	7.09
DO (mg/L):	-	-	-	-	-	-	-	-
Conductivity (µS/cm):	-	-	-	-	-	-	-	-
Salinity (ppt):	32.9	33.6	33.3	30.0	31.8	33.2	32.0	32.3
Alkalinity (mg/L):	-	-	-	-	-	-	-	-
Hardness (mg/L):	-	-	-	-	-	-	-	-
Total Chlorine (mg/L):	-	-	-	-	-	-	-	-
Free Chlorine (mg/L):	-	-	-	-	-	-	-	-
Technician Initials:	JW	JW	JW	JW	JW	JW	JW	JW

Ⓟ

Notes:

- Temperature should be 0 - 6°C if received > 24 hours past collection
- Only measured on samples with less than 3 ppt salinity
- If total chlorine is above 0.10 mg/L, the free chlorine will be measured
- Debris, odor, and color is described only if observed in the sample

Sample Descriptions:

Pore water

Initial QC: AD 11/16/18
Final Review: JW 1/21/19

Test Organism: NA Dilution Water: Nat-SW, Art-SW, RW, DMW, Other Salinity: 32ppt
Additional Control: Salinity

Ⓟ See sediment sample check in

Day 0 Porewater Sample Check-In: Effluent/Water

Wood Environmental Toxicology Lab
4905 Morena Blvd, Ste. 1304
San Diego, CA 92117

Client: Ance / Wood
Project Name: RIMP
Test ID Numbers: 18-08-025 to -041

Sample ID:	18-10140	18-10141	18-10142	18-10143	18-10144
Sample Number:	2018-50081	2018-50082	2018-50083	2018-50084	2018-50085
Collection Date/Time:					
Receipt Date/Time:					
Total Sample Volume (L):					
Receipt Temp (°C):					
Appropriate Temp (V/N):					
pH (units):	7.07	7.40	7.24	7.13	7.26
DO (mg/L):	-	-	-	-	-
Conductivity (µS/cm):	-	-	-	-	-
Salinity (ppt):	33.1	33.1	33.2	33.8	32.9
Alkalinity (mg/L):	-	-	-	-	-
Hardness (mg/L):	-	-	-	-	-
Total Chlorine (mg/L):	-	-	-	-	-
Free Chlorine (mg/L):	-	-	-	-	-
Technician Initials:	SW	SW	SW	SW	SW

Notes:

- Temperature should be 0 - 6°C if received > 24 hours past collection
- Only measured on samples with less than 3 ppt salinity
- If total chlorine is above 0.10 mg/L, the free chlorine will be measured
- Debris, odor, and color is described only if observed in the sample

Sample Descriptions:

Porewaters

Test Organism: N/A

Dilution Water: Nat-SW, Art-SW, RW, DMW, Other

Salinity

30 ppt

Additional Control:

Salinity

Initial QC: AD 11/16/18

Final Review: SW 11/21/19

@ See sediment sample check in

Oxygenator

Unionized Ammonia Calculation for Pressure of 1 atm										
Input 'Shaded' data										
Log Number	Beaker	Day	Dilution	Total Ammonia (mg/L)	Temp (C)	Salinity (ppt)	pH	Temp (K)	I	Station
Lab Control										
B18-10124	0		0	< 0.5	14.5	32.1	7.63	287.66	7.11	0
B18-10126	0		0	< 0.5	14.4	32.2	7.62	287.56	7.13	0
B18-10127	0		0	< 0.5	14.4	32.3	7.64	287.56	7.15	0
B18-10132	0		0	< 0.5	14.4	32.3	7.62	287.56	7.15	0
B18-10133	0		0	< 0.5	14.3	32.2	7.72	287.46	7.13	0
B18-10136	0		0	< 0.5	14.2	32.3	7.65	287.36	7.15	0
B18-10137	0		0	0.9	14.3	32.2	7.73	287.46	7.13	0
B18-10139	0		0	1.1	14.3	32.3	7.66	287.46	7.15	0
B18-10140	0		0	< 0.5	14.5	32.2	7.63	287.66	7.13	0
B18-10141	0		0	< 0.5	14.1	32.2	7.63	287.26	7.13	0
B18-10142	0		0	0.5	14.1	32.3	7.65	287.26	7.15	0
B18-10034	0		0	0.5	14.1	32.3	7.63	287.26	7.15	0
B18-10035	0		0	0.6	14.1	32.3	7.63	287.26	7.15	0
B18-10036	0		0	0.5	14.1	32.4	7.62	287.26	7.17	0
B18-10143	0		0	< 0.5	14.1	32.3	7.64	287.26	7.15	0
B18-10144	0		0	0.5	14.1	32.3	7.63	287.26	7.15	0
B18-10039	0		0	< 0.5	14.3	32.4	7.62	287.46	7.17	0
Grain Size Control	0		0	< 0.5	14.4	32.3	7.75	287.56	7.15	0
Lab Control										
B18-10124	10		10	< 0.5	15	31.9	7.77	288.16	7.07	0
B18-10126	10		10	< 0.5	15	32.5	7.74	288.16	7.20	0
B18-10127	10		10	< 0.5	15	32.6	7.68	288.16	7.22	0
B18-10132	10		10	< 0.5	14.9	32.8	7.71	288.06	7.26	0
B18-10133	10		10	2.1	14.8	32.7	7.73	287.96	7.24	0
B18-10136	10		10	< 0.5	14.8	32.8	7.76	287.96	7.26	0
B18-10137	10		10	0.6	14.7	32.6	7.75	287.86	7.22	0
B18-10139	10		10	0.5	14.7	32.7	7.70	287.86	7.24	0
B18-10140	10		10	1.1	14.7	32.7	7.68	287.86	7.24	0
B18-10141	10		10	< 0.5	14.7	32.7	7.72	287.86	7.24	0
B18-10142	10		10	< 0.5	14.6	32.6	7.73	287.76	7.22	0
B18-10034	10		10	0.9	14.7	32.7	7.69	287.86	7.24	0
B18-10035	10		10	< 0.5	14.6	32.7	7.67	287.76	7.24	0
B18-10036	10		10	< 0.5	14.6	32.7	7.65	287.76	7.24	0
B18-10143	10		10	0.5	14.6	32.8	7.66	287.76	7.26	0
B18-10144	10		10	< 0.5	14.5	32.7	7.68	287.66	7.24	0
B18-10039	10		10	< 0.5	14.5	32.6	7.66	287.66	7.22	0
Grain Size Control	10		10	< 0.5	14.7	32.8	7.67	287.86	7.26	0
				1.8	14.4	32.6	7.63	287.56	7.22	0

Day 0 Porewater

Unionized Ammonia Calculation for Pressure of 1 atm															
Input 'Shaded' data															
Log Number	Beaker	Day	Dilution	Total Ammonia		Salinity		pH	Temp (K)	I		Unionized Ammonia	D.O. (mg/L)	Beaker Num.	Station
				(mg/L)	Temp (C)	(ppt)				Rounded	pK				
B18-10124	0	PW	0	5.6	14.4	32.9	7.00	287.56	7.28	7	9.33	0.012		0	
B18-10126	0	PW	0	4	14.4	33.6	7.17	287.56	7.43	7	9.33	0.013		0	
B18-10127	0	PW	0	0.5	14.4	33.3	7.46	287.56	7.37	7	9.33	0.003		0	
B18-10132	0	PW	0	9.5	14.3	30.0	7.50	287.46	6.66	7	9.33	0.064		0	
B18-10133	0	PW	0	4.9	14.2	31.8	7.47	287.36	7.05	7	9.33	0.030		0	
B18-10136	0	PW	0	5	14.3	33.2	7.34	287.46	7.34	7	9.33	0.023		0	
B18-10137	0	PW	0	5	14.3	32.0	7.30	287.46	7.09	7	9.33	0.021		0	
B18-10139	0	PW	0	6.1	14.3	32.3	7.09	287.46	7.15	7	9.33	0.016		0	
B18-10140	0	PW	0	5.5	14.5	33.1	7.07	287.66	7.32	7	9.33	0.014		0	
B18-10141	0	PW	0	4.8	14.1	33.1	7.40	287.26	7.32	7	9.33	0.025		0	
B18-10142	0	PW	0	6.3	14.1	33.2	7.24	287.26	7.34	7	9.33	0.023		0	
B18-10034	0	PW	0	5.9	14.1	33.5	7.22	287.26	7.41	7	9.33	0.020		0	
B18-10035	0	PW	0	5.1	14.1	33.8	7.13	287.26	7.47	7	9.33	0.014		0	
B18-10036	0	PW	0	5.9	14.1	32.9	7.26	287.26	7.28	7	9.33	0.022		0	
B18-10143	0	PW	0	4.8	14.1	32.5	7.30	287.26	7.20	7	9.33	0.020		0	
B18-10144	0	PW	0	5.2	14.1	32.5	7.29	287.26	7.20	7	9.33	0.021		0	
B18-10039	0	PW	0	5.0	14.3	32.3	7.09	287.46	7.15	7	9.33	0.013		0	

Amphipod Batch #6

8/10/18

Survival Counts for 10 day Amphipod Test

Client: AMEC/WOOD

Project ID: RHMP - South SD Bay 8/10/18

Species *Eohaustorius estuarius*

Test No. 18-08-053 to 18-08-063

Sample ID	Rand #	Survival Counts		% Survival	Mean % Survival
		Number Added	Number Alive (Day 10)		
Lab Control	35	20	19	95	96.0
	50	20	19	95	
	4	20	20	100	
	7	20	19	95	
	21	20	19	95	
B18-10037	46	20	20	100	96.0
	48	20	18	90	
	12	20	18	90	
	18	20	20	100	
	34	20	20	100	
B18-10038	23	20	20	100	99.0
	36	20	20	100	
	44	20	20	100	
	40	20	20	100	
	42	20	19	95	
B18-10041	27	20	20	100	97.0
	20	20	20	100	
	37	20	18	90	
	51	20	20	100	
	43	20	19	95	
B18-10179	14	20	20	100	95.0
	32	20	18	90	
	19	20	20	100	
	22	20	19	95	
	24	20	18	90	
B18-10180	38	20	17	85	93.0
	25	20	20	100	
	5	20	20	100	
	17	20	17	85	
	31	20	19	95	
B18-10181	A	20	19	95	94.0
	B	20	20	100	
	C	20	18	90	
	D	20	20	100	
	E	20	17	85	

Comments:

QC Check:

SL 10/26/18

Final Review:

W H 1/18/19

Amec Foster Wheeler Environmental Lab, 4905 Morena Blvd, Ste. 1304, San Diego, CA 92117

Survival Counts for 10 day Amphipod Test

Client: AMEC/WOOD

Project ID: RHMP - Central SD Bay 8/3/18

Species *Eohaustorius estuarius*

Test No. 18-08-025 to 18-08-041

Sample ID	Rand #	Survival Counts		% Survival	Mean % Survival
		Number Added	Number Alive (Day 10)		
B18-10042	55	20	18	90	92.0
	33	20	19	95	
	1	20	19	95	
	8	20	19	95	
	53	20	17	85	
B18-10085	47	20	19	95	97.0
	29	20	20	100	
	54	20	20	100	
	10	20	20	100	
	2	20	18	90	
B18-10086	15	20	18	90	90.0
	3	20	16	80	
	52	20	18	90	
	49	20	18	90	
	41	20	20	100	
B18-10087	11	20	18	90	87.0
	30	20	18	90	
	28	20	20	100	
	6	20	16	80	
	13	20	15	75	
B18-10088	45	20	14	70	81.0
	16	20	19	95	
	39	20	18	90	
	9	20	14	70	
	26	20	16	80	
Grain Size Control	A	20	20	100	96.0
	B	20	20	100	
	C	20	18	90	
	D	20	19	95	
	E	20	19	95	

QC Check: SC 10/26/18

Final Review: SW 1/18/19

Unpaired t test		
1	Table Analyzed	Transform of RHMP 8.10 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column B	B18-10037
6		
7	Unpaired t test	
8	P value	0.3006
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.5441 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.388 ± 0.0431, n=5
16	Mean ± SEM of column B	1.436 ± 0.07636, n=5
17	Difference between means	-0.04771 ± 0.08769
18	95% confidence interval	-0.2499 to 0.1545
19	R squared (eta squared)	0.03568
20		
21	F test to compare variances	
22	F, DFn, Dfd	3.139, 4, 4
23	P value	0.2939
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 8.10 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column C	B18-10038
6		
7	Unpaired t test	
8	P value	0.0333
9	P value summary	*
10	Significantly different (P < 0.05)?	Yes
11	One- or two-tailed P value?	One-tailed
12	t, df	t=2.121 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.388 ± 0.0431, n=5
16	Mean ± SEM of column C	1.518 ± 0.0431, n=5
17	Difference between means	-0.1293 ± 0.06096
18	95% confidence interval	-0.2699 to 0.01126
19	R squared (eta squared)	0.36
20		
21	F test to compare variances	
22	F, DFn, Dfd	1, 4, 4
23	P value	>0.9999
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 8.10 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column D	B18-10041
6		
7	Unpaired t test	
8	P value	0.2110
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.8463 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.388 ± 0.0431, n=5
16	Mean ± SEM of column D	1.455 ± 0.06634, n=5
17	Difference between means	-0.06696 ± 0.07912
18	95% confidence interval	-0.2494 to 0.1155
19	R squared (eta squared)	0.08217
20		
21	F test to compare variances	
22	F, DFn, Dfd	2.369, 4, 4
23	P value	0.4240
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 8.10 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column E	B18-10179
6		
7	Unpaired t test	
8	P value	0.4785
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.05563 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.388 ± 0.0431, n=5
16	Mean ± SEM of column E	1.393 ± 0.07072, n=5
17	Difference between means	-0.004608 ± 0.08282
18	95% confidence interval	-0.1956 to 0.1864
19	R squared (eta squared)	0.0003868
20		
21	F test to compare variances	
22	F, DFn, Dfd	2.692, 4, 4
23	P value	0.3607
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 8.10 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column F	B18-10180
6		
7	Unpaired t test	
8	P value	0.3985
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.2659 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.388 ± 0.0431, n=5
16	Mean ± SEM of column F	1.363 ± 0.0868, n=5
17	Difference between means	0.02577 ± 0.09691
18	95% confidence interval	-0.1977 to 0.2493
19	R squared (eta squared)	0.008762
20		
21	F test to compare variances	
22	F, DFn, Dfd	4.055, 4, 4
23	P value	0.2038
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 8.10 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column G	B18-10181
6		
7	Unpaired t test	
8	P value	0.4549
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.117 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.388 ± 0.0431, n=5
16	Mean ± SEM of column G	1.378 ± 0.07953, n=5
17	Difference between means	0.01058 ± 0.09046
18	95% confidence interval	-0.198 to 0.2192
19	R squared (eta squared)	0.001708
20		
21	F test to compare variances	
22	F, DFn, Dfd	3.405, 4, 4
23	P value	0.2624
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 8.10 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column H	B18-10042
6		
7	Unpaired t test	
8	P value	0.0597
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=1.743 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.388 ± 0.0431, n=5
16	Mean ± SEM of column H	1.292 ± 0.035, n=5
17	Difference between means	0.09679 ± 0.05552
18	95% confidence interval	-0.03125 to 0.2248
19	R squared (eta squared)	0.2753
20		
21	F test to compare variances	
22	F, DFn, Dfd	1.517, 4, 4
23	P value	0.6964
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 8.10 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column I	B18-10085
6		
7	Unpaired t test	
8	P value	0.2110
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.8463 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.388 ± 0.0431, n=5
16	Mean ± SEM of column I	1.455 ± 0.06634, n=5
17	Difference between means	-0.06696 ± 0.07912
18	95% confidence interval	-0.2494 to 0.1155
19	R squared (eta squared)	0.08217
20		
21	F test to compare variances	
22	F, DFn, Dfd	2.369, 4, 4
23	P value	0.4240
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 8.10 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column J	B18-10086
6		
7	Unpaired t test	
8	P value	0.1283
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=1.222 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.388 ± 0.0431, n=5
16	Mean ± SEM of column J	1.283 ± 0.07468, n=5
17	Difference between means	0.1054 ± 0.08623
18	95% confidence interval	-0.09348 to 0.3042
19	R squared (eta squared)	0.1573
20		
21	F test to compare variances	
22	F, DFn, Dfd	3.002, 4, 4
23	P value	0.3122
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 8.10 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column K	B18-10087
6		
7	Unpaired t test	
8	P value	0.0891
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=1.476 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.388 ± 0.0431, n=5
16	Mean ± SEM of column K	1.243 ± 0.08884, n=5
17	Difference between means	0.1457 ± 0.09875
18	95% confidence interval	-0.08197 to 0.3734
19	R squared (eta squared)	0.214
20		
21	F test to compare variances	
22	F, DFn, Dfd	4.249, 4, 4
23	P value	0.1901
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 8.10 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column L	B18-10088
6		
7	Unpaired t test	
8	P value	0.0080
9	P value summary	**
10	Significantly different (P < 0.05)?	Yes
11	One- or two-tailed P value?	One-tailed
12	t, df	t=3.046 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.388 ± 0.0431, n=5
16	Mean ± SEM of column L	1.137 ± 0.07049, n=5
17	Difference between means	0.2516 ± 0.08262
18	95% confidence interval	0.0611 to 0.4422
19	R squared (eta squared)	0.5369
20		
21	F test to compare variances	
22	F, DFn, Dfd	2.674, 4, 4
23	P value	0.3638
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 8.10 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column M	Grain Size Control
6		
7	Unpaired t test	
8	P value	0.3815
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.312 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.388 ± 0.0431, n=5
16	Mean ± SEM of column M	1.412 ± 0.06314, n=5
17	Difference between means	-0.02386 ± 0.07645
18	95% confidence interval	-0.2002 to 0.1524
19	R squared (eta squared)	0.01202
20		
21	F test to compare variances	
22	F, DFn, Dfd	2.146, 4, 4
23	P value	0.4778
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Survival Counts for 10day Amphipod Test

Client: Amec FW

Test Species: *E. estuarius*

Project ID: RHMP

Start Date/Time: 8/8/2018 1330

Test No. 18-08-053 to 18-08-063

End Date/Time: 8/18/2018 1035

Rand #	Survival Counts		Final Weights (Growth)		
	Start (Day 0)	End (Day 10)	Pan Weight	Pan + Organism Weight	Final Weight (per organism)
1	20	19			
2	20	18			
3	20	16			
4	20	20			
5	20	20			
6	20	16			
7	20	19			
8	20	19			
9	20	14	14		
10	20	20			
11	20	18			
12	20	18			
13	20	15			
14	20	20			
15	20	18			
16	20	19	19		
17	20	17			
18	20	20			
19	20	20			
20	20	20			
21	20	19			
22	20	19			
23	20	20			
24	20	19			
25	20	20			
26	20	16	16		
27	20	20			
28	20	20			
29	20	20			
30	20	18			
31	20	19			
32	20	18			
33	20	19			
34	20	20			
35	20	19	19		
Tech Initials:	AG	AG/jw	AD		

Ammonia Collected: Test Start: 20

Test End: AB

Comments:

QC Check: AD 8/31/18

Final Review: jw 1/18/19

Survival Counts for 10day Amphipod Test

Client: Amec FW

Test Species: *E. estuarius*

Project ID: RHMP

Start Date/Time: 8/8/2018 1330

Test No. 18-08-053 to 18-08-063 End Date/Time: 8/18/2018 1035

3 End Date/Time: 8/18/2018 1035

Rand #	Survival Counts		Final Weights (Growth)		
	Start (Day 0)	End (Day 10)	Pan Weight	Pan + Organism Weight	Final Weight (per organism)
36	20	20			
37	20	18			
38	20	17	17		
39	20	18			
40	20	20			
41	20	20			
42	20	19			
43	20	19			
44	20	20			
45	20	14			
46	20	in 19 20	20		
47	20	19			
48	20	18			
49	20	18			
50	20	20 19			
51	20	20			
52	20	18			
53	20	17	17		
54	20	20			
55	20	18			
GSC - A	20	20			
GSC - B	20	20			
GSC - C	20	18			
GSC - D	20	19			
GSC - E	20	in 20 19	19		
10181A	20	19			
10181B	20	20			
10181C	20	18			
10181D	20	20			
10181E	20	17			
tech Initials:	AG	Ab/SW	AD		

Tech Initials:Ammonia Collected: Test Start: 2w

Test End: AB

Comments:

QC Check: AD 8/31/18

Final Review: JW 1/18/19

Amec FW
RHMP Sediment Testing
Random Numbers

SAMPLE ID	Rand#
Lab Control	35
	50
	4
	7
	21
B18-10037	46
	48
	12
	18
	34
B18-10038	23
	36
	44
	40
	42
B18-10041	27
	20
	37
	51
	43
B18-10179	14
	32
	19
	22
	24
B18-10180	38
	25
	5
	17
	31

QC Check - Amphipod: AC

Amec FW
RHMP Sediment Testing
Random Numbers

SAMPLE ID	Rand#
B18-10042	55 33 1 8 53
B18-10085	47 29 54 10 2
B18-10086	15 3 52 49 41
B18-10087	11 30 28 6 13
B18-10088	45 16 39 9 26
Grain Size Control	A B C D E

QC Check - Amphipod: AG

B18-10181	A B C D E
-----------	-----------------------

Water Quality for 10day Amphipod Test

Client: Amec FW

Project ID: RHMP

Test No. 18-08-053 to 18-08-063

Test Species: *E. estuarius*

Start Date/Time: 8/8/2018 1330

End Date/Time: 8/18/2018 1635

20

Sample ID	Water Quality Measurements (Day)											
	Parameter	0	1	2	3	4	5	6	7	8	9	10
Lab Control	Temp. (°C)	15.1	15.3	15.2	14.7	15.1	15.3	15.2	15.4	14.9	15.0	15.4
	Salinity (ppt)	32.2	32.0	32.1	32.5	32.2	31.8	31.7	31.9	32.4	32.4	32.2
	pH (units)	7.63	7.62	7.64	7.68	7.56	7.65	7.39	7.59	7.66	7.76	7.70
	DO (mg/L)	8.3	8.1	8.2	8.3	8.3	8.3	8.3	8.2	8.3	8.3	8.3
B18-10037	Temp. (°C)	14.9	15.4	15.2	14.7	15.2	15.2	15.0	15.3	14.9	14.7	15.4
	Salinity (ppt)	32.0	31.9	32.0	32.3	32.2	31.8	31.8	32.2	32.6	32.6	32.5
	pH (units)	7.60	7.64	7.65	7.66	7.57	7.64	7.54	7.59	7.65	7.77	7.72
	DO (mg/L)	8.3	8.1	8.2	8.3	8.3	8.2	8.3	8.3	8.3	8.3	8.3
B18-10038	Temp. (°C)	15.0	15.2	15.1	14.8	14.9	15.1	15.0	14.9	15.0	14.7	15.1
	Salinity (ppt)	32.1	32.0	32.3	32.3	32.2	31.9	31.9	32.3	32.7	32.7	32.6
	pH (units)	7.60	7.65	7.66	7.65	7.63	7.71	7.67	7.65	7.64	7.80	7.79
	DO (mg/L)	8.3	8.2	8.1	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3
B18-10041	Temp. (°C)	15.1	15.2	15.3	14.7	15.1	15.0	15.0	15.1	15.0	14.7	15.0
	Salinity (ppt)	32.3	32.3	32.4	32.6	32.6	32.2	32.3	32.8	33.0	33.0	33.0
	pH (units)	7.62	7.65	7.65	7.63	7.64	7.74	7.71	7.78	7.74	7.81	7.85
	DO (mg/L)	8.2	8.2	8.2	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3
B18-10179	Temp. (°C)	15.1	15.1	15.2	14.7	14.8	15.0	14.9	14.8	14.7	14.9	14.9
	Salinity (ppt)	32.1	32.1	32.2	32.4	32.3	32.0	32.0	32.5	32.8	32.9	32.8
	pH (units)	7.63	7.73	7.75	7.71	7.68	7.72	7.76	7.78	7.78	7.87	7.92
	DO (mg/L)	8.2	8.2	8.1	8.3	8.2	8.2	8.3	8.3	8.3	8.3	8.3
B18-10180	Temp. (°C)	15.2	15.2	15.3	14.7	14.8	14.8	14.9	14.9	14.9	14.9	14.9
	Salinity (ppt)	32.1	32.2	32.3	32.5	32.3	32.4	32.0	32.4	32.8	32.8	32.7
	pH (units)	7.61	7.74	7.72	7.71	7.66	7.66	7.71	7.76	7.70	7.85	7.91
	DO (mg/L)	8.2	8.2	8.1	8.3	8.2	8.3	8.3	8.3	8.3	8.3	8.3
B18-10181	Temp. (°C)	15.1	15.1	15.2	15.0	15.1	14.7	14.9	14.8	14.7	14.6	14.8
	Salinity (ppt)	32.1	32.1	32.2	32.3	32.3	31.9	31.9	32.4	32.7	32.8	32.7
	pH (units)	7.60	7.73	7.70	7.67	7.66	7.64	7.69	7.72	7.67	7.78	7.87
	DO (mg/L)	8.2	8.2	8.1	8.3	8.2	8.3	8.3	8.3	8.3	8.3	8.3
Tech Initials (Initial):		SW	SW	AG	SW	AD	AD	AD	AG	AD	AD	AG

Date Animals Received: NAS 8/8/18

Age or Size of Animals: 3-5mm

Comments: Ⓐ no reading taken; technician error

QC Check: AD 8/31/18

Final Review: SW 1/18/19

Water Quality for 10day Amphipod Test

Client: Amec FW

Project ID: RHMP

Test No. 18-08-053 to 18-08-063

Test Species: *E. estuarius*

Start Date/Time: 8/8/2018 1330

End Date/Time: 8/18/2018 1035

Sample ID	Water Quality Measurements (Day)											
	Parameter	0	1	2	3	4	5	6	7	8	9	10
B18-10042	Temp. (°C)	15.0	15.1	15.2	14.8	14.8	14.7	14.9	14.9	14.9	14.6	14.8
	Salinity (ppt)	32.2	32.3	32.4	32.4	32.5	32.1	32.1	32.6	32.9	33.0	32.9
	pH (units)	7.60	7.72	7.73	7.71	7.66	7.65	7.69	7.71	7.65	7.78	7.86
	DO (mg/L)	8.2	8.2	8.1	8.1	8.2	8.3	8.3	8.3	8.3	8.3	8.3
B18-10085	Temp. (°C)	15.0	15.0	15.2	15.0	15.0	14.6	14.8	14.7	14.9	14.8	14.8
	Salinity (ppt)	32.2	32.3	32.4	32.3	32.6	32.2	32.2	32.7	33.0	33.1	32.9
	pH (units)	7.60	7.75	7.73	7.67	7.69	7.67	7.71	7.73	7.66	7.79	7.88
	DO (mg/L)	8.2	8.3	8.2	8.1	8.2	8.3	8.3	8.3	8.3	8.3	8.3
B18-10086	Temp. (°C)	14.9	15.0	15.1	15.1	14.7	14.6	14.8	14.7	14.8	14.7	14.8
	Salinity (ppt)	32.0	32.1	32.2	32.2	32.3	32.1	32.1	32.4	32.7	32.7	32.7
	pH (units)	7.61	7.76	7.74	7.67	7.68	7.68	7.72	7.74	7.67	7.80	7.88
	DO (mg/L)	8.2	8.3	8.1	8.2	8.3	8.3	8.3	8.3	8.3	8.3	8.3
B18-10087	Temp. (°C)	14.9	14.9	14.9	14.8	14.9	14.4	14.7	14.6	14.7	14.5	14.5
	Salinity (ppt)	32.1	32.3	32.2	32.4	32.5	32.3	32.3	32.8	33.2	33.2	33.2
	pH (units)	7.62	7.76	7.73	7.68	7.66	7.67	7.71	7.73	7.66	7.79	7.88
	DO (mg/L)	8.3	8.3	8.1	8.3	8.3	8.3	8.3	8.3	8.3	8.4	8.3
B18-10088	Temp. (°C)	14.8	14.9	14.8	14.7	14.8	14.5	14.7	14.7	14.7	14.6	14.5
	Salinity (ppt)	31.9	32.1	32.1	32.3	32.4	32.0	32.0	32.5	32.8	32.8	32.8
	pH (units)	7.60	7.75	7.74	7.70	7.65	7.67	7.71	7.73	7.65	7.79	7.88
	DO (mg/L)	8.3	8.3	8.2	8.3	8.3	8.3	8.3	8.3	8.4	8.4	8.3
Grain Size Control	Temp. (°C)	14.7	14.8	14.8	14.6	14.7	14.4	14.7	14.5	14.6	14.6	14.6
	Salinity (ppt)	32.2	32.4	32.3	32.5	32.6	32.2	32.2	32.7	33.0	33.1	33.0
	pH (units)	7.62	7.73	7.71	7.68	7.65	7.67	7.71	7.70	7.64	7.79	7.90
	DO (mg/L)	8.3	8.3	8.2	8.3	8.3	8.3	8.3	8.3	8.4	8.3	8.3
	Temp. (°C)											
	Salinity (ppt)											
	pH (units)											
	DO (mg/L)											

Tech Initials (Initial):

2V 2W 46 2W AD AD AD AG AD AD X

Date Animals Received: NAS 8/8/18

Age or Size of Animals: 7-5 mm

Comments:

QC Check: AD 8/31/18

Final Review: 2W 1/18/19

Day 0 Pore water Sample Check-In: Effluent/Water

Amec Foster Wheeler - Environmental Lab
4905 Morena Blvd, Ste. 1304
San Diego, CA 92117

Client: Amec / Wood
Project Name: RMMP
Test ID Numbers: 18-08-053 to 18-08-063

Sample ID:	18-10037	18-10038	18-10041	18-10179	18-10180	18-10181	18-10042	18-10085
Sample Number:	-	-	-	-	-	-	-	-
Collection Date/Time:								
Receipt Date/Time:								
Total Sample Volume:								
Receipt Temperature:								
Appropriate Temp (Y/N) ¹ :								
pH (units):	7.24	7.62	7.28	7.34	7.33	7.22	7.34	7.35
DO (mg/L):								
Conductivity (µS/cm) ² :								
Salinity (ppt):	34.2	34.2	34.5	34.1	33.5	33.8	34.5	33.6
Alkalinity (mg/L):								
Hardness (mg/L) ² :								
Total Chlorine (mg/L) ³ :								
Free Chlorine (mg/L) ³ :								
Technician Initials:	sw	sw	sw	sw	sw	sw	sw	sw

Notes:

¹ Temperature should be 0 - 6°C if received > 24 hours past collection

² Only measured on samples with less than 3 ppt salinity

³ If total chlorine is above 0.10 mg/L, the free chlorine will be measured

⁴ Debris, odor, and color is described only if observed in the sample

Sample Descriptions⁴:

Test Organism: _____ Dilution Water: Lab SW, Art SW, RW, DMW, Other _____ Salinity _____

Additional Control: _____ Salinity _____

Initial QC: sw 1/18/19

Final Review: sw 4/5/19

Day 0 Porcupine Sample Check-In: Effluent/Water

Amec Foster Wheeler - Environmental Lab
4905 Morena Blvd, Ste. 1304
San Diego, CA 92117

Client: Amec / Wood
Project Name: RHMP
Test ID Numbers: 18-08-053 to 18-08-063

Sample ID:	1318-10086	1318-10087	1318-10088		
Sample Number:	-	-	-		
Collection Date/Time:					
Receipt Date/Time:					
Total Sample Volume:					
Receipt Temperature:					
Appropriate Temp (Y/N) ¹ :					
pH (units):	7.42	7.32	7.21		
DO (mg/L):					
Conductivity (µS/cm) ² :					
Salinity (ppt):	33.2	34.4	34.2		
Alkalinity (mg/L):					
Hardness (mg/L) ² :					
Total Chlorine (mg/L) ³ :					
Free Chlorine (mg/L) ³ :					
Technician Initials:	SW	SW	SW		

Notes:

¹ Temperature should be 0 - 6°C if received > 24 hours past collection

² Only measured on samples with less than 3 ppt salinity

³ If total chlorine is above 0.10 mg/L, the free chlorine will be measured

⁴ Debris, odor, and color is described only if observed in the sample

Sample Descriptions:

Test Organism: _____ Dilution Water: Lab SW, Art SW, RW, DMW, Other _____ Salinity _____

Additional Control: _____ Salinity _____

Initial QC: SW 1/15/19

Final Review: SC 4/5/19

Ammonia Subsample Analysis

Client: Amec FW
Project ID: RHMP - Overlying Water
Test No.: 18-08-653 to - 063

Test Species: *E. estuarius*
Start Date: 8/8/2018
End Date: 8/16/2018

DI Blank: 0.0

10 mg/L Ammonia Stock: 9.0 mg/L as NH_3

[illegible]

QC Check: AD 11/14/18

Final Review: 2w 1/18/19

Ammonia Subsample Analysis

Client: Amec FW
Project ID: RHMP - Powerwater
Test No.: 18-08-053 to -063

Test Species: *E. estuarius*
Start Date: 8/10/2018
End Date: 8/20/2018

DI Blank: 0.0

10 mg/L Ammonia Stock: $7.2 \times 1.22 = 8.8 \text{ mg/L as } \text{NH}_3$

[illegible]

QC Check: AD 11/19/18

Final Review: JW 1/18/19

Analyst: AB 8/17/18

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Final Reviewed: 11/18/19

Amphipod Batch #7

8/22/18

Survival Counts for 10 day Amphipod Test

Client: AMEC/WOOD

Project ID: RHMP - South SD Bay 8/22/18

Species *Eohaustorius estuarius*

Test No. 18-08-082 to 18-08-084

Sample ID	Rand #	Survival Counts		% Survival	Mean % Survival
		Number Added	Number Alive (Day 10)		
Lab Control	14	20	15	75	91.0
	6	20	19	95	
	17	20	19	95	
	19	20	19	95	
	1	20	19	95	
B18-10040	12	20	19	95	90.0
	7	20	18	90	
	11	20	17	85	
	16	20	18	90	
	2	20	18	90	
B18-10043	5	20	18	90	87.0
	10	20	19	95	
	3	20	17	85	
	18	20	18	90	
	15	20	15	75	
B18-10044	20	20	14	70	81.0
	9	20	16	80	
	8	20	20	100	
	13	20	17	85	
	4	20	14	70	
Grain Size Control	A	20	17	85	92.0
	B	20	19	95	
	C	20	19	95	
	D	20	19	95	
	E	20	18	90	

Comments:

QC Check: SC 10/26/18

Final Review: SW 1/17/19

Unpaired t test		
1	Table Analyzed	Transform of RHMP 8.22 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column B	B18-10040
6		
7	Unpaired t test	
8	P value	0.3165
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.4965 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.286 ± 0.05962, n=5
16	Mean ± SEM of column B	1.253 ± 0.02734, n=5
17	Difference between means	0.03256 ± 0.06559
18	95% confidence interval	-0.1187 to 0.1838
19	R squared (eta squared)	0.02989
20		
21	F test to compare variances	
22	F, DFn, Dfd	4.756, 4, 4
23	P value	0.1601
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 8.22 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column C	B18-10043
6		
7	Unpaired t test	
8	P value	0.1872
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.9405 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.286 ± 0.05962, n=5
16	Mean ± SEM of column C	1.213 ± 0.04959, n=5
17	Difference between means	0.07293 ± 0.07754
18	95% confidence interval	-0.1059 to 0.2518
19	R squared (eta squared)	0.09956
20		
21	F test to compare variances	
22	F, DFn, Dfd	1.445, 4, 4
23	P value	0.7298
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 8.22 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column D	B18-10044
6		
7	Unpaired t test	
8	P value	0.1728
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=1.002 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.286 ± 0.05962, n=5
16	Mean ± SEM of column D	1.165 ± 0.105, n=5
17	Difference between means	0.121 ± 0.1207
18	95% confidence interval	-0.1574 to 0.3994
19	R squared (eta squared)	0.1115
20		
21	F test to compare variances	
22	F, DFn, Dfd	3.102, 4, 4
23	P value	0.2986
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 8.22 Amphipod
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column E	Grain Size Control
6		
7	Unpaired t test	
8	P value	0.4669
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.08581 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.286 ± 0.05962, n=5
16	Mean ± SEM of column E	1.292 ± 0.035, n=5
17	Difference between means	-0.005932 ± 0.06913
18	95% confidence interval	-0.1653 to 0.1535
19	R squared (eta squared)	0.0009197
20		
21	F test to compare variances	
22	F, DFn, Dfd	2.901, 4, 4
23	P value	0.3268
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Survival Counts for 10day Amphipod Test

Client: Amec FW

Test Species: *E. estuarius*

Project ID: RHMP

Start Date/Time: 8/22/2018

Test No. 18-08-082 to 18-08-084 Enc

End Date/Time: 9/1/2018

[illegible]Ammonia Collected: Test Start: AD

Test End: Ab

Comments:

QC Check: AD 11/14/18

Final Review: SW 1/17/19

Amec FW
RHMP Sediment Testing
Random Numbers

SAMPLE ID	Rand#
Lab Control 32 ppv	14 6 17 19 1
B18-10040	12 7 11 16 2
B18-10043	5 18 10 19 3 17 18 18 15 15
B18-10044 surv = 19	20. 9 8 13. 4.
Grain Size Control 32 ppv	A B C D E

QC Check - Amphipod: GM

Water Quality for 10day Amphipod Test

Client: Amec FW

Project ID: RHMP

Test No. 18-08-082 to 18-08-084

Test Species: *E. estuarius*

Start Date/Time: 8/22/2018

End Date/Time: 9/1/2018

1145

1515

Sample ID	Water Quality Measurements (Day)											
	Parameter	0	1	2	3	4	5	6	7	8	9	10
Lab Control 32 ppt	Temp. (°C)	15.1	15.1	15.3	15.2	15.1	15.1	15.3	15.2	15.3	15.5	15.3
	Salinity (ppt)	31.7	31.7	31.7	31.7	31.9	31.8	31.6	31.9	31.7	31.6	31.7
	pH (units)	7.68	7.66	7.67	7.69	7.68	7.68	7.66	7.75	7.73	7.64	7.70
	DO (mg/L)	8.3	8.3	8.2	8.2	8.2	8.3	8.2	8.3	8.3	8.3	8.2
B18-10040	Temp. (°C)	15.1	15.1	15.2	15.1	15.0	15.0	15.4	15.1	15.4	15.3	15.2
	Salinity (ppt)	31.9	31.9	31.9	32.0	32.0	32.1	31.9	32.1	32.1	32.0	32.1
	pH (units)	7.71	7.65	7.65	7.74	7.71	7.78	7.69	7.86	7.92	7.81	7.73
	DO (mg/L)	8.3	8.1	8.1	8.2	8.2	8.3	8.2	8.3	8.3	8.3	7.2
B18-10043	Temp. (°C)	15.1	15.1	15.1	15.0	15.0	15.0	15.1	15.1	15.1	15.1	15.0
	Salinity (ppt)	32.3	32.5	32.4	32.8	32.7	32.9	32.7	33.0	33.1	33.0	33.1
	pH (units)	7.74	7.68	7.67	7.80	7.78	7.78	7.68	7.86	7.91	7.79	7.82
	DO (mg/L)	8.3	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.3	8.2	8.1
B18-10044	Temp. (°C)	14.8	15.0	15.0	15.0	15.1	15.0	15.0	15.0	15.1	15.0	14.9
	Salinity (ppt)	32.1	32.3	32.4	32.5	32.5	32.6	32.4	32.7	32.7	32.7	32.8
	pH (units)	7.78	7.70	7.65	7.81	7.84	7.73	7.73	7.77	7.82	7.75	7.78
	DO (mg/L)	8.3	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.3	8.3	8.2
Grain Size Control	Temp. (°C)	15.1	15.0	15.0	15.0	15.1	15.0	15.0	15.1	15.1	14.9	14.9
	Salinity (ppt)	32.0	32.1	32.2	32.3	32.3	32.4	32.2	32.5	32.5	32.7	32.6
	pH (units)	7.75	7.68	7.65	7.78	7.85	7.75	7.69	7.82	7.88	7.70	7.79
	DO (mg/L)	8.3	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2
	Temp. (°C)											
	Salinity (ppt)											
	pH (units)											
	DO (mg/L)											
	Temp. (°C)											
	Salinity (ppt)											
	pH (units)											
	DO (mg/L)											

Tech Initials (Initial):

AD/AD AD AD AD AD AD AD AD AD AD AD AD

Date Animals Received: 8/16/18

Age or Size of Animals: 3-5 mm

Comments:

QC Check: AD 11/14/18

Final Review: JW 1/17/19

Sample Check-In: Effluent/Water

Amec Foster Wheeler - Environmental Lab
4905 Morena Blvd, Ste. 1304
San Diego, CA 92117

Client: Amec/Wood
Project Name: RMP
Sample ID: _____
Test ID No.: 18-08-074^{AD} to 18-08-084
082

Sample ID (or A, B, C):	<u>1318-10040</u>	<u>1318-10043</u>	<u>1318-10044</u>	
Sample Number:	<u>2018-80109</u>	<u>2018-80110</u>	<u>2018-80111</u>	
Collection Date & Time:	<u>8/14/18 1400</u>	<u>8/14/18 1030</u>	<u>8/14/18 620</u>	
Receipt Date & Time:	<u>8/14/18 1620</u>			
Total Sample Volume:	<u>4L</u>			
Receipt Temperature:	<u>10.0</u>	<u>8.0</u>	<u>10.0</u>	
Appropriate Temp (Yes/No) ¹ :	<u>7.27 Yes</u>	<u>Yes</u>	<u>Yes</u>	
pH (units):	<u>6.59</u>	<u>7.17</u>	<u>7.27</u>	
DO (mg/L):	<u>sw -</u>	<u>-</u>	<u>-</u>	
Conductivity (µS/cm) ² :	<u>-</u>	<u>-</u>	<u>-</u>	
Salinity (ppt):	<u>33.1</u>	<u>35.3</u>	<u>34.9</u>	
Alkalinity (mg/L):	<u>-</u>	<u>-</u>	<u>-</u>	
Hardness (mg/L) ² :	<u>-</u>	<u>-</u>	<u>-</u>	
Total Chlorine (mg/L) ³ :	<u>-</u>	<u>-</u>	<u>-</u>	
Free Chlorine (mg/L) ³ :	<u>-</u>	<u>-</u>	<u>-</u>	
Technician Initials:	<u>sw</u>	<u>sw</u>	<u>sw</u>	

Notes:

- ¹ Temperature should be 0 - 6°C if received > 24 hours past collection
² Only measured on samples with less than 3 ppt salinity
³ If total chlorine is above 0.10 mg/L, the free chlorine will be measured
⁴ Debris, odor, and color is described only if observed in the sample

Sample Descriptions⁴:

Porewater

Test Organism: <u>NA</u>	Dilution Water: Lab SW, Art SW, RW, DMW, Other _____	Salinity <u>32 ppt</u>
Additional Control: _____		Salinity _____
Test Organism: _____	Dilution Water: Lab SW, Art SW, RW, DMW, Other _____	Salinity _____
Additional Control: _____		Salinity _____
Test Organism: _____	Dilution Water: Lab SW, Art SW, RW, DMW, Other _____	Salinity _____
Additional Control: _____		Salinity _____

Additional Comments:

Initial QC: AD 11/14/18
Final Review: sw 1/17/19

[illegible]

Page 1

Final Review: 3w 1/17/19

Ammonia Subsample Analysis

Client: Amec FW
Project ID: RHMP
Test No.: 18-08-082 to -084

Test Species: *E. estuarius*
Start Date: 8/22/2018
End Date: 9/1/2018

DI Blank: 0.0

10 mg/L Ammonia Stock: 8.8 mg/L as NH_3

[illegible]

QC Check: AD 11/14/18

Final Review: SW 1/17/19

Amphipod Batch #8

10/10/18

Survival Counts for 10 day Amphipod Test

Client: AMEC/WOOD

Project ID: RHMP - South SD Bay 10/10/18

Species *Eohaustorius estuarius*

Test No. 18-09-026 AD 18-09-026

Sample ID	Rep	Survival Counts		% Survival	Mean % Survival
		Number Added	Number Alive (Day 10)		
Lab Control	27	20	20	100	97.0
	11	20	20	100	
	21	20	19	95	
	28	20	19	95	
	9	20	19	95	
B18-10200	50	20	16	80	82.0
	46	20	18	90	
	48	20	16	80	
	44	20	18	90	
	52	20	14	70	

Comments:

QC Check: SC 10/26/18

Final Review: SW 1/17/19

Unpaired t test	
1	Table Analyzed
2	Transform of RHMP 10.10 Amphipod
3	Column A
4	vs.
5	Column B
6	B18-10200
7	Unpaired t test
8	P value
9	P value summary
10	Significantly different (P < 0.05)?
11	One- or two-tailed P value?
12	t, df
13	
14	How big is the difference?
15	Mean ± SEM of column A
16	Mean ± SEM of column B
17	Difference between means
18	95% confidence interval
19	R squared (eta squared)
20	
21	F test to compare variances
22	F, DFn, Dfd
23	P value
24	P value summary
25	Significantly different (P < 0.05)?

Survival Counts for 10day Amphipod Test

Client: Amec FW

Project ID: RHMP-SDA South

Test No. 18-69-026

Test Species: *E. estuarius*

Start Date/Time: 10/10/2018 1300

End Date/Time: 10/20/2018 1230

[illegible]

Ammonia Collected: Test Start: 11:00

Test End: AB

Comments:

QC Check: AD 11/14/18

Final Review: sw 1/17/19

**Amec FW
RHMP
Random Numbers**

SAMPLE ID	Rand#
Lab Control	27
	11
	21
	28
	9
B18-10200	50
	46
	48
	44
	52

QC Check - Amphipod: SW

Water Quality for 10day Amphipod Test

Client: Amec FW

Test Species: *E. estuarius*

Project ID: RHMP - SD Bay South

Start Date/Time: 10/10/2018 1300

Test No. 18-09-026

End Date/Time: 10/20/2018 1230

Sample ID	Water Quality Measurements (Day)											
	Parameter	0	1	2	3	4	5	6	7	8	9	10
Lab Control	Temp. (°C)	14.60	15.3	15.2	15.2	15.2	15.0	15.0	14.8	15.0	15.5	15.3
	Salinity (ppt)	31.6	31.8	32.1	32.1	32.1	32.2	32.1	32.0	32.1	32.0	32.0
	pH (units)	7.95	7.81	7.77	7.61	7.74	7.75	7.80	7.78	7.84	7.75	7.73
	DO (mg/L)	8.23	8.3	8.2	8.2	8.3	8.3	8.3	8.3	8.4	8.3	8.4
B18-10200	Temp. (°C)	14.9	14.9	14.9	14.9	15.0	14.9	14.8	14.8	14.9	14.9	14.8
	Salinity (ppt)	31.8	31.8	32.0	32.0	31.9	32.0	32.0	32.1	32.1	32.1	32.1
	pH (units)	7.93	7.86	7.80	7.67	7.77	7.75	7.80	7.96	7.98	8.08	8.00
	DO (mg/L)	8.2	8.2	8.2	8.1	8.2	8.3	8.2	8.3	8.3	8.3	8.3
	Temp. (°C)											
	Salinity (ppt)											
	pH (units)											
	DO (mg/L)											
	Temp. (°C)											
	Salinity (ppt)											
	pH (units)											
	DO (mg/L)											
	Temp. (°C)											
	Salinity (ppt)											
	pH (units)											
	DO (mg/L)											
	Temp. (°C)											
	Salinity (ppt)											
	pH (units)											
	DO (mg/L)											
	Temp. (°C)											
	Salinity (ppt)											
	pH (units)											
	DO (mg/L)											

Tech Initials (Initial): AG AD AD AG AD JW AG AD AD AG AD

Date Animals Received: 10/19/18

Age or Size of Animals: 3-5mm

Comments:

QC Check: AD 11/14/18

Final Review: JW 1/17/19

Page 1

Final reviewed: 200 1/17/19

Sample Check-In: ^{Dry 0 Porewater} Effluent/Water _{SW}

Amec Foster Wheeler - Environmental Lab
4905 Morena Blvd, Ste. 1304
San Diego, CA 92117

Client: Amec FW / Wood
Project Name: RHMP
Sample ID: B18-10200
Test ID No.: 18-09-026

Sample ID (or A, B, C):	<u>B18-10200</u>			
Sample Number:	<u>2018-50132</u>			
Collection Date & Time:	<u>9/12/18 1240</u>			
Receipt Date & Time:	<u>9/12/18 1825</u>			
Total Sample Volume:	<u>—</u>			
Receipt Temperature:	<u>—</u>			
Appropriate Temp (Yes/No) ¹ :	<u>—</u>			
pH (units):	<u>7.64</u>			
DO (mg/L):	<u>—</u>			
Conductivity (µS/cm) ² :	<u>—</u>			
Salinity (ppt):	<u>32.1</u>			
Alkalinity (mg/L):	<u>—</u>			
Hardness (mg/L) ² :	<u>—</u>			
Total Chlorine (mg/L) ³ :	<u>—</u>			
Free Chlorine (mg/L) ³ :	<u>—</u>			
Technician Initials:	<u>SW</u>			

Notes:

- ¹ Temperature should be 0 - 6°C if received > 24 hours past collection
² Only measured on samples with less than 3 ppt salinity
³ If total chlorine is above 0.10 mg/L, the free chlorine will be measured
⁴ Debris, odor, and color is described only if observed in the sample

Sample Descriptions⁴:

Test Organism: _____	Dilution Water: Lab SW, Art SW, RW, DMW, Other _____	Salinity _____
Additional Control: _____		Salinity _____
Test Organism: _____	Dilution Water: Lab SW, Art SW, RW, DMW, Other _____	Salinity _____
Additional Control: _____		Salinity _____
Test Organism: _____	Dilution Water: Lab SW, Art SW, RW, DMW, Other _____	Salinity _____
Additional Control: _____		Salinity _____

Additional Comments:

Initial QC: AD 1/17/19
Final Review: SW 1/17/19

Ammonia Subsample Analysis

Client: Amec FW
Project ID: RHMP
Test No.: 18-09-026

Test Species: *E. estuarius*
 Start Date: 10/10/2018
 End Date: 10/20/2018

DI Blank: 0.0

10 mg/L Ammonia Stock: 8.5 mg/L as NH_3

[illegible]

QC Check: AD 1/17/19

Final Review: SW 1/17/19

APPENDIX C

Statistical Analyses and Raw Data Packages for Bivalve (*Mytilus*)

Sediment-Water Interface

Bivalve Batch #1

Lab Control #1

7/18/18

48hr Bivalve Development Results

Client: AMEC/WOOD

Project ID: RHMP - Dana Point & Oceanside

Species *Mytilus galloprovincialis*

Test No. 18-07-007 to 18-07-010; 18-07-015 to 18-07-018

Sample ID	Rand #	# Initial Embryos	# Counted	# Normal	Combined % Normal-Alive	Mean Combined % Normal-Alive
Lab Control #1	39	231	231	221	95.7	91.1
	3	215	210	190	88.4	
	11	215	187	176	81.9	
	16	234	234	224	95.7	
	34	215	213	202	94.0	
B18-10065	18	240	240	225	93.8	82.8
	32	215	196	184	85.6	
	10	215	181	167	77.7	
	9	215	164	156	72.6	
	21	215	185	182	84.7	
B18-10066	44	215	177	165	76.7	86.2
	2	215	213	205	95.3	
	42	215	176	171	79.5	
	1	257	257	248	96.5	
	41	215	184	178	82.8	
B18-10067	19	215	198	188	87.4	86.1
	29	224	224	212	94.6	
	17	215	175	165	76.7	
	33	215	197	188	87.4	
	45	215	186	181	84.2	
B18-10068	36	215	194	187	87.0	84.7
	22	215	209	200	93.0	
	31	215	170	162	75.3	
	40	215	189	182	84.7	
	15	215	191	179	83.3	
B18-10069	26	215	159	155	72.1	80.2
	24	215	169	159	74.0	
	4	215	166	160	74.4	
	37	215	214	205	95.3	
	43	215	194	183	85.1	

QC Check: AD 9/24/18

Final Review:

SW 1/2/19

48hr Bivalve Development Results

Client: AMEC/WOOD

Project ID: RHMP - Dana Point & Oceanside

Species *Mytilus galloprovincialis*

Test No. 18-07-007 to 18-07-010; 18-07-015 to 18-07-018

Sample ID	Rand #	# Initial Embryos	# Counted	# Normal	Combined % Normal-Alive	Mean Combined % Normal-Alive
B18-10070	6	215	207	193	89.8	87.1
	28	215	165	158	73.5	
	30	215	212	207	96.3	
	27	215	198	190	88.4	
	5	215	205	188	87.4	
B18-10071	14	215	183	177	82.3	81.5
	20	215	196	186	86.5	
	35	215	182	176	81.9	
	38	215	179	175	81.4	
	25	215	171	162	75.3	
B18-10072	7	215	180	174	80.9	86.5
	12	215	192	179	83.3	
	8	215	194	182	84.7	
	13	233	233	221	94.8	
	23	215	203	191	88.8	

QC Check: AD 9/24/18

Final Review:

sw 1/2/19

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.18 Bivalve #1
2		
3	Column A	Lab Control #1
4	vs.	vs.
5	Column B	B18-10065
6		
7	Unpaired t test	
8	P value	0.0498
9	P value summary	*
10	Significantly different (P < 0.05)?	Yes
11	One- or two-tailed P value?	One-tailed
12	t, df	t=1.862 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.28 ± 0.04506, n=5
16	Mean ± SEM of column B	1.154 ± 0.05093, n=5
17	Difference between means	0.1267 ± 0.068
18	95% confidence interval	-0.03016 to 0.2835
19	R squared (eta squared)	0.3025
20		
21	F test to compare variances	
22	F, DFn, Dfd	1.277, 4, 4
23	P value	0.8184
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.18 Bivalve #1
2		
3	Column A	Lab Control #1
4	vs.	vs.
5	Column C	B18-10066
6		
7	Unpaired t test	
8	P value	0.1994
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.8913 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.28 ± 0.04506, n=5
16	Mean ± SEM of column C	1.209 ± 0.06589, n=5
17	Difference between means	0.07115 ± 0.07983
18	95% confidence interval	-0.1129 to 0.2552
19	R squared (eta squared)	0.09034
20		
21	F test to compare variances	
22	F, DFn, Dfd	2.138, 4, 4
23	P value	0.4799
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.18 Bivalve #1
2		
3	Column A	Lab Control #1
4	vs.	vs.
5	Column D	B18-10067
6		
7	Unpaired t test	
8	P value	0.1079
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=1.344 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.28 ± 0.04506, n=5
16	Mean ± SEM of column D	1.196 ± 0.04344, n=5
17	Difference between means	0.08412 ± 0.06259
18	95% confidence interval	-0.06022 to 0.2285
19	R squared (eta squared)	0.1842
20		
21	F test to compare variances	
22	F, DFn, Dfd	1.076, 4, 4
23	P value	0.9450
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.18 Bivalve #1
2		
3	Column A	Lab Control #1
4	vs.	vs.
5	Column E	B18-10068
6		
7	Unpaired t test	
8	P value	0.0604
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=1.736 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.28 ± 0.04506, n=5
16	Mean ± SEM of column E	1.175 ± 0.04077, n=5
17	Difference between means	0.1055 ± 0.06077
18	95% confidence interval	-0.03466 to 0.2456
19	R squared (eta squared)	0.2736
20		
21	F test to compare variances	
22	F, DFn, Dfd	1.222, 4, 4
23	P value	0.8509
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.18 Bivalve #1
2		
3	Column A	Lab Control #1
4	vs.	vs.
5	Column F	B18-10069
6		
7	Unpaired t test	
8	P value	0.0397
9	P value summary	*
10	Significantly different (P < 0.05)?	Yes
11	One- or two-tailed P value?	One-tailed
12	t, df	t=2.009 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.28 ± 0.04506, n=5
16	Mean ± SEM of column F	1.123 ± 0.06383, n=5
17	Difference between means	0.1569 ± 0.07813
18	95% confidence interval	-0.02325 to 0.3371
19	R squared (eta squared)	0.3352
20		
21	F test to compare variances	
22	F, DFn, Dfd	2.006, 4, 4
23	P value	0.5167
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.18 Bivalve #1
2		
3	Column A	Lab Control #1
4	vs.	vs.
5	Column G	B18-10070
6		
7	Unpaired t test	
8	P value	0.2001
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.8886 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.28 ± 0.04506, n=5
16	Mean ± SEM of column G	1.217 ± 0.05549, n=5
17	Difference between means	0.06352 ± 0.07148
18	95% confidence interval	-0.1013 to 0.2284
19	R squared (eta squared)	0.08983
20		
21	F test to compare variances	
22	F, DFn, Dfd	1.516, 4, 4
23	P value	0.6967
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.18 Bivalve #1
2		
3	Column A	Lab Control #1
4	vs.	vs.
5	Column H	B18-10071
6		
7	Unpaired t test	
8	P value	0.0083
9	P value summary	**
10	Significantly different (P < 0.05)?	Yes
11	One- or two-tailed P value?	One-tailed
12	t, df	t=3.021 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.28 ± 0.04506, n=5
16	Mean ± SEM of column H	1.128 ± 0.02292, n=5
17	Difference between means	0.1527 ± 0.05056
18	95% confidence interval	0.03616 to 0.2693
19	R squared (eta squared)	0.5329
20		
21	F test to compare variances	
22	F, DFn, Dfd	3.867, 4, 4
23	P value	0.2186
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.18 Bivalve #1
2		
3	Column A	Lab Control #1
4	vs.	vs.
5	Column I	B18-10072
6		
7	Unpaired t test	
8	P value	0.1117
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=1.32 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.28 ± 0.04506, n=5
16	Mean ± SEM of column I	1.202 ± 0.03924, n=5
17	Difference between means	0.07885 ± 0.05975
18	95% confidence interval	-0.05894 to 0.2166
19	R squared (eta squared)	0.1788
20		
21	F test to compare variances	
22	F, DFn, Dfd	1.319, 4, 4
23	P value	0.7951
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Embryo-Larval Development Test Scoring Worksheet

Client: Amec FW
Project ID: RHMP
Test No.: 18-07-007 to -010

Test Species: M. galloprovincialis
Start Date: 7/18/2018 1310
End Date: 7/20/2018 1300

18-07-015 to -018 18-07-028 to -036

Random #	# Counted	# Normal	Tech Initials	Notes
1	257	248	JW	
2	213	205	↓	
3	210	190	AG	
4	166	160		
5	205	188		
6	207	193		
7	180	174		
8	194	182		
9	164	156		
10	187 181	176 167		
11	187	176		
12	192	179		
13	233	221		
14	183	177		
15	191	179		
16	234	224		
17	175	165	↓	
18	240	225	JW	
19	198	188		
20	196	186		
21	185	182		
22	209	200		
23	203	191	↓	
24	169	159	AG	
25	171	162		
26	159	155		
27	198	190		
28	165	158		
29	224	212		
30	212	207		
31	170	162		
32	196	184		
33	197	188		
34	213	202		
35	182	176		
36	194	187		
37	214	205		
38	179	175		
39	231	221		
40	189	182	↓	

QC Check: AD 9/24/18

Final Review: JW 1/2/19

Embryo-Larval Development Test Scoring Worksheet

Client: Amec FW
Project ID: RHMP
Test No.: 18-07-007 to -010

Test Species: *M. galloprovincialis*
 Start Date: 7/18/2018 1310
 End Date: 7/20/2018 1300

Test No.: 18-07-007 to -010

End Date: 7/20/2018 1300

~~18-07-015 to -018; 18-07-028 to -026. m~~

[illegible]

QC Check: AD 9/24/18

Final Review: sw 1/2/19

Amec FW
RHMP Sediment Testing
Random Numbers

SAMPLE ID	Rand#
Lab Control	39 3 11 16 34
B18-10065	18 32 10 9 21
B18-10066	44 2 42 1 41
B18-10067	19 29 17 33 45
B18-10068	36 22 31 40 15
B18-10069	26 24 4 37 43
B18-10070	6 28 30 27 5
B18-10071	14 20 35 38 25
B18-10072	7 12 8 13 23

QC Check - Mussel: AD

Final Review: W 1/2/16

Water Quality for Bivalve Development

Client: Amec FW

Test Species: *M. galloprovincialis*

Project ID: RHMP

Start Date/Time: 7/18/2018 1310

Test No. 18-07-007 to -010

End Date/Time: 7/20/2018 1300

18-07-015 to -018; 18-07-028 to -036

Sample ID	Water Quality Measurements			
	Parameter	0hr	24hr	48hr
Lab Control #1	Temp. (°C)	15.2	15.0	15.3
	Salinity (ppt)	31.9	31.8	31.6
	pH (units)	7.65	7.70	7.62
	DO (mg/L)	8.2	8.3	8.3
B18-10065	Temp. (°C)	15.0	14.8	14.9
	Salinity (ppt)	32.4	32.5	32.5
	pH (units)	7.64	7.68	7.69
	DO (mg/L)	8.2	8.3	8.2
B18-10066	Temp. (°C)	15.1	15.0	14.9
	Salinity (ppt)	32.5	32.6	32.6
	pH (units)	7.65	7.71	7.72
	DO (mg/L)	8.1	8.3	8.2
B18-10067	Temp. (°C)	15.1	14.8	14.9
	Salinity (ppt)	32.4	32.5	32.5
	pH (units)	7.64	7.71	7.73
	DO (mg/L)	8.1	8.3	8.3
B18-10068	Temp. (°C)	15.0	14.8	14.9
	Salinity (ppt)	32.4	32.5	32.5
	pH (units)	7.64	7.70	7.75
	DO (mg/L)	8.2	8.3	8.4
B18-10069	Temp. (°C)	14.9	14.8	14.8
	Salinity (ppt)	32.4	32.4	32.4
	pH (units)	7.66	7.72	7.76
	DO (mg/L)	8.2	8.3	8.3
B18-10070	Temp. (°C)	14.8	14.8	14.8
	Salinity (ppt)	32.4	32.5	32.5
	pH (units)	7.65	7.71	7.71
	DO (mg/L)	8.3	8.3	8.3
Tech Initials:		AD	AG	AD

Source of Animals: Mission Bay

Date Received: 7/18/18

Comments:

QC Check: AD 9/24/18

Final Review: JW 12/1/19

Water Quality for Bivalve Development

Client: Amec FW
Project ID: RHMP
Test No. 18-07-007 to -010
18-07-015 to -018 ~~18-07-028 to -030~~

Test Species: *M. galloprovincialis*
Start Date/Time: 7/18/2018 1310
End Date/Time: 7/20/2018 1300

Sample ID	Water Quality Measurements <i>sw</i>			
	Parameter	0hr	24hr	48hr
B18-10071	Temp. (°C)	14.9	14.8	14.8
	Salinity (ppt)	32.3	32.4	32.4
	pH (units)	7.64	7.71	7.73
	DO (mg/L)	8.1	8.1	8.4
B18-10072	Temp. (°C)	15.1	14.8	14.8
	Salinity (ppt)	32.2	32.3	32.3
	pH (units)	7.67	7.74	7.75
	DO (mg/L)	8.2	8.3	8.4
	Temp. (°C)			
	Salinity (ppt)			
	pH (units)			
	DO (mg/L)			
	Temp. (°C)			
	Salinity (ppt)			
	pH (units)			
	DO (mg/L)			
	Temp. (°C)			
	Salinity (ppt)			
	pH (units)			
	DO (mg/L)			
	Temp. (°C)			
	Salinity (ppt)			
	pH (units)			
	DO (mg/L)			
	Temp. (°C)			
	Salinity (ppt)			
	pH (units)			
	DO (mg/L)			
Tech Initials:		AD	AG	AD

Source of Animals: MISSION Bay

Date Received: 7/18/18

Comments: _____

QC Check: AD 9/24/18

Final Review: sw 1/2/19

overlying water

Unionized Ammonia Calculation for Pressure of 1 atm

Input 'Shaded' data														
		I		pK										
1		9.26												
2		9.27												
3		9.28												
4		9.29												
5		9.30												
6		9.32												
7		9.33												
8		9.34												

Ammonia Subsample Analysis

Client: Amec FW
 Project ID: RHMP - Overlying Water
 Test No.: 18-07-007 to -010; 18-07-015 to -018
 18-07-028 to -036
 DI Blank: 0.0

Test Species: *M. galloprovincialis*
 Start Date: 7/18/2018
 End Date: 7/20/2018

10 mg/L Ammonia Stock: 10.2 mg/L as NH₃

Sample ID	Test Day	Vial #	Ammonia (mg/L as N)	Ammonia (mg/L as NH ₃)	Notes
Lab Control	0	1	<0.4	<0.5	
B18-10065	0	2	1.8	2.2	
B18-10066	0	3	1.7	2.1	
B18-10067	0	4	0.5	0.6	
B18-10068	0	5	0.8	1.0	
B18-10069	0	6	0.8	1.0	
B18-10070	0	7	0.5	0.6	
B18-10071	0	8	1.1	1.3	
B18-10072	0	9	0.6	0.7	
Lab Control #2	0	10	<0.4	<0.5	
B18-10015	0	11	<0.4	<0.5	
B18-10016	0	12	<0.4	<0.5	
B18-10017	0	13	<0.4	<0.5	
B18-10438	0	14	<0.4	<0.5	
B18-10019	0	15	<0.4	<0.5	
B18-10020	0	16	<0.4	<0.5	
B18-10073	0	17	<0.4	<0.5	
B18-10074	0	18	<0.4	<0.5	
B18-10075	0	19	<0.4	<0.5	
Lab Control	2	20	<0.4	<0.5	
B18-10065	2	21	0.9	1.1	
B18-10066	2	22	<0.4	<0.5	
B18-10067	2	23	<0.4	<0.5	
B18-10068	2	24	<0.4	<0.5	
B18-10069	2	25	<0.4	<0.5	
B18-10070	2	26	<0.4	<0.5	
B18-10071	2	27	<0.4	<0.5	
B18-10072	2	28	<0.4	<0.5	
Lab Control #2	2	29	<0.4	<0.5	
B18-10015	2	30	<0.4	<0.5	
B18-10016	2	31	<0.4	<0.5	
B18-10017	2	32	<0.4	<0.5	
B18-10438	2	33	<0.4	<0.5	
B18-10019	2	34	1.1	1.3	
B18-10020	2	35	1.2	1.5	
B18-10073	2	36	1.2	1.5	
B18-10074	2	37	<0.4	<0.5	
B18-10075	2	38	<0.4	<0.5	

QC Check: JW 12/23/18

Final Review: SC 4/5/19

Embryo-Larval Development Test

Stock Preparation Worksheet

Test Species: M. galloprovincialis
 Batch ID: _____
 Test Type: Embryo Development

Test Date: 7/18/2018
 Analyst: BCS, JV, AD
 Initialed = 12:30 - 13:10

Task	
Spawning Induction	0700
Spawning Begins	0820
# Males/# Females	3/2
Spawn Condition	Moderate
Fertilization Initiated	Stock 1: 0913, Stock 2: 1002
Fertilization End/Eggs Rinsed	0933
Embryo Counts	1200
Test Initiation	1230 - 1310

Embryo Density Counts

per 100 μ L

Stock #	Stock Volume (mL)	Rep 1	Rep 2	Rep 3	Rep 4	Mean #/100 μ L	Mean #/mL (x10)
Stock 1	300	27, 29	30, 34	32, 34	45	33	330
Stock 2							
Stock 3							

Cell Division:

	% Divided
Stock 1	Not Counted
Stock 2	
Stock 3	

Selected Stock:	1
-----------------	---

Adjust selected embryo stock to 500 embryos/mL.
 Dilution Factor = Stock Density/mL/500

Stock Density
330
 500

Dil Factor
0.46

In 10 mL sample volume add 500 μ L of 500 embryo/mL stock to obtain 25 embryos/mL in test vials.

Notes:

* Approx 15% of embryos do not appearance
 $Q_1 = 204/216 = 94.4\%$
 $T_0 = 210, T_0 = 232, T_0 = 227, T_0 = 193, T_0 = 215$ Average = 215

QA Review:

ALB 8/28/8

Final Review: JW 12/26/8

Bivalve Batch #1

Lab Control #2

7/18/18

48hr Bivalve Development Results

Client: AMEC/WOOD

Project ID: RHMP - Mission Bay

Species *Mytilus galloprovincialis*

Test No. 18-07-028 to 18-07-036

Sample ID	Rand #	# Initial Embryos	# Counted	# Normal	Combined % Normal-Alive	Mean Combined % Normal-Alive
Lab Control #2	93	238	238	233	97.9	92.4
	79	215	209	202	94.0	
	74	276	276	270	97.8	
	49	215	214	206	95.8	
	48	215	185	165	76.7	
B18-10015	76	221	221	217	98.2	94.9
	47	215	211	202	94.0	
	86	234	234	219	93.6	
	81	215	203	198	92.1	
	59	219	219	212	96.8	
B18-10016	89	215	208	201	93.5	90.6
	82	223	223	215	96.4	
	80	215	198	193	89.8	
	58	231	231	223	96.5	
	55	215	170	165	76.7	
B18-10017	57	215	192	183	85.1	90.2
	67	215	191	187	87.0	
	87	215	208	201	93.5	
	71	215	199	196	91.2	
	64	215	215	203	94.4	
B18-10438	65	215	179	167	77.7	89.6
	73	228	228	223	97.8	
	63	229	229	212	92.6	
	90	215	203	191	88.8	
	77	215	202	196	91.2	
B18-10019	56	231	231	214	92.6	90.0
	62	215	195	180	83.7	
	92	215	203	192	89.3	
	95	215	202	197	91.6	
	54	215	208	199	92.6	

QC Check: AD 9/24/13

Final Review: *SW* 1/2/14

48hr Bivalve Development Results

Client: AMEC/WOOD

Project ID: RHMP - Mission Bay

Species *Mytilus galloprovincialis*

Test No. 18-07-028 to 18-07-036

Sample ID	Rand #	# Initial Embryos	# Counted	# Normal	Combined % Normal-Alive	Mean Combined % Normal-Alive
B18-10020	68	215	172	165	76.7	86.1
	88	230	230	217	94.3	
	69	215	192	188	87.4	
	60	215	188	184	85.6	
	78	215	195	186	86.5	
B18-10073	72	215	203	199	92.6	79.6
	84	215	180	167	77.7	
	50	215	164	157	73.0	
	53	215	171	168	78.1	
	91	215	177	165	76.7	
B18-10074	75	215	189	183	85.1	84.7
	85	215	188	182	84.7	
	52	215	198	192	89.3	
	66	215	180	167	77.7	
	51	215	196	187	87.0	
B18-10075	61	215	172	164	76.3	86.8
	46	216	216	202	93.5	
	70	215	193	186	86.5	
	94	220	220	213	96.8	
	83	215	182	174	80.9	

QC Check: AD 9/24/18

Final Review: *sw 11/2/19*

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.18 Bivalve #2
2		
3	Column A	Lab Control #2
4	vs.	vs.
5	Column B	B18-10015
6		
7	Unpaired t test	
8	P value	0.3438
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.417 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.32 ± 0.06613, n=5
16	Mean ± SEM of column B	1.35 ± 0.02753, n=5
17	Difference between means	-0.02987 ± 0.07163
18	95% confidence interval	-0.195 to 0.1353
19	R squared (eta squared)	0.02127
20		
21	F test to compare variances	
22	F, DFn, Dfd	5.77, 4, 4
23	P value	0.1180
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.18 Bivalve #2
2		
3	Column A	Lab Control #2
4	vs.	vs.
5	Column C	B18-10016
6		
7	Unpaired t test	
8	P value	0.3204
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.4848 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.32 ± 0.06613, n=5
16	Mean ± SEM of column C	1.278 ± 0.05835, n=5
17	Difference between means	0.04276 ± 0.08819
18	95% confidence interval	-0.1606 to 0.2461
19	R squared (eta squared)	0.02855
20		
21	F test to compare variances	
22	F, DFn, Dfd	1.284, 4, 4
23	P value	0.8142
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.18 Bivalve #2
2		
3	Column A	Lab Control #2
4	vs.	vs.
5	Column D	B18-10017
6		
7	Unpaired t test	
8	P value	0.2090
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.854 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.32 ± 0.06613, n=5
16	Mean ± SEM of column D	1.258 ± 0.03061, n=5
17	Difference between means	0.06223 ± 0.07286
18	95% confidence interval	-0.1058 to 0.2303
19	R squared (eta squared)	0.08355
20		
21	F test to compare variances	
22	F, DFn, Dfd	4.668, 4, 4
23	P value	0.1648
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.18 Bivalve #2
2		
3	Column A	Lab Control #2
4	vs.	vs.
5	Column E	B18-10438
6		
7	Unpaired t test	
8	P value	0.2485
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.7114 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.32 ± 0.06613, n=5
16	Mean ± SEM of column E	1.259 ± 0.05534, n=5
17	Difference between means	0.06134 ± 0.08623
18	95% confidence interval	-0.1375 to 0.2602
19	R squared (eta squared)	0.0595
20		
21	F test to compare variances	
22	F, DFn, Dfd	1.428, 4, 4
23	P value	0.7384
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.18 Bivalve #2
2		
3	Column A	Lab Control #2
4	vs.	vs.
5	Column F	B18-10019
6		
7	Unpaired t test	
8	P value	0.1824
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.9606 df=8
13		
14	How big is the difference?	
15	Mean \pm SEM of column A	1.32 \pm 0.06613, n=5
16	Mean \pm SEM of column F	1.252 \pm 0.0264, n=5
17	Difference between means	0.0684 \pm 0.0712
18	95% confidence interval	-0.09579 to 0.2326
19	R squared (eta squared)	0.1034
20		
21	F test to compare variances	
22	F, DFn, Dfd	6.273, 4, 4
23	P value	0.1030
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.18 Bivalve #2
2		
3	Column A	Lab Control #2
4	vs.	vs.
5	Column G	B18-10020
6		
7	Unpaired t test	
8	P value	0.0754
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=1.589 df=8
13		
14	How big is the difference?	
15	Mean \pm SEM of column A	1.32 \pm 0.06613, n=5
16	Mean \pm SEM of column G	1.196 \pm 0.04175, n=5
17	Difference between means	0.1242 \pm 0.0782
18	95% confidence interval	-0.05608 to 0.3046
19	R squared (eta squared)	0.2399
20		
21	F test to compare variances	
22	F, DFn, Dfd	2.509, 4, 4
23	P value	0.3948
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.18 Bivalve #2
2		
3	Column A	Lab Control #2
4	vs.	vs.
5	Column H	B18-10073
6		
7	Unpaired t test	
8	P value	0.0162
9	P value summary	*
10	Significantly different (P < 0.05)?	Yes
11	One- or two-tailed P value?	One-tailed
12	t, df	t=2.585 df=8
13		
14	How big is the difference?	
15	Mean \pm SEM of column A	1.32 \pm 0.06613, n=5
16	Mean \pm SEM of column H	1.11 \pm 0.04752, n=5
17	Difference between means	0.2105 \pm 0.08143
18	95% confidence interval	0.02274 to 0.3983
19	R squared (eta squared)	0.4552
20		
21	F test to compare variances	
22	F, DFn, Dfd	1.937, 4, 4
23	P value	0.5378
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.18 Bivalve #2
2		
3	Column A	Lab Control #2
4	vs.	vs.
5	Column I	B18-10074
6		
7	Unpaired t test	
8	P value	0.0356
9	P value summary	*
10	Significantly different (P < 0.05)?	Yes
11	One- or two-tailed P value?	One-tailed
12	t, df	t=2.08 df=8
13		
14	How big is the difference?	
15	Mean \pm SEM of column A	1.32 \pm 0.06613, n=5
16	Mean \pm SEM of column I	1.172 \pm 0.02633, n=5
17	Difference between means	0.148 \pm 0.07117
18	95% confidence interval	-0.01609 to 0.3122
19	R squared (eta squared)	0.351
20		
21	F test to compare variances	
22	F, DFn, Dfd	6.309, 4, 4
23	P value	0.1021
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test	
1	Table Analyzed
2	
3	Column A
4	vs.
5	Column J
6	
7	Unpaired t test
8	P value
9	P value summary
10	Significantly different (P < 0.05)?
11	One- or two-tailed P value?
12	t, df
13	
14	How big is the difference?
15	Mean \pm SEM of column A
16	Mean \pm SEM of column J
17	Difference between means
18	95% confidence interval
19	R squared (eta squared)
20	
21	F test to compare variances
22	F, DFn, Dfd
23	P value
24	P value summary
25	Significantly different (P < 0.05)?

Transform of RHMP 7.18 Bivalve #2

Lab Control #2

vs.

B18-10075

0.1388

ns

No

One-tailed

t=1.165 df=8

1.32 \pm 0.06613, n=5

1.216 \pm 0.06066, n=5

0.1045 \pm 0.08973

-0.1024 to 0.3115

0.1451

1.188, 4, 4

0.6712

ns

No

Embryo-Larval Development Test Scoring Worksheet

Client: Amec FW
Project ID: RHMP
Test No.: 18-07-007 to -010 ^{#10}

Test Species: *M. galloprovincialis*
Start Date: 7/18/2018 ¹³¹⁰
End Date: 7/20/2018 ¹³⁰⁰

18-07-015 to -018; 18-07-028 to -036

Random #	# Counted	# Normal	Tech Initials	Notes
46	216	202	AG	
47	211	202		
48	185	165		
49	214	206		
50	164	157		
51	196	187		
52	198	192		
53	171	168		
54	208	199		
55	170	165		
56	231	214		
57	192	183		
58	231	223		
59	219	212		
60	188	184		
61	172	164		
62	195	180		
63	229	212		
64	215 174	167 203		
65	179	167		
66	180 215	203 167		
67	180 191	187		
68	172	165		
69	192	188		
70	193	186		
71	199	196		
72	203	199		
73	228	223		
74	276	270		
75	189	183		
76	221	217		
77	202	196		
78	195	186		
79	209	202		
80	198	193		
81	203	198		
82	223	215		
83	182	174		
84	180	167		
85	183	182	✓	

QC Check: AD 9/24/19

Final Review: sw 1/2/19

Embryo-Larval Development Test Scoring Worksheet

Client: Amec FW
Project ID: RHMP
Test No.: 18-67-007 to 010

Test Species: *M. galloprovincialis*
 Start Date: 7/18/2018 1310
 End Date: 7/20/2018 1300

Test No.: 18-07-007 to -010 ^{AD} End Date: 7/1
18-07-015 to -018 18-07-028 to -036

[illegible]

QC Check: AD 9/24/18

Final Review: 2w 1/2/19

Amec FW
RHMP Sediment Testing
Random Numbers

SAMPLE ID	Rand#
Lab Control #2	93
	79
	74
	49
	48
B18-10015	76
	47
	86
	81
	59
B18-10016	89
	82
	80
	58
	55
B18-10017	57
	67
	87
	71
	64
B18-10438	65
	73
	63
	90
	77
B18-10019	56
	62
	92
	95
	54
B18-10020	68
	88
	69
	60
	78
B18-10073	72
	84
	50
	53
	91
B18-10074	75
	85
	52
	66
	51
B18-10075	61
	46
	70
	94
	83

Don't change

199 5
1210 12

QC Check - Mussel:

AD

[illegible]

Final Review on 11/5/14

Ammonia Subsample Analysis

Client: Amec FW
 Project ID: RHMP - Overlying Water
 Test No.: 18-07-007 to -010 ; 18-07-015 to -018
 18-07-028 to -036
 DI Blank: 0.0

Test Species: *M. galloprovincialis*
 Start Date: 7/18/2018
 End Date: 7/20/2018

10 mg/L Ammonia Stock: 10.2 mg/L as NH₃

Sample ID	Test Day	Vial #	Ammonia (mg/L as N)	Ammonia (mg/L as NH ₃)	Notes
Lab Control	0	1	<0.4	<0.5	
B18-10065	0	2	1.8	2.2	
B18-10066	0	3	1.7	2.1	
B18-10067	0	4	0.5	0.6	
B18-10068	0	5	0.8	1.0	
B18-10069	0	6	0.8	1.0	
B18-10070	0	7	0.5	0.6	
B18-10071	0	8	1.1	1.3	
B18-10072	0	9	0.6	0.7	
Lab Control #2	0	10	<0.4	<0.5	
B18-10015	0	11	<0.4	<0.5	
B18-10016	0	12	<0.4	<0.5	
B18-10017	0	13	<0.4	<0.5	
B18-10438	0	14	<0.4	<0.5	
B18-10019	0	15	<0.4	<0.5	
B18-10020	0	16	<0.4	<0.5	
B18-10073	0	17	<0.4	<0.5	
B18-10074	0	18	<0.4	<0.5	
B18-10075	0	19	<0.4	<0.5	
Lab Control	2	20	<0.4	<0.5	
B18-10065	2	21	0.9	1.1	
B18-10066	2	22	<0.4	<0.5	
B18-10067	2	23	<0.4	<0.5	
B18-10068	2	24	<0.4	<0.5	
B18-10069	2	25	<0.4	<0.5	
B18-10070	2	26	<0.4	<0.5	
B18-10071	2	27	<0.4	<0.5	
B18-10072	2	28	<0.4	<0.5	
Lab Control #2	2	29	<0.4	<0.5	
B18-10015	2	30	<0.4	<0.5	
B18-10016	2	31	<0.4	<0.5	
B18-10017	2	32	<0.4	<0.5	
B18-10438	2	33	<0.4	<0.5	
B18-10019	2	34	1.1	1.3	
B18-10020	2	35	1.2	1.5	
B18-10073	2	36	1.2	1.5	
B18-10074	2	37	<0.4	<0.5	
B18-10075	2	38	<0.4	<0.5	

QC Check: JW 12/27/18

Final Review: JC 4/5/19

Water Quality for Bivalve Development

Client: Amec FW
Project ID: RHMP
Test No. ~~18-07-007 to 010~~ ~~18-07-015 to 018~~ ~~AD~~

Test Species: *M. galloprovincialis*
Start Date/Time: 7/18/2018 1310
End Date/Time: 7/20/2018 1330

Sample ID	Water Quality Measurements			
	Parameter	0hr	24hr	48hr
Lab Control #2	Temp. (°C)	15.1	14.7	14.8
	Salinity (ppt)	32.7	32.6	32.5
	pH (units)	7.64	7.66	7.68
	DO (mg/L)	8.3	8.3	8.3
B18-10015	Temp. (°C)	14.9	14.6	14.6
	Salinity (ppt)	32.6	32.7	32.8
	pH (units)	7.63	7.69	7.74
	DO (mg/L)	8.3	8.4	8.4
B18-10016	Temp. (°C)	14.8	14.6	14.6
	Salinity (ppt)	32.4	32.5	32.5
	pH (units)	7.63	7.70	7.75
	DO (mg/L)	8.2	8.3	8.4
B18-10017	Temp. (°C)	14.9	14.6	14.6
	Salinity (ppt)	32.7	32.7	32.8
	pH (units)	7.65	7.71	7.75
	DO (mg/L)	8.2	8.4	8.4
B18-10438	Temp. (°C)	14.7	14.5	14.6
	Salinity (ppt)	32.6	32.6	32.7
	pH (units)	7.64	7.72	7.76
	DO (mg/L)	8.2	8.4	8.4
B18-10019	Temp. (°C)	14.8	14.5	14.6
	Salinity (ppt)	32.5	32.5	32.5
	pH (units)	7.69	7.72	7.75
	DO (mg/L)	7.68.2	8.4	8.4
B18-10020	Temp. (°C)	14.8	14.6	14.6
	Salinity (ppt)	32.5	32.5	32.5
	pH (units)	7.66	7.71	7.75
	DO (mg/L)	8.3	8.4	8.4
Tech Initials:		AD	AG	AD

Source of Animals: Mission Bay

Date Received: 7/18/18

Comments:

QC Check: AD 9/24/18

Final Review: JW 1/2/19

Embryo-Larval Development Test Stock Preparation Worksheet

Test Species: M. galloprovincialis

Batch ID: _____

Test Type: Embryo Development

Test Date: 7/18/2018

Analyst: BCS, JV, AD

Initiated = 12:30 - 13:10

Task	
Spawning Induction	0700
Spawning Begins	0820
# Males/# Females	3/2
Spawn Condition	Moderate
Fertilization Initiated	Stock 1: 0913 Stock 2: 1002
Fertilization End/Eggs Rinsed	0933
Embryo Counts	1200
Test Initiation	1230 - 1310

Embryo Density Counts

per 100 μ L

Stock #	Stock Volume (mL)	Rep 1	Rep 2	Rep 3	Rep 4	Mean #/100 μ L	Mean #/mL (x10)
Stock 1	300	27, 29	30, 34	32, 34	45	33	330
Stock 2							
Stock 3							

Cell Division:

	% Divided
Stock 1	
Stock 2	
Stock 3	

Selected Stock:	1
-----------------	---

Adjust selected embryo stock to 500 embryos/mL.

Dilution Factor = Stock Density/mL/500

Stock Density

330
500

Dil Factor

0.46

In 10 mL sample volume add 500 μ L of 500 embryo/mL stock to obtain 25 embryos/mL in test vials.

Notes:

* Approx 15% of embryos do not appearance

$QL1 = 204/216 = 94.4\%$

$T\phi_1 = 210, T\phi_2 = 232, T\phi_3 = 227, T\phi_4 = 193, T\phi_5 = 215$ Average = 215

QA Review:

AB 8/28/18

Final Review: sw 1/2/19

Bivalve Batch #2

Lab Control #1

7/26/18

48hr Bivalve Development Results

Client: AMEC/WOOD

Project ID: RHMP - SD Bay North

Species *Mytilus galloprovincialis*

Test No. 18-07-079 to 18-07-091

Sample ID	Rand #	# Initial Embryos	# Counted	# Normal	Combined % Normal-Alive	Mean Combined % Normal-Alive
Lab Control #1	44	248	212	180	72.6	76.0
	29	248	213	185	74.6	
	45	248	219	197	79.4	
	24	248	225	189	76.2	
	56	248	221	191	77.0	
B18-10023	49	248	204	193	77.8	84.7
	58	248	218	207	83.5	
	39	248	241	221	89.1	
	25	248	224	201	81.0	
	63	259	259	238	91.9	
B18-10030	50	248	219	196	79.0	81.3
	19	248	231	197	79.4	
	53	248	226	217	87.5	
	12	248	229	196	79.0	
	41	248	219	202	81.5	
B18-10078	6	248	207	194	78.2	78.9
	15	248	242	192	77.4	
	2	248	188	177	71.4	
	22	248	227	194	78.2	
	55	248	230	221	89.1	
B18-10079	54	248	238	226	91.1	83.7
	20	248	241	217	87.5	
	37	248	222	205	82.7	
	42	248	204	188	75.8	
	18	248	224	202	81.5	
B18-10117	21	248	182	158	63.7	72.7
	16	248	203	177	71.4	
	65	248	207	201	81.0	
	9	248	218	191	77.0	
	31	248	206	174	70.2	
B18-10080	69	248	238	218	87.9	78.5
	36	248	235	211	85.1	
	5	248	194	174	70.2	
	62	248	177	164	66.1	
	61	248	221	207	83.5	

QC Check:

AD 1/3/19

Final Review:

JW 1/3/19

48hr Bivalve Development Results

Client: AMEC/WOOD

Project ID: RHMP - SD Bay North

Species *Mytilus galloprovincialis*

Test No. 18-07-079 to 18-07-091

Sample ID	Rand #			# Normal	Combined % Normal-Alive	Mean Combined % Normal-Alive
		# Initial Embryos	# Counted			
B18-10081	60	248	175	163	65.7	75.6
	47	248	205	194	78.2	
	26	248	212	182	73.4	
	4	248	234	212	85.5	
	59	248	193	186	75.0	
B18-10082 [ⓧ]	57	248	117	98	39.5	58.1
	17	248	174	158	63.7	
	10	248	144	132	53.2	
	14	248	179	160	64.5	
	3	248	200	173	69.8	
B18-10083	13	248	183	169	68.1	70.9
	48	248	178	172	69.4	
	68	248	212	199	80.2	
	8	248	199	182	73.4	
	7	248	180	157	63.3	
B18-10084	1	248	197	181	73.0	76.6
	67	248	202	189	76.2	
	34	248	236	208	83.9	
	11	248	186	176	71.0	
	27	248	224	196	79.0	
B18-10022	43	248	199	190	76.6	78.7
	46	248	201	190	76.6	
	23	248	211	196	79.0	
	51	248	214	207	83.5	
	64	248	202	193	77.8	
B18-10076	66	248	206	191	77.0	80.2
	52	248	228	214	86.3	
	30	248	205	186	75.0	
	38	248	207	196	79.0	
	70	248	232	208	83.9	
B18-10077	32	248	227	192	77.4	79.1
	33	248	236	195	78.6	
	35	248	239	211	85.1	
	28	248	213	191	77.0	
	40	248	202	192	77.4	

QC Check:

AP 1/28/19

Final Review:

AP 1/31/19

Amec Foster Wheeler Environmental Lab, 4905 Morena Blvd, Ste. 1304, San Diego, CA 92117

ⓧ All vials double checked and deemed reliable. No replicates were statistical outliers.

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.26 Bivalve #1
2		
3	Column A	Lab Control #1
4	vs.	vs.
5	Column B	B18-10023
6		
7	Unpaired t test	
8	P value	0.0097
9	P value summary	**
10	Significantly different (P < 0.05)?	Yes
11	One- or two-tailed P value?	One-tailed
12	t, df	t=2.914 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.059 ± 0.0134, n=5
16	Mean ± SEM of column B	1.174 ± 0.03712, n=5
17	Difference between means	-0.115 ± 0.03946
18	95% confidence interval	-0.206 to -0.024
19	R squared (eta squared)	0.5149
20		
21	F test to compare variances	
22	F, DFn, Dfd	7.668, 4, 4
23	P value	0.0737
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.26 Bivalve #1
2		
3	Column A	Lab Control #1
4	vs.	vs.
5	Column C	B18-10030
6		
7	Unpaired t test	
8	P value	0.0164
9	P value summary	*
10	Significantly different (P < 0.05)?	Yes
11	One- or two-tailed P value?	One-tailed
12	t, df	t=2.576 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.059 ± 0.0134, n=5
16	Mean ± SEM of column C	1.125 ± 0.02191, n=5
17	Difference between means	-0.06617 ± 0.02568
18	95% confidence interval	-0.1254 to -0.006946
19	R squared (eta squared)	0.4535
20		
21	F test to compare variances	
22	F, DFn, Dfd	2.671, 4, 4
23	P value	0.3643
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.26 Bivalve #1
2		
3	Column A	Lab Control #1
4	vs.	vs.
5	Column D	B18-10078
6		
7	Unpaired t test	
8	P value	0.1800
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.9708 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.059 ± 0.0134, n=5
16	Mean ± SEM of column D	1.097 ± 0.03728, n=5
17	Difference between means	-0.03846 ± 0.03962
18	95% confidence interval	-0.1298 to 0.0529
19	R squared (eta squared)	0.1054
20		
21	F test to compare variances	
22	F, DFn, Dfd	7.737, 4, 4
23	P value	0.0726
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.26 Bivalve #1
2		
3	Column A	Lab Control #1
4	vs.	vs.
5	Column E	B18-10079
6		
7	Unpaired t test	
8	P value	0.0151
9	P value summary	*
10	Significantly different (P < 0.05)?	Yes
11	One- or two-tailed P value?	One-tailed
12	t, df	t=2.629 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.059 ± 0.0134, n=5
16	Mean ± SEM of column E	1.16 ± 0.03624, n=5
17	Difference between means	-0.1016 ± 0.03864
18	95% confidence interval	-0.1907 to -0.01246
19	R squared (eta squared)	0.4634
20		
21	F test to compare variances	
22	F, DFn, Dfd	7.31, 4, 4
23	P value	0.0799
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.26 Bivalve #1
2		
3	Column A	Lab Control #1
4	vs.	vs.
5	Column F	B18-10117
6		
7	Unpaired t test	
8	P value	0.1749
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.9931 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.059 ± 0.0134, n=5
16	Mean ± SEM of column F	1.023 ± 0.03358, n=5
17	Difference between means	0.03591 ± 0.03615
18	95% confidence interval	-0.04747 to 0.1193
19	R squared (eta squared)	0.1098
20		
21	F test to compare variances	
22	F, DFn, Dfd	6.276, 4, 4
23	P value	0.1030
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.26 Bivalve #1
2		
3	Column A	Lab Control #1
4	vs.	vs.
5	Column G	B18-10080
6		
7	Unpaired t test	
8	P value	0.2512
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.7024 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.059 ± 0.0134, n=5
16	Mean ± SEM of column G	1.097 ± 0.05277, n=5
17	Difference between means	-0.03824 ± 0.05444
18	95% confidence interval	-0.1638 to 0.0873
19	R squared (eta squared)	0.05809
20		
21	F test to compare variances	
22	F, DFn, Dfd	15.5, 4, 4
23	P value	0.0212
24	P value summary	*
25	Significantly different (P < 0.05)?	Yes

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.26 Bivalve #1
2		
3	Column A	Lab Control #1
4	vs.	vs.
5	Column H	B18-10081
6		
7	Unpaired t test	
8	P value	0.4855
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.03746 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.059 ± 0.0134, n=5
16	Mean ± SEM of column H	1.057 ± 0.03831, n=5
17	Difference between means	0.001521 ± 0.04059
18	95% confidence interval	-0.09208 to 0.09512
19	R squared (eta squared)	0.0001754
20		
21	F test to compare variances	
22	F, DFn, Dfd	8.17, 4, 4
23	P value	0.0662
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.26 Bivalve #1
2		
3	Column A	Lab Control #1
4	vs.	vs.
5	Column I	B18-10082
6		
7	Unpaired t test	
8	P value	0.0049
9	P value summary	**
10	Significantly different (P < 0.05)?	Yes
11	One- or two-tailed P value?	One-tailed
12	t, df	t=3.374 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.059 ± 0.0134, n=5
16	Mean ± SEM of column I	0.8685 ± 0.05477, n=5
17	Difference between means	0.1903 ± 0.05639
18	95% confidence interval	0.06022 to 0.3203
19	R squared (eta squared)	0.5873
20		
21	F test to compare variances	
22	F, DFn, Dfd	16.7, 4, 4
23	P value	0.0184
24	P value summary	*
25	Significantly different (P < 0.05)?	Yes

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.26 Bivalve #1
2		
3	Column A	Lab Control #1
4	vs.	vs.
5	Column J	B18-10083
6		
7	Unpaired t test	
8	P value	0.0719
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=1.62 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.059 ± 0.0134, n=5
16	Mean ± SEM of column J	1.003 ± 0.03187, n=5
17	Difference between means	0.05603 ± 0.03458
18	95% confidence interval	-0.02371 to 0.1358
19	R squared (eta squared)	0.2471
20		
21	F test to compare variances	
22	F, DFn, Dfd	5.655, 4, 4
23	P value	0.1219
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.26 Bivalve #1
2		
3	Column A	Lab Control #1
4	vs.	vs.
5	Column K	B18-10084
6		
7	Unpaired t test	
8	P value	0.3846
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.3036 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.059 ± 0.0134, n=5
16	Mean ± SEM of column K	1.068 ± 0.02747, n=5
17	Difference between means	-0.009279 ± 0.03056
18	95% confidence interval	-0.07976 to 0.0612
19	R squared (eta squared)	0.01139
20		
21	F test to compare variances	
22	F, DFn, Dfd	4.2, 4, 4
23	P value	0.1935
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.26 Bivalve #1
2		
3	Column A	Lab Control #1
4	vs.	vs.
5	Column L	B18-10022
6		
7	Unpaired t test	
8	P value	0.0765
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=1.579 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.059 ± 0.0134, n=5
16	Mean ± SEM of column L	1.092 ± 0.01608, n=5
17	Difference between means	-0.03305 ± 0.02094
18	95% confidence interval	-0.08132 to 0.01523
19	R squared (eta squared)	0.2375
20		
21	F test to compare variances	
22	F, DFn, Dfd	1.44, 4, 4
23	P value	0.7327
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.26 Bivalve #1
2		
3	Column A	Lab Control #1
4	vs.	vs.
5	Column M	B18-10076
6		
7	Unpaired t test	
8	P value	0.0569
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=1.775 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.059 ± 0.0134, n=5
16	Mean ± SEM of column M	1.112 ± 0.02707, n=5
17	Difference between means	-0.05363 ± 0.03021
18	95% confidence interval	-0.1233 to 0.01603
19	R squared (eta squared)	0.2826
20		
21	F test to compare variances	
22	F, DFn, Dfd	4.08, 4, 4
23	P value	0.2020
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.26 Bivalve #1
2		
3	Column A	Lab Control #1
4	vs.	vs.
5	Column N	B18-10077
6		
7	Unpaired t test	
8	P value	0.0725
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=1.615 df=8
13		
14	How big is the difference?	
15	Mean \pm SEM of column A	1.059 \pm 0.0134, n=5
16	Mean \pm SEM of column N	1.097 \pm 0.01961, n=5
17	Difference between means	-0.03836 \pm 0.02375
18	95% confidence interval	-0.09312 to 0.01641
19	R squared (eta squared)	0.2459
20		
21	F test to compare variances	
22	F, DFn, Dfd	2.14, 4, 4
23	P value	0.4795
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Embryo-Larval Development Test Scoring Worksheet

Client: Amec FW
Project ID: RHMP
Test No.: 18-07-079 to 18-07-104 ^{AD} 091

Test Species: *M. galloprovincialis*
Start Date: 7/25/2018 1530
End Date: 7/27/2018 1400
28

Random #	# Counted	# Normal	Tech Initials	Notes
1	197	181	AG	
2	188	177		
3	200	173		* counts double checked
4	234	212		
5	194	177		
6	207	194		
7	180	157		
8	199	182		
9	218	191		
10	144	132		* counts double checked
11	186	176		
12	229	196		
13	183	169		
14	179	160		* counts double checked
15	242	192		
16	203	177		
17	174 148	175 158		* counts double checked
18	224	202		
19	231	197		
20	241	217		
21	182	158		
22	227	194		
23	211	196		
24	225	189		
25	224	201		
26	212	182		
27	224	196		
28	213	191		
29	213	185		
30	205	186		
31	206	174		
32	227	192		
33	236	195		
34	236	208		
35	239	211		
36	235	211		
37	222	205		
38	207	196		
39	241	221		
40	202	192	✓	

QC Check: AD 8/30/19

Final Review: 2m 1/3/19

Embryo-Larval Development Test Scoring Worksheet

Client: Amec FW
Project ID: RHMP
Test No.: 18-07-079 to 18-07-1091

Test Species: *M. galloprovincialis*

Start Date:	7/25/2018	1530
End Date:	7/27/2018	1400

[illegible]

QC Check: AD 8/30/18

Final Review: sw 1/3/14

**Amec FW
RHMP Sediment Testing
Random Numbers**

SAMPLE ID	Rand#
Lab Control #1	44
	29
	45
	24
	56
B18-10023	49
	58
	39
	25
B18-10030	63
	50
	19
	53
B18-10078	12
	41
	6
	15
B18-10079	2
	22
	55
	54
B18-10117	20
	37
	42
	18
B18-10080	21
	16
	65
	9
	31
	69
	36
	5
	62
	61

187/215 AL

QC Check - Mussel: 2W

Top set 1

A - 244
B - 218
C - 276
D - 270
E - 248
F - 252

Top set 2

A - 262
B - 281
C - 236
D - 233
E - 212
X - 245

Amec FW
RHMP Sediment Testing
Random Numbers

SAMPLE ID	Rand#
B18-10081	60
	47
	26
	4
	59
B18-10082	57
	17
	10
	14
	3
B18-10083	13
	48
	68
	8
	7
B18-10084	1
	67
	34
	11
	27
B18-10022	43
	46
	23
	51
	64
B18-10076	66
	52
	30
	38
	70
B18-10077	32
	33
	35
	28
	40

QC Check - Mussel: KB

Water Quality for Bivalve Development

Client: Amec FW
Project ID: RHMP
Test No. 18-07-079 to 18-07-104
091

Test Species: *M. galloprovincialis*

Start Date/Time: 7-26-18 1530
End Date/Time: 7/28/18 1400

Sample ID	Water Quality Measurements			
	Parameter	0hr	24hr	48hr
Lab Control #1	Temp. (°C)	15.3	15.4	15.5
	Salinity (ppt)	31.8	31.9	31.6
	pH (units)	7.79	7.69	7.79
	DO (mg/L)	8.1	8.0	8.2
B18-10023	Temp. (°C)	15.1	15.2	15.5
	Salinity (ppt)	31.9	32.1	31.9
	pH (units)	7.80	7.64	7.86
	DO (mg/L)	8.1	8.1	8.1
B18-10030	Temp. (°C)	15.0	15.1	15.6
	Salinity (ppt)	32.0	32.1	32.0
	pH (units)	7.80	7.67	7.89
	DO (mg/L)	8.1	8.2	8.1
B18-10078	Temp. (°C)	15.0	15.1	15.7
	Salinity (ppt)	32.2	32.4	32.3
	pH (units)	7.80	7.73	7.89
	DO (mg/L)	8.1	8.2	8.1
B18-10079	Temp. (°C)	15.0	15.2	15.6
	Salinity (ppt)	32.2	32.3	32.2
	pH (units)	7.79	7.72	7.87
	DO (mg/L)	8.1	8.2	8.1
B18-10117	Temp. (°C)	15.0	15.1	15.7
	Salinity (ppt)	32.4	32.5	32.5
	pH (units)	7.79	7.68	7.92
	DO (mg/L)	8.1	8.1	8.1
B18-10080	Temp. (°C)	15.0	15.1	15.7
	Salinity (ppt)	32.0	32.2	32.1
	pH (units)	7.79	7.74	7.85
	DO (mg/L)	8.1	8.1	8.1
Tech Initials:		AD	2W	AD

Source of Animals: Mission Bay

Date Received: 7/6/18 - 7/24/18

Comments:

QC Check: AD 8/30/18

Final Review: 2W 1/3/19

Water Quality for Bivalve Development

Client: Amec FW
Project ID: RHMP
Test No. 18-07-079 to 18-07-104

Test Species: *M. galloprovincialis*

AP Start Date/Time: 7-26-18 1530
End Date/Time: 7/28/18 1400

Sample ID	Water Quality Measurements			
	Parameter	0hr	24hr	48hr
B18-10081	Temp. (°C)	15.0	14.9	15.7
	Salinity (ppt)	32.0	32.2	32.1
	pH (units)	7.74	7.71	7.85
	DO (mg/L)	8.0	8.2	8.1
B18-10082	Temp. (°C)	15.0	15.1	15.6
	Salinity (ppt)	32.1	32.3	32.1
	pH (units)	7.79	7.69	7.85
	DO (mg/L)	8.1	8.2	8.1
B18-10083	Temp. (°C)	14.9	15.1	15.7
	Salinity (ppt)	32.1	32.2	32.2
	pH (units)	7.78	7.71	7.88
	DO (mg/L)	8.1	8.2	8.1
B18-10084	Temp. (°C)	15.0	15.2	15.5
	Salinity (ppt)	32.0	32.1	32.1
	pH (units)	7.76	7.74	7.87
	DO (mg/L)	8.2	8.2	8.2
B18-10022	Temp. (°C)	15.0	15.1	15.5
	Salinity (ppt)	32.1	32.2	32.2
	pH (units)	7.77	7.70	7.87
	DO (mg/L)	8.1	8.2	8.2
B18-10076	Temp. (°C)	15.0	15.1	15.4
	Salinity (ppt)	32.2	32.3	32.1
	pH (units)	7.78	7.74	7.88
	DO (mg/L)	8.1	8.2	8.2
B18-10077	Temp. (°C)	15.0	15.1	15.3
	Salinity (ppt)	32.1	32.2	32.1
	pH (units)	7.78	7.72	7.89
	DO (mg/L)	8.1	8.2	8.2
Tech Initials:		AD	SW	AD

Source of Animals: Mission Bay

Date Received: 7/6/18 - 7/24/18

Comments: _____

QC Check: AD 8/30/18

Final Review: SW 1/3/19

Unionized Ammonia Calculation for Pressure of 1 atm

Input 'Shaded' data

I	pK
1	9.26
2	9.27
3	9.28
4	9.29
5	9.30
6	9.32
7	9.33
8	9.34

Page 1

Final Review: JW 1/8/14

Ammonia Subsample Analysis

Client: Amec FW
Project ID: RHMP - Overlying Water
Test No.: 18-07-019 to

Test Species: *M. galloprovincialis*
Start Date: ~~7/25/2018~~ 7/26/18
End Date: ~~7/27/2018~~ 7/28/18

DI Blank: 0.0

10 mg/L Ammonia Stock: 8.2 mg/L as NH_3

[illegible]

QC Check: 11/9/18 AD

Final Review: W 1/3/19

Ammonia Subsample Analysis

Client: Amec FW
Project ID: RHMP - Overlying Water
Test No.: 18-07-079 to 18-07-104

Test Species: *M. galloprovincialis*
 Start Date: 7/25/2018 7/26/18
 End Date: 7/27/2018 7/28/18

DI Blank: 0.0

10 mg/L Ammonia Stock: $8.0 \times 1.22 \rightarrow 9.76 \text{ mg/L as } \text{NH}_3$

[illegible]

QC Check: AD 11/4/18

Final Review: ju 1/3/19

Embryo-Larval Development Test

Stock Preparation Worksheet

Test Species: M. galloprovincialis
 Batch ID: Mission Bay
 Test Type: Embryo Development

Test Date: 7-26-18
 Analyst: BGS/AR/JW

Task	stock #1
Spawning Induction	0845
Spawning Begins	1000
# Males/# Females	2 / 1
Spawn Condition	Moderate
Fertilization Initiated	1205
Fertilization End/Eggs Rinsed	1235
Embryo Counts	1445
Test Initiation	1530

stock 2

1253
1320

Embryo Density Counts

per 100 µL

Stock #	Stock Volume (mL)	Rep 1	Rep 2	Rep 3	Rep 4	Mean #/100 µL	Mean #/mL (x10)
Stock 1	200	51	46	45	38	45	450
Stock 2	↓	51	41	39	44	44	440
Stock 3	—	—	—	—	—	—	440

Cell Division:

	% Divided
Stock 1	75
Stock 2	
Stock 3	

Selected Stock:	1
-----------------	---

Adjust selected embryo stock to 500 embryos/mL.
 Dilution Factor = Stock Density/mL/500

Stock Density
440
 500

Dil Factor
0.88

In 10 mL sample volume add 500 µl of 500 embryo/mL stock to obtain 25 embryos/mL in test vials.

Notes:

TD Counts: 246, 215, 276, 270, 248, 262, 281, 236, 233, 212, ^{SW} 245
 TD Average = 248 embryos/vial

QA Review:

AR 8/30/18

Final Review: JW 1/3/19

Bivalve Batch #2

Lab Control #2

7/26/18

48hr Bivalve Development Results

Client: AMEC/WOOD

Project ID: RHMP - SD Bay North

Species *Mytilus galloprovincialis*

Test No. 18-07-092 to 18-07-104

Sample ID	Rand #	# Initial Embryos	# Counted	# Normal	Combined % Normal-Alive	Mean Combined % Normal-Alive
Lab Control #2	115	248	203	176	71.0	75.4
	135	248	212	181	73.0	
	102	248	196	172	69.4	
	74	248	226	195	78.6	
	97	251	251	214	85.3	
B18-10112	72	248	222	198	79.8	81.2
	117	248	207	191	77.0	
	106	248	236	213	85.9	
	78	248	203	196	79.0	
	88	248	226	209	84.3	
10113 B18-100113 <i>sw</i>	119	248	189	176	71.0	72.9
	113	248	217	204	82.3	
	77	248	233	226	91.1	
	93	248	214	204	82.3	
	108	248	101	94	37.9	
B18-10024	99	248	196	180	72.6	75.0
	111	248	190	171	69.0	
	76	248	222	210	84.7	
	79	248	226	211	85.1	
	81	248	174	158	63.7	
B18-10029	127	248	221	190	76.6	67.7
	114	248	201	175	70.6	
	80	248	165	141	56.9	
	105	248	186	159	64.1	
	118	248	203	174	70.2	
B18-10114	96	248	185	169	68.1	72.4
	100	248	219	204	82.3	
	94	248	196	176	71.0	
	109	248	207	186	75.0	
	125	248	173	163	65.7	
B18-10115	75	248	228	214	86.3	83.5
	139	255	255	223	87.5	
	128	248	242	221	89.1	
	101	248	236	209	84.3	
	98	248	192	174	70.2	

QC Check:

AD 1/3/19

Final Review:

sw 1/3/19

Amec Foster Wheeler Environmental Lab, 4905 Morena Blvd, Ste. 1304, San Diego, CA 92117

counts double checked and deemed reliable. Replicate also evaluated as a potential outlier. Not identified as ~~out~~ *sw* statistical outlier according to Grubb's test.

48hr Bivalve Development Results

Client: AMEC/WOOD

Project ID: RHMP - SD Bay North

Species *Mytilus galloprovincialis*

Test No. 18-07-092 to 18-07-104

Sample ID	Rand #					
		# Initial Embryos	# Counted	# Normal	Combined % Normal-Alive	Mean Combined % Normal-Alive
B18-10116	133	248	248	217	87.5	77.2
	132	248	244	209	84.3	
	85	248	165	152	61.3	
	103	248	192	181	73.0	
	138	248	234	198	79.8	
B18-10031	122	248	205	178	71.8	78.5
	130	248	213	189	76.2	
	86	248	231	213	85.9	
	73	248	213	202	81.5	
	131	248	219	192	77.4	
B18-10032	140	248	230	205	82.7	78.7
	91	248	207	192	77.4	
	123	248	202	186	75.0	
	95	248	221	208	83.9	
	137	248	198	185	74.6	
B18-10119	92	248	243	219	88.3	80.2
	134	248	246	215	86.7	
	116	248	227	202	81.5	
	104	248	187	173	69.8	
	126	248	207	186	75.0	
B18-10121	90	248	204	185	74.6	78.5
	107	248	203	190	76.6	
	121	248	226	206	83.1	
	82	248	211	192	77.4	
	120	248	214	200	80.6	
B18-10123	136	248	219	194	78.2	82.3
	129	248	232	208	83.9	
	110	248	204	185	74.6	
	112	248	234	215	86.7	
	124	248	240	218	87.9	
B18-10178	71	248	205	193	77.8	82.1
	83	248	201	193	77.8	
	89	248	246	227	91.5	
	87	248	215	203	81.9	
	84	248	224	202	81.5	

QC Check: AD 11/20/18

Final Review: JD 1/3/19

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.26 Bivalve #2
2		
3	Column A	Lab Control #2
4	vs.	vs.
5	Column B	B18-10112
6		
7	Unpaired t test	
8	P value	0.0692
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=1.646 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.056 ± 0.03526, n=5
16	Mean ± SEM of column B	1.124 ± 0.02174, n=5
17	Difference between means	-0.06819 ± 0.04142
18	95% confidence interval	-0.1637 to 0.02733
19	R squared (eta squared)	0.253
20		
21	F test to compare variances	
22	F, DFn, Dfd	2.629, 4, 4
23	P value	0.3719
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.26 Bivalve #2
2		
3	Column A	Lab Control #2
4	vs.	vs.
5	Column C	B18-10113
6		
7	Unpaired t test	
8	P value	0.4492
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.1318 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.056 ± 0.03526, n=5
16	Mean ± SEM of column C	1.041 ± 0.1034, n=5
17	Difference between means	0.01441 ± 0.1093
18	95% confidence interval	-0.2376 to 0.2664
19	R squared (eta squared)	0.002168
20		
21	F test to compare variances	
22	F, DFn, Dfd	8.608, 4, 4
23	P value	0.0605
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.26 Bivalve #2
2		
3	Column A	Lab Control #2
4	vs.	vs.
5	Column D	B18-10024
6		
7	Unpaired t test	
8	P value	0.4868
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.03421 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.056 ± 0.03526, n=5
16	Mean ± SEM of column D	1.054 ± 0.05058, n=5
17	Difference between means	0.002109 ± 0.06166
18	95% confidence interval	-0.1401 to 0.1443
19	R squared (eta squared)	0.0001463
20		
21	F test to compare variances	
22	F, DFn, Dfd	2.059, 4, 4
23	P value	0.5016
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.26 Bivalve #2
2		
3	Column A	Lab Control #2
4	vs.	vs.
5	Column E	B18-10029
6		
7	Unpaired t test	
8	P value	0.0594
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=1.747 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.056 ± 0.03526, n=5
16	Mean ± SEM of column E	0.968 ± 0.03573, n=5
17	Difference between means	0.08769 ± 0.0502
18	95% confidence interval	-0.02807 to 0.2034
19	R squared (eta squared)	0.2761
20		
21	F test to compare variances	
22	F, DFn, Dfd	1.027, 4, 4
23	P value	0.9799
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.26 Bivalve #2
2		
3	Column A	Lab Control #2
4	vs.	vs.
5	Column F	B18-10114
6		
7	Unpaired t test	
8	P value	0.2446
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.7249 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.056 ± 0.03526, n=5
16	Mean ± SEM of column F	1.02 ± 0.03369, n=5
17	Difference between means	0.03535 ± 0.04876
18	95% confidence interval	-0.0771 to 0.1478
19	R squared (eta squared)	0.06164
20		
21	F test to compare variances	
22	F, DFn, Dfd	1.095, 4, 4
23	P value	0.9318
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.26 Bivalve #2
2		
3	Column A	Lab Control #2
4	vs.	vs.
5	Column G	B18-10115
6		
7	Unpaired t test	
8	P value	0.0506
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=1.852 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.056 ± 0.03526, n=5
16	Mean ± SEM of column G	1.158 ± 0.04286, n=5
17	Difference between means	-0.1028 ± 0.0555
18	95% confidence interval	-0.2307 to 0.02522
19	R squared (eta squared)	0.3
20		
21	F test to compare variances	
22	F, DFn, Dfd	1.478, 4, 4
23	P value	0.7142
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.26 Bivalve #2
2		
3	Column A	Lab Control #2
4	vs.	vs.
5	Column H	B18-10116
6		
7	Unpaired t test	
8	P value	0.3579
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.3773 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.056 ± 0.03526, n=5
16	Mean ± SEM of column H	1.08 ± 0.05478, n=5
17	Difference between means	-0.02458 ± 0.06515
18	95% confidence interval	-0.1748 to 0.1256
19	R squared (eta squared)	0.01749
20		
21	F test to compare variances	
22	F, DFn, Dfd	2.415, 4, 4
23	P value	0.4141
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.26 Bivalve #2
2		
3	Column A	Lab Control #2
4	vs.	vs.
5	Column I	B18-10031
6		
7	Unpaired t test	
8	P value	0.2275
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.7851 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.056 ± 0.03526, n=5
16	Mean ± SEM of column I	1.092 ± 0.02981, n=5
17	Difference between means	-0.03625 ± 0.04617
18	95% confidence interval	-0.1427 to 0.07022
19	R squared (eta squared)	0.07154
20		
21	F test to compare variances	
22	F, DFn, Dfd	1.399, 4, 4
23	P value	0.7528
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.26 Bivalve #2
2		
3	Column A	Lab Control #2
4	vs.	vs.
5	Column J	B18-10032
6		
7	Unpaired t test	
8	P value	0.2036
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.8747 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.056 ± 0.03526, n=5
16	Mean ± SEM of column J	1.093 ± 0.02403, n=5
17	Difference between means	-0.03732 ± 0.04267
18	95% confidence interval	-0.1357 to 0.06107
19	R squared (eta squared)	0.08728
20		
21	F test to compare variances	
22	F, DFn, Dfd	2.153, 4, 4
23	P value	0.4780
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.26 Bivalve #2
2		
3	Column A	Lab Control #2
4	vs.	vs.
5	Column K	B18-10119
6		
7	Unpaired t test	
8	P value	0.1569
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=1.075 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.056 ± 0.03526, n=5
16	Mean ± SEM of column K	1.116 ± 0.04404, n=5
17	Difference between means	-0.06064 ± 0.05641
18	95% confidence interval	-0.1907 to 0.06944
19	R squared (eta squared)	0.1262
20		
21	F test to compare variances	
22	F, DFn, Dfd	1.56, 4, 4
23	P value	0.6770
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.26 Bivalve #2
2		
3	Column A	Lab Control #2
4	vs.	vs.
5	Column L	B18-10121
6		
7	Unpaired t test	
8	P value	0.2127
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.8398 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.056 ± 0.03526, n=5
16	Mean ± SEM of column L	1.089 ± 0.01859, n=5
17	Difference between means	-0.03347 ± 0.03986
18	95% confidence interval	-0.1254 to 0.05844
19	R squared (eta squared)	0.08101
20		
21	F test to compare variances	
22	F, DFn, Dfd	3.596, 4, 4
23	P value	0.2429
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 7.26 Bivalve #2
2		
3	Column A	Lab Control #2
4	vs.	vs.
5	Column M	B18-10123
6		
7	Unpaired t test	
8	P value	0.0601
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=1.739 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.056 ± 0.03526, n=5
16	Mean ± SEM of column M	1.14 ± 0.03305, n=5
17	Difference between means	-0.08404 ± 0.04832
18	95% confidence interval	-0.1955 to 0.02739
19	R squared (eta squared)	0.2744
20		
21	F test to compare variances	
22	F, DFn, Dfd	1.138, 4, 4
23	P value	0.9032
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test	
1	Table Analyzed
2	
3	Column A
4	vs.
5	Column N
6	
7	Unpaired t test
8	P value
9	P value summary
10	Significantly different (P < 0.05)?
11	One- or two-tailed P value?
12	t, df
13	
14	How big is the difference?
15	Mean \pm SEM of column A
16	Mean \pm SEM of column N
17	Difference between means
18	95% confidence interval
19	R squared (eta squared)
20	
21	F test to compare variances
22	F, DFn, Dfd
23	P value
24	P value summary
25	Significantly different (P < 0.05)?

Embryo-Larval Development Test Scoring Worksheet

Client: Amec FW
Project ID: RHMP AD
Test No.: 18-07-079 to 18-07-104
092

Test Species: *M. galloprovincialis*
Start Date: 7/25/2018 1530
End Date: 7/27/2018 1400
28

Random #	# Counted	# Normal	Tech Initials	Notes
71	205	193	JW	
72	222	198		
73	213	202		
74	226	195		
75	228	214		
76	222	210		
77	233	226		
78	203	196	✓	
79	226	211	AG	
80	165	141		Double checked
81	174	158		Double checked
82	211	192		
83	201	193		
84	224	202		
85	165	152		Double checked
86	231	213		
87	215	203		
88	226	209		
89	246	227		
90	204	185		
91	207	192		
92	243	219		
93	214	204	✓	
94	196	176	AG	Double checked
95	221	208		
96	185	169		
97	251 272 AG	228 214 AG		
98	192	174		
99	196	180		
100	219	204		
101	236	209		
102	196	172		
103	192	181		
104	187	173		
105	186	159		
106	236	213		
107	203	190		
108	101 207 AG	186 194 AG		Double checked
109	207	186		
110	204	185	✓	

QC Check: AD 8/30/18

Final Review: JW 1/3/19

Embryo-Larval Development Test Scoring Worksheet

Client: Amec FW
Project ID: RHMP
Test No.: 18-07-077 to 18-07-104
092

Test Species: *M. galloprovincialis*
 Start Date: 7/18/2018 1530
 End Date: 7/20/2018 1400
 28

[illegible]

QC Check: Ad 8/30/18

Final Review: on 1/3/19

Amec FW
RHMP Sediment Testing
Random Numbers

SAMPLE ID	Rand#
Lab Control #2	115
	135
	102
	74
	97
B18-10112	72
	117
	106
	78
	88
B18-10113	119
	113
	77
	93
	108
B18-10024	99
	111
	76
	79
	81
B18-10029	127
	114
	80
	105
	118
B18-10114	96
	100
	94
	109
	125
B18-10115	75
	139
	128
	101
	98

QC Check - Mussel:

Amec FW
RHMP Sediment Testing
Random Numbers

SAMPLE ID	Rand#
B18-10116	133
	132
	85
	103
	138
B18-10031	122
	130
	86
	73
	131
B18-10032	140
	91
	123
	95
	137
B18-10119	92
	134
	116
	104
	126
B18-10121	90
	107
	121
	82
	120
B18-10123	136
	129
	110
	112
	124
B18-10178	71
	83
	89
	87
	84

QC Check - Mussel:

Embryo-Larval Development Test

Stock Preparation Worksheet

Test Species: M. galloprovincialis
 Batch ID: Mission Bay
 Test Type: Embryo Development

Test Date: 7-26-18
 Analyst: BCS/AR/pw

Task	Stock #1
Spawning Induction	6845
Spawning Begins	1000
# Males/# Females	2 / 1
Spawn Condition	Moderate
Fertilization Initiated	1205
Fertilization End/Eggs Rinsed	1235
Embryo Counts	1445
Test Initiation	1530

Stock 2

1253
1320

Embryo Density Counts

per 100 µL

Stock #	Stock Volume (mL)	Rep 1	Rep 2	Rep 3	Rep 4	Mean #/100 µL	Mean #/mL (x10)
Stock 1	200	51	46	45	38	45	450
Stock 2	↓	51	41	39	44	44	440
Stock 3	—	—	—	—	—	—	440

Cell Division:

	% Divided
Stock 1	75
Stock 2	
Stock 3	

Selected Stock:	1
-----------------	---

Adjust selected embryo stock to 500 embryos/mL.
 Dilution Factor = Stock Density/mL/500

Stock Density
440
 500

Dil Factor
0.88

In 10 mL sample volume add 500 µL of 500 embryo/mL stock to obtain 25 embryos/mL in test vials.

Notes:

TD Counts: 246, 218, 276, 270, 248, 262, 281, 236, 233, 212, ²⁴⁵
 TD Average = 248 embryos/vial

QA Review:

AW 8/30/18

Final Review: sw 11/3/19

Water Quality for Bivalve Development

Client: Amec FW
Project ID: RHMP
Test No. 18-07-079 to 18-07-104

Test Species: *M. galloprovincialis*
Start Date/Time: 7-26-18 1530
End Date/Time: 7/28/18 1400

Sample ID	Water Quality Measurements			
	Parameter	0hr	24hr	48hr
Lab Control #2	Temp. (°C)	14.9	14.8	14.8
	Salinity (ppt)	31.5	31.7	31.4
	pH (units)	7.79	7.74	7.79
	DO (mg/L)	8.1	8.1	8.3
B18-10112	Temp. (°C)	14.7	14.7	14.6
	Salinity (ppt)	31.8	31.9	31.9
	pH (units)	7.78	7.70	7.85
	DO (mg/L)	8.2	8.2	8.3
B18-10113	Temp. (°C)	14.7	14.7	14.6
	Salinity (ppt)	32.2	32.3	32.3
	pH (units)	7.79	7.70	7.85
	DO (mg/L)	8.2	8.2	8.3
B18-10024	Temp. (°C)	14.6	14.7	14.5
	Salinity (ppt)	31.7	31.8	31.9
	pH (units)	7.79	7.72	7.86
	DO (mg/L)	8.2	8.2	8.3
B18-10029	Temp. (°C)	14.6	14.7	14.5
	Salinity (ppt)	31.7	31.9	31.8
	pH (units)	7.77	7.82	7.85
	DO (mg/L)	8.2	8.2	8.3
B18-10114	Temp. (°C)	14.6	14.7	14.5
	Salinity (ppt)	31.8	31.9	32.0
	pH (units)	7.77	7.74	7.85
	DO (mg/L)	8.2	8.2	8.3
B18-10115	Temp. (°C)	14.4	14.6	14.5
	Salinity (ppt)	32.0	32.2	32.1
	pH (units)	7.79	7.72	7.86
	DO (mg/L)	8.2	8.3	8.3
Tech Initials:		AD	SW	AD

Source of Animals: Mission Bay

Date Received: 7/16/18-7/24/18

Comments: AD AD

QC Check: AD 8/30/18

Final Review: SW 1/3/19

Water Quality for Bivalve Development

Client: Amec FW
Project ID: RHMP
Test No. 18-07-079 to 18-07-104
AD
092

Test Species: *M. galloprovincialis*
Start Date/Time: 7-26-18 1530
End Date/Time: 7/28/18 1400

Sample ID	Water Quality Measurements			
	Parameter	0hr	24hr	48hr
B18-10116	Temp. (°C)	14.6	14.6	14.5
	Salinity (ppt)	32.0	32.2	32.1
	pH (units)	7.79	7.73	7.83
	DO (mg/L)	8.1	8.2	8.3
B18-10031	Temp. (°C)	14.7	14.5	14.5
	Salinity (ppt)	32.2	32.4	32.3
	pH (units)	7.78	7.72	7.84
	DO (mg/L)	8.2	8.2	8.3
B18-10032	Temp. (°C)	14.7	14.6	14.5
	Salinity (ppt)	32.2	32.3	32.3
	pH (units)	7.79	7.72	7.85
	DO (mg/L)	8.2	8.3	8.3
B18-10119	Temp. (°C)	14.7	14.6	14.5
	Salinity (ppt)	32.3	32.4	32.4
	pH (units)	7.77	7.73	7.85
	DO (mg/L)	8.2	8.3	8.3
B18-10121	Temp. (°C)	14.6	14.7	14.6
	Salinity (ppt)	32.4	32.5	32.5
	pH (units)	7.78	7.71	7.85
	DO (mg/L)	8.1	8.3	8.3
B18-10123	Temp. (°C)	14.7	14.7	14.6
	Salinity (ppt)	32.3	32.3	32.4
	pH (units)	7.77	7.72	7.81
	DO (mg/L)	8.0	8.3	8.2
B18-10178	Temp. (°C)	14.5	14.6	14.6
	Salinity (ppt)	32.4	32.5	32.5
	pH (units)	7.77	7.70	7.84
	DO (mg/L)	8.0	8.2	8.2
Tech Initials:		AD	sw	AD

Source of Animals: Mission Bay

Date Received: 7/16/18 - 7/24/18

Comments:

QC Check: AD 8/30/18

Final Review: sw 1/3/19

Unionized Ammonia Calculation for Pressure of 1 atm

Input 'Shaded' data

I	pK
1	9.26
2	9.27
3	9.28
4	9.29
5	9.30
6	9.32
7	9.33
8	9.34

Log Number	Beaker	Day	Dilution	Total Ammonia (mg/L)	Temp (C)	Salinity (ppt)	pH	Temp (K)	I	Rounded	pK	Unionized Ammonia	D.O. (mg/L)	Beaker Num.	Station
Lab Control #2			0	1.2	14.9	31.5	7.79	288.06	7	6.98	9.33	0.016			
B18-10112			0	0.5	14.7	31.8	7.78	287.86	7	7.05	9.33	< 0.007		0	
B18-10113			0	0.9	14.7	32.2	7.79	287.86	7	7.13	9.33	0.012		0	
B18-10024			0	2.8	14.6	31.7	7.79	287.76	7	7.02	9.33	0.037		0	
B18-10029			0	0.5	14.6	31.7	7.77	287.76	7	7.02	9.33	< 0.006		0	
B18-10114			0	1.0	14.6	31.8	7.77	287.76	7	7.05	9.33	0.013		0	
B18-10115			0	2.4	14.4	32.0	7.79	287.56	7	7.09	9.33	0.031		0	
B18-10116			0	2.4	14.6	32.0	7.79	287.76	7	7.09	9.33	0.032		0	
B18-10031			0	2.4	14.7	32.2	7.78	287.86	7	7.13	9.33	0.031		0	
B18-10032			0	3.1	14.7	32.2	7.79	287.86	7	7.13	9.33	0.041		0	
B18-10119			0	2.7	14.7	32.3	7.77	287.86	7	7.15	9.33	0.034		0	
B18-10121			0	1.0	14.6	32.4	7.78	287.76	7	7.17	9.33	0.013		0	
B18-10123			0	2.4	14.7	32.3	7.77	287.86	7	7.15	9.33	0.031		0	
B18-10178			0	1.1	14.5	32.4	7.77	287.66	7	7.17	9.33	0.014		0	
Lab Control #2			2	0.5	14.8	31.4	7.79	287.96	7	6.96	9.33	< 0.007		0	
B18-10112			2	0.5	14.6	31.9	7.85	287.76	7	7.07	9.33	< 0.008		0	
B18-10113			2	1.7	14.6	32.3	7.85	287.76	7	7.15	9.33	0.026		0	
B18-10024			2	0.6	14.5	31.9	7.86	287.66	7	7.07	9.33	0.009		0	
B18-10029			2	1.3	14.5	31.8	7.85	287.66	7	7.05	9.33	0.020		0	
B18-10114			2	2.1	14.5	32.0	7.85	287.66	7	7.09	9.33	0.032		0	
B18-10115			2	1.1	14.5	32.1	7.86	287.66	7	7.11	9.33	0.017		0	
B18-10116			2	2.1	14.5	32.1	7.83	287.66	7	7.11	9.33	0.030		0	
B18-10031			2	2.1	14.5	32.3	7.84	287.66	7	7.15	9.33	0.031		0	
B18-10032			2	3.1	14.5	32.3	7.85	287.66	7	7.15	9.33	0.047		0	
B18-10119			2	3.1	14.5	32.4	7.85	287.66	7	7.17	9.33	0.047		0	
B18-10121			2	2.6	14.6	32.5	7.85	287.76	7	7.20	9.33	0.039		0	
B18-10123			2	2.7	14.6	32.4	7.81	287.76	7	7	9.33	0.037			
B18-10178			2	3.4	14.6	32.5	7.84	287.76	7	7	9.33	0.050			

Final Review: JW 1/8/19

Ammonia Subsample Analysis

Client: Amec FW

Project ID: RHMP - Overlying Water

Test No.: 18-07-079 to 18-07-104

Test Species: M. galloprovincialis

Start Date: 7/25/2018 7/26/18

End Date: 7/27/2018 7/28/18

DI Blank: 0.0

10 mg/L Ammonia Stock: $8.0 \times 1.22 \rightarrow 9.76$

[illegible]

QC Check: AD 11/4/18

Final Review: on 1/3/19

Ammonia Subsample Analysis

Client: Amec FW

Project ID: RHMP - Overlying Water

Test No.: 18-07-079 to 18-07

Test Species: *M. galloprovincialis*

Start Date: ~~7/25/2018~~ 7/26/18

End Date: ~~7/27/2018~~ 7/28/18

DI Blank: 0.0

10 mg/L Ammonia Stock: 9.6 8.2 mg/L as NH_3

[illegible]

QC Check: 11/9/18 AD

Final Review: su 1/3/09

Bivalve Batch #3

Lab Control #1

8/2/18

48hr Bivalve Development Results

Client: AMEC/WOOD


Project ID: RHMP - SD Bay Central

Species *Mytilus galloprovincialis*

Test No. 18-08-001 to -011

Sample ID	Rand #	# Initial Embryos	# Counted	# Normal	Combined % Normal-Alive	Mean Combined % Normal-Alive
Lab Control #1	47	227	227	203	89.4	84.2
	45	237	237	207	87.3	
	29	206	180	161	78.2	
	23	210	210	182	86.7	
	6	206	189	164	79.6	
B18-10124	30	206	180	171	83.0	88.0
	32	206	205	198	96.1	
	54	206	185	178	86.4	
	17	206	198	188	91.3	
	22	206	187	171	83.0	
B18-10126	59	206	146	138	67.0	83.5
	5	211	211	186	88.2	
	48	206	195	187	90.8	
	37	206	193	173	84.0	
	3	207	207	181	87.4	
B18-10127	58	206	175	168	81.6	85.5
	43	206	183	170	82.5	
	53	206	193	187	90.8	
	18	206	185	175	85.0	
	27	206	197	181	87.9	
B18-10132	36	206	178	163	79.1	81.1
	15	206	201	186	90.3	
	57	206	162	150	72.8	
	44	206	184	175	85.0	
	46	206	168	161	78.2	
B18-10133	25	206	187	173	84.0	83.1
	13	206	205	179	86.9	
	16	206	172	162	78.6	
	19	206	178	157	76.2	
	28	206	199	185	89.8	
B18-10136	2	206	198	177	85.9	83.2
	40	206	196	185	89.8	
	7	206	189	170	82.5	
	55	214	214	193	90.2	
	20	206	148	139	67.5	

QC Check: AD 1/21/19

Final Review:  1/21/19

48hr Bivalve Development Results

Client: AMEC/WOOD

Project ID: RHMP - SD Bay Central

Species *Mytilus galloprovincialis*

Test No. 18-08-001 70-011

Sample ID	Rand #	# Initial Embryos	# Counted	# Normal	Combined % Normal-Alive	Mean Combined % Normal-Alive
B18-10137	24	206	198	184	89.3	81.6
	14	206	206	182	88.3	
	41	206	132	125	60.7	
	33	206	188	180	87.4	
	34	206	184	169	82.0	
B18-10139	56	206	182	174	84.5	79.6
	52	206	177	171	83.0	
	10	206	159	151	73.3	
	26	206	187	164	79.6	
	50	206	169	160	77.7	
B18-10140	39	206	171	160	77.7	81.6
	11	213	213	203	95.3	
	4	206	183	169	82.0	
	42	206	162	151	73.3	
	51	206	170	164	79.6	
B18-10141	49	206	179	163	79.1	80.9
	60	206	171	164	79.6	
	38	206	192	182	88.3	
	31	206	170	155	75.2	
	1	206	184	169	82.0	
B18-10142	9	206	152	142	68.9	77.5
	21	206	184	175	85.0	
	35	206	176	166	80.6	
	8	206	186	171	83.0	
	12	206	153	144	69.9	

QC Check: AD 1/21/19

Final Review: JWR 1/21/19 [Signature]

Unpaired t test		
1	Table Analyzed	Transform of RHMP 8.2 Bivalve #1
2		
3	Column A	Lab Control #1
4	vs.	vs.
5	Column B	B18-10124
6		
7	Unpaired t test	
8	P value	0.1463
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=1.126 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.166 ± 0.03051, n=5
16	Mean ± SEM of column B	1.226 ± 0.0432, n=5
17	Difference between means	-0.05957 ± 0.05288
18	95% confidence interval	-0.1815 to 0.06238
19	R squared (eta squared)	0.1369
20		
21	F test to compare variances	
22	F, DFn, Dfd	2.005, 4, 4
23	P value	0.5170
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 8.2 Bivalve #1
2		
3	Column A	Lab Control #1
4	vs.	vs.
5	Column C	B18-10126
6		
7	Unpaired t test	
8	P value	0.4730
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.06978 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.166 ± 0.03051, n=5
16	Mean ± SEM of column C	1.162 ± 0.05333, n=5
17	Difference between means	0.004287 ± 0.06144
18	95% confidence interval	-0.1374 to 0.146
19	R squared (eta squared)	0.0006082
20		
21	F test to compare variances	
22	F, DFn, Dfd	3.056, 4, 4
23	P value	0.3047
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 8.2 Bivalve #1
2		
3	Column A	Lab Control #1
4	vs.	vs.
5	Column D	B18-10127
6		
7	Unpaired t test	
8	P value	0.3343
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.4444 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.166 ± 0.03051, n=5
16	Mean ± SEM of column D	1.184 ± 0.025, n=5
17	Difference between means	-0.01753 ± 0.03944
18	95% confidence interval	-0.1085 to 0.07342
19	R squared (eta squared)	0.02409
20		
21	F test to compare variances	
22	F, DFn, Dfd	1.489, 4, 4
23	P value	0.7089
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 8.2 Bivalve #1
2		
3	Column A	Lab Control #1
4	vs.	vs.
5	Column E	B18-10132
6		
7	Unpaired t test	
8	P value	0.2248
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.795 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.166 ± 0.03051, n=5
16	Mean ± SEM of column E	1.126 ± 0.03999, n=5
17	Difference between means	0.03999 ± 0.0503
18	95% confidence interval	-0.07601 to 0.156
19	R squared (eta squared)	0.07321
20		
21	F test to compare variances	
22	F, DFn, Dfd	1.719, 4, 4
23	P value	0.6128
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test	
1	Table Analyzed
2	
3	Column A
4	vs.
5	Column F
6	
7	Unpaired t test
8	P value
9	P value summary
10	Significantly different (P < 0.05)?
11	One- or two-tailed P value?
12	t, df
13	
14	How big is the difference?
15	Mean ± SEM of column A
16	Mean ± SEM of column F
17	Difference between means
18	95% confidence interval
19	R squared (eta squared)
20	
21	F test to compare variances
22	F, DFn, Dfd
23	P value
24	P value summary
25	Significantly different (P < 0.05)?

Unpaired t test	
1	Table Analyzed
2	
3	Column A
4	vs.
5	Column G
6	
7	Unpaired t test
8	P value
9	P value summary
10	Significantly different (P < 0.05)?
11	One- or two-tailed P value?
12	t, df
13	
14	How big is the difference?
15	Mean ± SEM of column A
16	Mean ± SEM of column G
17	Difference between means
18	95% confidence interval
19	R squared (eta squared)
20	
21	F test to compare variances
22	F, DFn, Dfd
23	P value
24	P value summary
25	Significantly different (P < 0.05)?

Unpaired t test	
1	Table Analyzed
2	
3	Column A
4	vs.
5	Column H
6	
7	Unpaired t test
8	P value
9	P value summary
10	Significantly different (P < 0.05)?
11	One- or two-tailed P value?
12	t, df
13	
14	How big is the difference?
15	Mean ± SEM of column A
16	Mean ± SEM of column H
17	Difference between means
18	95% confidence interval
19	R squared (eta squared)
20	
21	F test to compare variances
22	F, DFn, Dfd
23	P value
24	P value summary
25	Significantly different (P < 0.05)?

Unpaired t test	
1	Table Analyzed
2	
3	Column A
4	vs.
5	Column I
6	
7	Unpaired t test
8	P value
9	P value summary
10	Significantly different (P < 0.05)?
11	One- or two-tailed P value?
12	t, df
13	
14	How big is the difference?
15	Mean ± SEM of column A
16	Mean ± SEM of column I
17	Difference between means
18	95% confidence interval
19	R squared (eta squared)
20	
21	F test to compare variances
22	F, DFn, Dfd
23	P value
24	P value summary
25	Significantly different (P < 0.05)?

Unpaired t test		
1	Table Analyzed	Transform of RHMP 8.2 Bivalve #1
2		
3	Column A	Lab Control #1
4	vs.	vs.
5	Column J	B18-10140
6		
7	Unpaired t test	
8	P value	0.3401
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.4275 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.166 ± 0.03051, n=5
16	Mean ± SEM of column J	1.139 ± 0.05606, n=5
17	Difference between means	0.02728 ± 0.06382
18	95% confidence interval	-0.1199 to 0.1745
19	R squared (eta squared)	0.02233
20		
21	F test to compare variances	
22	F, DFn, Dfd	3.377, 4, 4
23	P value	0.2655
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 8.2 Bivalve #1
2		
3	Column A	Lab Control #1
4	vs.	vs.
5	Column K	B18-10141
6		
7	Unpaired t test	
8	P value	0.1534
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=1.092 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.166 ± 0.03051, n=5
16	Mean ± SEM of column K	1.12 ± 0.0286, n=5
17	Difference between means	0.04565 ± 0.04182
18	95% confidence interval	-0.05079 to 0.1421
19	R squared (eta squared)	0.1296
20		
21	F test to compare variances	
22	F, DFn, Dfd	1.137, 4, 4
23	P value	0.9037
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 8.2 Bivalve #1
2		
3	Column A	Lab Control #1
4	vs.	vs.
5	Column L	B18-10142
6		
7	Unpaired t test	
8	P value	0.0646
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=1.692 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.166 ± 0.03051, n=5
16	Mean ± SEM of column L	1.081 ± 0.04028, n=5
17	Difference between means	0.08548 ± 0.05053
18	95% confidence interval	-0.03104 to 0.202
19	R squared (eta squared)	0.2635
20		
21	F test to compare variances	
22	F, DFn, Dfd	1.743, 4, 4
23	P value	0.6036
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Embryo-Larval Development Test Scoring Worksheet

Client: Amec FW Test Species: M. galloprovincialis
 Project ID: RHMP Start Date: 8/2/2018 1415
 Test No.: 18-08-079 to 18-08-204-01 End Date: 8/4/2018 1330
 001 FEOT

Random #	# Counted	# Normal	Tech Initials	Notes
1	184	169	AC	
2	198	177		
3	207	181		
4	183	169		
5	211	186		
6	189	164		
7	189	170		
8	186	171		
9	152	142		
10	159	151		
11	213	203		
12	153	144		
13	205	179		
14	206	182		
15	201	186		
16	172	162		
17	198	188		
18	185	175		
19	178	157		
20	148	139		
21	184	175		
22	187 210	182 171		
23	210	182		
24	198	184		
25	187	173		
26	187	164		
27	197	181		
28	199	185		
29	180	161		
30	180	171		
31	170	155		
32	205	198		
33	188	180		
34	184	169		
35	176	166		
36	178	163		
37	193	173		
38	192	182		
39	171	160		
40	196	185		

QC Check: AD 1/21/19

Final Review: SW 1/21/19

Embryo-Larval Development Test Scoring Worksheet

Client: Amec FW
Project ID: RHMP
Test No.: 18-08-079 to 18-08-080

Test Species: *M. galloprovincialis*
 Start Date: 8/2/2018 1415
 End Date: 8/4/2018 1330

[illegible]

QC Check: AD 1/21/19

Final Review: Jan 1/21/19

Amec FW
RHMP Sediment Testing
Random Numbers

SAMPLE ID	Rand#
Lab Control #1	47 →
	45
	29
	23
	6
B18-10124	30 →
	32
	54
	17
	22
B18-10126	59
	5 →
	48
	37
B18-10127	3
	58
	43
	53
	18
B18-10132	27 →
	36
	15
	57
	44
B18-10133	46
	25
	13
	16
	19
B18-10136	28
	2
	40
	7
	55
	20

165/187 Ab 8/7/18

177/210 Ab 8/7/18

156/181 Ab 8/7/18

167/196 Ab 8/7/18

QC Check - Mussel:

Ab

**Amec FW
RHMP Sediment Testing
Random Numbers**

SAMPLE ID	Rand#
B18-10137	24 14 41 33 34
B18-10139	56 52 10 26 50
B18-10140	39 11 4 42 51
B18-10141	49 60 38 31 1
B18-10142	9 21 35 8 12

QC Check - Mussel: AB

Water Quality for Bivalve Development

Client: Amec FW
Project ID: RHMP
Test No. 18-08-001 to 18-08-011

Test Species: *M. galloprovincialis*
Start Date/Time: 8/2/2018 1415
End Date/Time: 8/4/2018 1330

Sample ID	Water Quality Measurements			
	Parameter	0hr	24hr	48hr
Lab Control #1	Temp. (°C)	15.4	15.9	15.7
	Salinity (ppt)	31.6	31.5	31.4
	pH (units)	7.50	7.33	7.65
	DO (mg/L)	8.2	8.0	8.1
B18-10124	Temp. (°C)	15.1	15.7	15.4
	Salinity (ppt)	31.9	32.0	32.1
	pH (units)	7.50	7.38	7.70
	DO (mg/L)	8.0	8.0	8.1
B18-10126	Temp. (°C)	15.1	15.6	15.4
	Salinity (ppt)	31.9	32.0	32.1
	pH (units)	7.53	7.40	7.71
	DO (mg/L)	8.0	8.0	8.1
B18-10127	Temp. (°C)	15.1	15.4	15.3
	Salinity (ppt)	31.8	32.0	32.1
	pH (units)	7.56	7.45	7.73
	DO (mg/L)	8.0	8.0	8.1
B18-10132	Temp. (°C)	15.1	15.3	15.3
	Salinity (ppt)	31.8	32.0	32.0
	pH (units)	7.54	7.45	7.76
	DO (mg/L)	8.0	8.0	8.1
B18-10133	Temp. (°C)	15.1	15.5	15.3
	Salinity (ppt)	31.9	32.1	32.2
	pH (units)	7.60	7.49	7.75
	DO (mg/L)	8.1	8.1	8.2
B18-10136	Temp. (°C)	15.1	15.3	15.2
	Salinity (ppt)	31.9	32.1	32.2
	pH (units)	7.58	7.48	7.75
	DO (mg/L)	8.1	8.1	8.2
Tech Initials:		AG	AG	AD

Source of Animals: Mission Bay / AG

Date Received: 6/6/18

Comments: _____

QC Check: AD 8/30/18

Final Review: JW 1/21/19

Water Quality for Bivalve Development

Client: Amec FW
Project ID: RHMP
Test No. 18-08-001 to 18-08-011

Test Species: *M. galloprovincialis*
Start Date/Time: 8/2/2018 1415
End Date/Time: 8/4/2018 1330

Sample ID	Water Quality Measurements			
	Parameter	0hr	24hr	48hr
B18-10137	Temp. (°C)	15.1	15.5	15.1
	Salinity (ppt)	32.0	32.3	32.4
	pH (units)	7.60	7.50	7.82
	DO (mg/L)	8.0	8.1	8.1
B18-10139	Temp. (°C)	15.1	15.5	15.0
	Salinity (ppt)	32.0	32.2	32.2
	pH (units)	7.61	7.51	7.78
	DO (mg/L)	8.1	8.1	8.2
B18-10140	Temp. (°C)	14.8	15.4	15.1
	Salinity (ppt)	32.1	32.3	32.4
	pH (units)	7.59	7.51	7.77
	DO (mg/L)	8.1	8.1	8.2
B18-10141	Temp. (°C)	15.1	15.4	15.0
	Salinity (ppt)	32.0	32.1	32.1
	pH (units)	7.61	7.52	7.75
	DO (mg/L)	8.1	8.1	8.2
B18-10142	Temp. (°C)	15.1	15.4	15.0
	Salinity (ppt)	31.9	32.1	32.2
	pH (units)	7.60	7.51	7.77
	DO (mg/L)	8.0	8.1	8.2
	Temp. (°C)			
	Salinity (ppt)			
	pH (units)			
	DO (mg/L)			
	Temp. (°C)			
	Salinity (ppt)			
	pH (units)			
	DO (mg/L)			
Tech Initials:		AG	AG	AD

Source of Animals: Mission Bay / AG

Date Received: 6/6/18

Comments:

QC Check: AD 8/30/18

Final Review: 2018/11/21/19

Embryo-Larval Development Test

Stock Preparation Worksheet

Test Species: M. galloprovincialis
 Batch ID: MISSION Bay
 Test Type: Embryo Development

Test Date: 8/2/18
 Analyst: BLS/sw

Task	
Spawning Induction	0830
Spawning Begins	1000
# Males/# Females	2 / 2
Spawn Condition	Good
Fertilization Initiated	stock #1 1030 1045
Fertilization End/Eggs Rinsed	1100 1115
Embryo Counts	1330 1340
Test Initiation	1415

stock #2

Embryo Density Counts

per 100 µL

Stock #	Stock Volume (mL)	Rep 1	Rep 2	Rep 3	Rep 4	Mean #/100 µL	Mean #/mL (x10)
Stock 1	300	44	61	67	42	53.5	535
Stock 2	300	89	NC				
Stock 3							

Cell Division:

	% Divided
Stock 1	99
Stock 2	96
Stock 3	

Selected Stock:	#1
-----------------	----

Stock Density

Dil Factor

Adjust selected embryo stock to 500 embryos/mL.

Dilution Factor = Stock Density/mL/500

535
500

1.07

In 10 mL sample volume add 500 µl of 500 embryo/ml stock to obtain 25 embryos/mL in test vials.

Notes:

QC₁ = 193/255

T₀ Counts = 218, 195, 197, 220, 200, 181, 214, 228, 195, 210

T₀ Average = 206 embryos/vial NC = no counts

QA Review:

AD 8/30/18

Final Review: sw 1/21/19

Ammonia Subsample Analysis

Client: Amec FW
Project ID: RHMP - Overlying Water
Test No.: 18-08-001 to -002

Test Species: *M. galloprovincialis*
Start Date: 8/2/2018
End Date: 8/4/2018

DI Blank: 0.0

10 mg/L Ammonia Stock: 8.1 mg/L as NH_3

[illegible]

QC Check: AD 11/16/18

Final Review: Jw 1/21/19

Ammonia Subsample Analysis

Client: Amec FW

Project ID: RHMP - Overlying Water

Test No.: 18-08-001 to -011

Test Species: *M. galloprovincialis*

Start Date: 8/2/2018

End Date: 8/4/2018

DI Blank: 0.0

10 mg/L Ammonia Stock: 8.2 mg/L as NH_3

[illegible]

QC Check: AD 11/18/18
AD

Final Review: ju 1/21/19

Overlying water

Page 1

Final Review: on 11/21/19

Bivalve Batch #3

Lab Control #2

8/2/18

48hr Bivalve Development Results

Client: AMEC/WOOD

Project ID: RHMP - SD Bay Central

Species *Mytilus galloprovincialis*

Test No. 18-08-012 to - 017

Sample ID	Rand #	# Initial Embryos	# Counted	# Normal	Combined % Normal-Alive	Mean Combined % Normal-Alive
Lab Control #2	73	206	206	179	86.9	85.4
	90	219	219	194	88.6	
	83	206	199	168	81.6	
	64	206	202	175	85.0	
	66	226	226	192	85.0	
B18-10034	63	206	184	162	78.6	81.0
	77	206	186	175	85.0	
	88	206	153	140	68.0	
	74	209	209	194	92.8	
	93	206	177	166	80.6	
B18-10035	91	206	183	172	83.5	82.6
	78	206	192	175	85.0	
	71	206	166	156	75.7	
	89	218	218	196	89.9	
	69	206	178	163	79.1	
B18-10036	75	206	191	178	86.4	84.2
	65	206	180	168	81.6	
	81	210	210	191	91.0	
	87	206	177	160	77.7	
	68	206	198	174	84.5	
B18-10143	76	206	190	170	82.5	87.7
	92	206	192	175	85.0	
	72	207	207	197	95.2	
	85	206	201	182	88.3	
	82	206	194	180	87.4	
B18-10144	86	206	180	166	80.6	78.4
	62	206	177	173	84.0	
	95	206	171	154	74.8	
	80	206	172	168	81.6	
	70	206	156	147	71.4	
B18-10039	67	206	193	182	88.3	83.8
	61	206	163	161	78.2	
	84	206	185	177	85.9	
	79	206	168	152	73.8	
	94	211	211	196	92.9	

QC Check: AD 1/21/19

Final Review: JW 1/22/19

Embryo-Larval Development Test Scoring Worksheet

Client: Amec FW

Test Species: *M. galloprovincialis*

Project ID: RHMP

Start Date: 8/2/2018 1415

Test No.: 18-08-079 to 18-08-104

End Date: 8/4/2018 1330

[illegible]

QC Check: AD 11/16/18

Final Review: *sw* 1/22/19

Unpaired t test		
1	Table Analyzed	Transform of RHMP 8.2 Bivalve #2
2		
3	Column A	Lab Control #2
4	vs.	vs.
5	Column B	B18-10034
6		
7	Unpaired t test	
8	P value	0.1966
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.9023 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.18 ± 0.01647, n=5
16	Mean ± SEM of column B	1.129 ± 0.05388, n=5
17	Difference between means	0.05083 ± 0.05634
18	95% confidence interval	-0.07909 to 0.1808
19	R squared (eta squared)	0.09236
20		
21	F test to compare variances	
22	F, DFn, Dfd	10.7, 4, 4
23	P value	0.0413
24	P value summary	*
25	Significantly different (P < 0.05)?	Yes

Unpaired t test		
1	Table Analyzed	Transform of RHMP 8.2 Bivalve #2
2		
3	Column A	Lab Control #2
4	vs.	vs.
5	Column C	B18-10035
6		
7	Unpaired t test	
8	P value	0.1836
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.9556 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.18 ± 0.01647, n=5
16	Mean ± SEM of column C	1.145 ± 0.03299, n=5
17	Difference between means	0.03524 ± 0.03688
18	95% confidence interval	-0.0498 to 0.1203
19	R squared (eta squared)	0.1025
20		
21	F test to compare variances	
22	F, DFn, Dfd	4.013, 4, 4
23	P value	0.2070
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 8.2 Bivalve #2
2		
3	Column A	Lab Control #2
4	vs.	vs.
5	Column D	B18-10036
6		
7	Unpaired t test	
8	P value	0.3545
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.3868 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.18 ± 0.01647, n=5
16	Mean ± SEM of column D	1.166 ± 0.03147, n=5
17	Difference between means	0.01374 ± 0.03552
18	95% confidence interval	-0.06817 to 0.09566
19	R squared (eta squared)	0.01836
20		
21	F test to compare variances	
22	F, DFn, Dfd	3.652, 4, 4
23	P value	0.2375
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 8.2 Bivalve #2
2		
3	Column A	Lab Control #2
4	vs.	vs.
5	Column E	B18-10143
6		
7	Unpaired t test	
8	P value	0.1804
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.9693 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.18 ± 0.01647, n=5
16	Mean ± SEM of column E	1.218 ± 0.03588, n=5
17	Difference between means	-0.03826 ± 0.03948
18	95% confidence interval	-0.1293 to 0.05277
19	R squared (eta squared)	0.1051
20		
21	F test to compare variances	
22	F, DFn, Dfd	4.745, 4, 4
23	P value	0.1607
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test	
1	Table Analyzed
2	
3	Column A
4	vs.
5	Column F
6	
7	Unpaired t test
8	P value
9	P value summary
10	Significantly different (P < 0.05)?
11	One- or two-tailed P value?
12	t, df
13	
14	How big is the difference?
15	Mean ± SEM of column A
16	Mean ± SEM of column F
17	Difference between means
18	95% confidence interval
19	R squared (eta squared)
20	
21	F test to compare variances
22	F, DFn, Dfd
23	P value
24	P value summary
25	Significantly different (P < 0.05)?

Unpaired t test	
1	Table Analyzed
2	
3	Column A
4	vs.
5	Column G
6	
7	Unpaired t test
8	P value
9	P value summary
10	Significantly different (P < 0.05)?
11	One- or two-tailed P value?
12	t, df
13	
14	How big is the difference?
15	Mean ± SEM of column A
16	Mean ± SEM of column G
17	Difference between means
18	95% confidence interval
19	R squared (eta squared)
20	
21	F test to compare variances
22	F, DFn, Dfd
23	P value
24	P value summary
25	Significantly different (P < 0.05)?

**Amec FW
RHMP Sediment Testing
Random Numbers**

SAMPLE ID	Rand#
Lab Control #2	73
	90
	83
	64
	66
B18-10034	63
	77
	88
	74
B18-10035	93
	91
	78
	71
B18-10036	89
	69
	75
	65
B18-10143	81
	87
	68
	76
B18-10144	92
	72
	85
	82
B18-10039	86
	62
	95
	80
	70
	67
	61
	84
	79
	94

QC Check - Mussel: AD

Ammonia Subsample Analysis

Client: Amec FW
Project ID: RHMP - Overlying Water
Test No.: 18-08-012 to -

Test Species: M. galloprovincialis
Start Date: 8/2/2018
End Date: 8/4/2018

DI Blank: 6.0

10 mg/L Ammonia Stock: 8.1 mg/L as NH_3

[illegible]

QC Check: AD 11/16/18

Final Review: ju 1/22/19

Log Number	Beaker	Day	Dilution	Total Ammonia (mg/L)	Temp (C)	Salinity (ppt)	pH	Temp (K)	I	Rounded	pK	Unionized Ammonia	D.O. (mg/L)	Beaker Num.	Station
Lab Control #2			0	< 0.5	15	31.5	7.57	288.16	7	6.98	9.33	< 0.004		0	
B18-10034		0	0	0.6	14.6	32.2	7.57	287.76	7	7.13	9.33	0.005		0	
B18-10035		0	0	0.6	14.4	32.0	7.69	287.56	7	7.09	9.33	0.006		0	
B18-10036		0	0	1.1	14.3	32.3	7.58	287.46	7	7.15	9.33	0.009		0	
B18-10143		0	0	0.7	14.3	32.4	7.58	287.46	7	7.17	9.33	0.006		0	
B18-10143 ^{Am}		0	0	< 0.5	14.4	32.4	7.56	287.56	7	7.17	9.33	< 0.004		0	
B18-10039		0	0	1	14.4	32.3	7.58	287.56	7	7.15	9.33	0.008		0	
Lab Control #2		2	2	< 0.5	14.8	31.8	7.73	287.96	7	7.05	9.33	< 0.006		0	
B18-10034		2	2	1.7	14.7	32.5	7.71	287.86	7	7.20	9.33	0.019		0	
B18-10035		2	2	0.9	14.7	32.4	7.70	287.86	7	7.17	9.33	0.010		0	
B18-10036		2	2	1.2	14.7	32.6	7.72	287.86	7	7.22	9.33	0.014		0	
B18-10143		2	2	1.0	14.7	32.7	7.74	287.86	7	7.24	9.33	0.012		0	
B18-10143 ^{Am}		2	2	1.7	14.6	32.7	7.70	287.76	7	7.24	9.33	0.018		0	
B18-10039		2	2	0.9	14.7	32.7	7.68	287.86	7	7.24	9.33	0.009		0	

Final Reviewed: 11/22/19

Ammonia Subsample Analysis

Client: Amec FW
Project ID: RHMP - Overlying Water
Test No.: 18-08-012 to -017

Test Species: *M. galloprovincialis*
Start Date: 8/2/2018
End Date: 8/4/2018

DI Blank: 0.0

10 mg/L Ammonia Stock: 8.2 mg/L as NH_3

[illegible]

QC Check: AD 11/16/18

Final Review: Jan 1/22/19

Water Quality for Bivalve Development

Client: Amec FW
Project ID: RHMP
Test No. 18-08-002 to 18-08-017

Test Species: *M. galloprovincialis*
Start Date/Time: 8/2/2018 1415
End Date/Time: 8/4/2018 1330

Sample ID	Water Quality Measurements			
	Parameter	0hr	24hr	48hr
Lab Control #2	Temp. (°C)	15.0	14.9	14.8
	Salinity (ppt)	31.5	32.0	31.8
	pH (units)	7.57	7.54	7.73
	DO (mg/L)	8.3	8.2	8.2
B18-10034	Temp. (°C)	14.6	15.0	14.7
	Salinity (ppt)	32.2	32.4	32.5
	pH (units)	7.57	7.53	7.71
	DO (mg/L)	8.2	8.2	8.3
B18-10035	Temp. (°C)	14.4	15.0	14.7
	Salinity (ppt)	32.0	32.4	32.4
	pH (units)	7.69	7.54	7.70
	DO (mg/L)	7.8	8.2	8.2
B18-10036	Temp. (°C)	14.3	15.0	14.7
	Salinity (ppt)	32.3	32.6	32.6
	pH (units)	7.58	7.54	7.72
	DO (mg/L)	8.1	8.2	8.2
B18-10143	Temp. (°C)	14.3	15.0	14.7
	Salinity (ppt)	32.4	32.7	32.7
	pH (units)	7.58	7.53	7.74
	DO (mg/L)	8.1	8.2	8.3
B18-10144	Temp. (°C)	14.4	15.0	14.6
	Salinity (ppt)	32.4	32.7	32.7
	pH (units)	7.56	7.53	7.70
	DO (mg/L)	8.1	8.2	8.3
B18-10039	Temp. (°C)	14.4	15.0	14.7
	Salinity (ppt)	32.3	32.7	32.7
	pH (units)	7.58	7.54	7.68
	DO (mg/L)	8.1	8.1	8.1
Tech Initials:		AB	AB	AD

Source of Animals: Mission Bay / AB

Date Received: 6/6/18

Comments: _____

QC Check: AD 8/30/18

Final Review: Jim 1/22/19

Embryo-Larval Development Test

Stock Preparation Worksheet

Test Species: M. galloprovincialis
 Batch ID: MISSION Bay
 Test Type: Embryo Development

Test Date: 8/2/18
 Analyst: BLS/jw

Task	
Spawning Induction	0830
Spawning Begins	1000
# Males/# Females	2 / 2
Spawn Condition	Good
Fertilization Initiated ^{stock #2}	1030 1045
Fertilization End/Eggs Rinsed	1100 1115
Embryo Counts	1330 1340
Test Initiation	1415

Stock #2

Embryo Density Counts

per 100 μ L

Stock #	Stock Volume (mL)	Rep 1	Rep 2	Rep 3	Rep 4	Mean #/100 μ L	Mean #/mL (x10)
Stock 1	300	44	61	67	42	53.5	535
Stock 2	300	89	NL				
Stock 3							

Cell Division:

	% Divided
Stock 1	99
Stock 2	96
Stock 3	

Selected Stock:	#1
-----------------	----

Stock Density

Dil Factor

Adjust selected embryo stock to 500 embryos/mL.

Dilution Factor = Stock Density/mL/500

535
500

1.07

In 10 mL sample volume add 500 μ L of 500 embryo/mL stock to obtain 25 embryos/mL in test vials.

Notes:

QC₁ = 193/255
TD Counts = 218, 195, 197, 220, 200, 181, 214, 228, 198, 210
TD Average = 206 embryos/vial NL = no counts

QA Review:

AD 8/30/18

Final Review: sw 1/22/19

Bivalve Batch #4

Lab Control #1

8/14/18

48hr Bivalve Development Results

Client: AMEC/WOOD

Project ID: RHMP - SD Bay North

Species *Mytilus galloprovincialis*

Test No. 18-08-042 to 18-08-052

Sample ID	Rand #	# Initial Embryos	# Counted	# Normal	Combined % Normal-Alive	Mean Combined % Normal-Alive
Lab Control	42	224	180	156	69.6	82.0
	9	224	203	190	84.8	
	49	224	212	185	82.6	
	3	224	205	184	82.1	
	41	245	245	223	91.0	
B18-10037	16	224	213	193	86.2	81.3
	2	224	187	179	79.9	
	40	224	186	170	75.9	
	15	224	205	194	86.6	
	5	224	191	174	77.7	
B18-10038	60	⊗	⊗	⊗	⊗	79.5
	19	224	185	168	75.0	
	12	224	210	190	84.8	
	21	224	191	180	80.4	
	59	224	189	174	77.7	
B18-10041	58	224	195	179	79.9	81.8
	35	224	220	203	90.6	
	37	224	177	170	75.9	
	26	224	203	178	79.5	
	8	224	203	186	83.0	
B18-10179	44	224	183	170	75.9	75.8
	13	224	193	176	78.6	
	53	224	168	157	70.1	
	56	224	185	173	77.2	
	17	224	186	173	77.2	
B18-10180	52	224	186	178	79.5	81.9
	28	224	216	205	91.5	
	43	224	185	166	74.1	
	27	⊗	⊗	⊗	⊗	
	24	224	202	185	82.6	
B18-10181	11	224	189	177	79.0	89.6
	4	229	229	215	93.9	
	36	237	237	223	94.1	
	25	227	227	209	92.1	
	18	224	214	199	88.8	

QC Check: AD 1/18/19

Final Review: JW 1/18/19

Amec Foster Wheeler Environmental Lab, 4905 Morena Blvd, Ste. 1304, San Diego, CA 92117

⊗ outlier according to Grubbs test, excluded from analysis

48hr Bivalve Development Results

Client: AMEC/WOOD

Project ID: RHMP - SD Bay North

Species *Mytilus galloprovincialis*

Test No. 18-08-042 to 18-08-052

Sample ID	Rand #			# Normal		
		# Initial Embryos	# Counted		Combined % Normal-Alive	Mean Combined % Normal-Alive
B18-10042	47	224	184	163	72.8	76.8
	34	224	195	164	73.2	
	48	224	180	174	77.7	
	50	224	188	177	79.0	
	7	224	188	182	81.3	
B18-10085	30	249	249	224	90.0	81.0
	31	⊗	⊗	⊗	⊗	
	39	224	201	183	81.7	
	57	224	181	167	74.6	
	29	224	193	174	77.7	
B18-10086	32	224	196	186	83.0	79.8
	46	224	186	175	78.1	
	51	224	179	167	74.6	
	38	224	187	166	74.1	
	45	224	217	200	89.3	
B18-10087	23	224	198	183	81.7	80.3
	14	224	158	143	63.8	
	20	247	247	227	91.9	
	22	224	216	204	91.1	
	54	224	176	164	73.2	
B18-10088	33	224	196	183	81.7	80.8
	10	224	199	186	83.0	
	1	224	186	172	76.8	
	55	224	197	181	80.8	
	6	224	195	183	81.7	

QC Check: AD 1/18/19

Final Review:

[Signature] 1/21/19

Amec Foster Wheeler Environmental Lab, 4905 Morena Blvd, Ste. 1304, San Diego, CA 92117

⊗ outlier according to Grubbs test; excluded from analysis

Unpaired t test		
1	Table Analyzed	Transform of RHMP 8.14 Bivalve
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column B	B18-10037
6		
7	Unpaired t test	
8	P value	0.4011
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.259 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.14 ± 0.0449, n=5
16	Mean ± SEM of column B	1.126 ± 0.02856, n=5
17	Difference between means	0.01378 ± 0.05321
18	95% confidence interval	-0.1089 to 0.1365
19	R squared (eta squared)	0.008317
20		
21	F test to compare variances	
22	F, DFn, Dfd	2.473, 4, 4
23	P value	0.4020
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 8.14 Bivalve
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column C	B18-10038
6		
7	Unpaired t test	
8	P value	0.2626
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.6684 df=7
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.14 ± 0.0449, n=5
16	Mean ± SEM of column C	1.102 ± 0.0263, n=4
17	Difference between means	0.03737 ± 0.05591
18	95% confidence interval	-0.09484 to 0.1696
19	R squared (eta squared)	0.05999
20		
21	F test to compare variances	
22	F, DFn, Dfd	3.643, 4, 3
23	P value	0.3166
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 8.14 Bivalve
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column D	B18-10041
6		
7	Unpaired t test	
8	P value	0.4615
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.0998 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.14 ± 0.0449, n=5
16	Mean ± SEM of column D	1.134 ± 0.03429, n=5
17	Difference between means	0.005639 ± 0.0565
18	95% confidence interval	-0.1247 to 0.1359
19	R squared (eta squared)	0.001243
20		
21	F test to compare variances	
22	F, DFn, Dfd	1.714, 4, 4
23	P value	0.6143
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 8.14 Bivalve
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column E	B18-10179
6		
7	Unpaired t test	
8	P value	0.0623
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=1.716 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.14 ± 0.0449, n=5
16	Mean ± SEM of column E	1.057 ± 0.01701, n=5
17	Difference between means	0.08238 ± 0.04802
18	95% confidence interval	-0.02835 to 0.1931
19	R squared (eta squared)	0.269
20		
21	F test to compare variances	
22	F, DFn, Dfd	6.971, 4, 4
23	P value	0.0865
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 8.14 Bivalve
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column F	B18-10180
6		
7	Unpaired t test	
8	P value	0.4930
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.0181 df=7
13		
14	How big is the difference?	
15	Mean \pm SEM of column A	1.14 \pm 0.0449, n=5
16	Mean \pm SEM of column F	1.138 \pm 0.0503, n=4
17	Difference between means	0.00122 \pm 0.06741
18	95% confidence interval	-0.1582 to 0.1606
19	R squared (eta squared)	4.677e-005
20		
21	F test to compare variances	
22	F, DFn, Dfd	1.004, 3, 4
23	P value	0.9552
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 8.14 Bivalve
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column G	B18-10181
6		
7	Unpaired t test	
8	P value	0.0545
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=1.804 df=8
13		
14	How big is the difference?	
15	Mean \pm SEM of column A	1.14 \pm 0.0449, n=5
16	Mean \pm SEM of column G	1.251 \pm 0.04276, n=5
17	Difference between means	-0.1118 \pm 0.062
18	95% confidence interval	-0.2548 to 0.03114
19	R squared (eta squared)	0.2891
20		
21	F test to compare variances	
22	F, DFn, Dfd	1.103, 4, 4
23	P value	0.9266
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 8.14 Bivalve
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column H	B18-10042
6		
7	Unpaired t test	
8	P value	0.0947
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=1.434 df=8
13		
14	How big is the difference?	
15	Mean \pm SEM of column A	1.14 \pm 0.0449, n=5
16	Mean \pm SEM of column H	1.069 \pm 0.01966, n=5
17	Difference between means	0.0703 \pm 0.04902
18	95% confidence interval	-0.04274 to 0.1833
19	R squared (eta squared)	0.2045
20		
21	F test to compare variances	
22	F, DFn, Dfd	5.215, 4, 4
23	P value	0.1387
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 8.14 Bivalve
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column I	B18-10085
6		
7	Unpaired t test	
8	P value	0.4131
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.2279 df=7
13		
14	How big is the difference?	
15	Mean \pm SEM of column A	1.14 \pm 0.0449, n=5
16	Mean \pm SEM of column I	1.125 \pm 0.04501, n=4
17	Difference between means	0.01469 \pm 0.06446
18	95% confidence interval	-0.1377 to 0.1671
19	R squared (eta squared)	0.007365
20		
21	F test to compare variances	
22	F, DFn, Dfd	1.244, 4, 3
23	P value	0.8930
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 8.14 Bivalve
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column J	B18-10086
6		
7	Unpaired t test	
8	P value	0.3098
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.5164 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.14 ± 0.0449, n=5
16	Mean ± SEM of column J	1.109 ± 0.0375, n=5
17	Difference between means	0.03021 ± 0.0585
18	95% confidence interval	-0.1047 to 0.1651
19	R squared (eta squared)	0.03225
20		
21	F test to compare variances	
22	F, DFn, Dfd	1.434, 4, 4
23	P value	0.7356
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 8.14 Bivalve
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column K	B18-10087
6		
7	Unpaired t test	
8	P value	0.4373
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.163 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.14 ± 0.0449, n=5
16	Mean ± SEM of column K	1.126 ± 0.06882, n=5
17	Difference between means	0.0134 ± 0.08217
18	95% confidence interval	-0.1761 to 0.2029
19	R squared (eta squared)	0.003312
20		
21	F test to compare variances	
22	F, DFn, Dfd	2.349, 4, 4
23	P value	0.4285
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 8.14 Bivalve
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column L	B18-10088
6		
7	Unpaired t test	
8	P value	0.3271
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.4653 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.14 ± 0.0449, n=5
16	Mean ± SEM of column L	1.118 ± 0.01319, n=5
17	Difference between means	0.02178 ± 0.0468
18	95% confidence interval	-0.08615 to 0.1297
19	R squared (eta squared)	0.02635
20		
21	F test to compare variances	
22	F, DFn, Dfd	11.59, 4, 4
23	P value	0.0359
24	P value summary	*
25	Significantly different (P < 0.05)?	Yes

Final Review : Jan 1/18/19

Embryo-Larval Development Test Scoring Worksheet

Client: Amec FW
Project ID: RHMP
Test No.: 18-08-042 to -052

Test Species: M. galloprovincialis
Start Date: 8/14/2018
End Date: 8/16/2018

Random #	# Counted	# Normal	Tech Initials	Notes
1	186	172	JW	
2	187	179		
3	205	184		
4	229	215		
5	191	174		
6	195	183		
7	188	182		
8	203	186		
9	203	190		
10	JW 189 199	186		
11	189	177		
12	JW 190 210	190		
13	193	176		
14	158	143		
15	205	194		
16	213	193		
17	186	173		
18	214	199		
19	185	168		
20	247	227		
21	191	180		
22	216	204		
23	198	183		
24	202	185		
25	227	209		
26	203	178		
27	JW 24	1		excluded as outlier
28	216	205		
29	193	174		
30	249	224		
31	11	4		excluded as outlier
32	196	186		
33	196	183		
34	195	164		
35	220	203		
36	237	223		
37	177	170		
38	187	166		
39	201	183		
40	186	170	JW	

QC Check: AB 11/14/18

Final Review: JW 1/18/19

Embryo-Larval Development Test Scoring Worksheet

Client: Amec FW
Project ID: RHMP
Test No.: 18-08-042 to -05

Test Species: *M. galloprovincialis*
Start Date: 8/14/2018
End Date: 8/16/2018

[illegible]

QC Check: AD 11/14/18

Final Review: ju 1/18/19

Amec FW
RHMP Sediment Testing
Random Numbers

SAMPLE ID	Rand#
Lab Control	42
	9
	49
	3
	41
B18-10037	16
	2
	40
	15
	5
B18-10038	60
	19
	12
	21
	59
B18-10041	58
	35
	37
	26
	8
B18-10179	44
	13
	53
	56
	17
B18-10180	52
	28
	43
	27
	24
B18-10181	11
	4
	36
	25
	18

163/184
204/221
188/212
191/216
220/245

QC Check - Mussel: 25

Amec FW
RHMP Sediment Testing
Random Numbers

SAMPLE ID	Rand#
B18-10042	47
	34
	48
	50
	7
B18-10085	30
	31
	39
	57
	29
B18-10086	32
	46
	51
	38
	45
B18-10087	23
	14
	20
	22
	54
B18-10088	33
	10
	1
	55
	6

QC Check - Mussel: juv

Water Quality for Bivalve Development

Client: Amec FW
 Project ID: RHMP
 Test No. 18-08-042 to -052

Test Species: M. galloprovincialis
 Start Date/Time: 8/14/2018 1455
 End Date/Time: 8/16/2018 1530

Sample ID	Water Quality Measurements			
	Parameter	0hr	24hr	48hr
Lab Control	Temp. (°C)	15.0	14.8	15.4
	Salinity (ppt)	31.8	31.4	31.2
	pH (units)	7.70	7.68	7.64
	DO (mg/L)	8.3	8.3	8.4
B18-10037	Temp. (°C)	15.2	14.7	15.0
	Salinity (ppt)	32.1	31.8	31.8
	pH (units)	7.68	7.67	7.65
	DO (mg/L)	8.0	8.3	8.4
B18-10038	Temp. (°C)	15.1	14.7 AD	15.0
	Salinity (ppt)	32.1	32.3 31.8	31.8
	pH (units)	7.66	7.67	7.66
	DO (mg/L)	7.8	8.3	8.4
B18-10041	Temp. (°C)	15.6	14.8 AD	15.0
	Salinity (ppt)	32.4	32.4 31.1	32.1
	pH (units)	AD 7.68	7.68	7.67
	DO (mg/L)	8.0	8.2	8.3
B18-10179	Temp. (°C)	15.5	14.6	15.0
	Salinity (ppt)	32.3	32.0	32.0
	pH (units)	7.71	7.69	7.70
	DO (mg/L)	8.0	8.3	8.3
B18-10180	Temp. (°C)	15.6	14.7	15.0
	Salinity (ppt)	32.2	32.0	32.0
	pH (units)	7.70	7.69	7.69
	DO (mg/L)	8.1	8.3	8.3
B18-10181	Temp. (°C)	15.4	14.7	15.0
	Salinity (ppt)	32.1	31.8	31.8
	pH (units)	7.70	7.71	7.68
	DO (mg/L)	8.1	8.2	8.3
Tech Initials:		AD	AD	AD

Source of Animals: Mission Bay

Date Received: 8/14/18 - 8/14/18

Comments: _____

QC Check: AD 11/14/18

Final Review: JW 1/18/19

Water Quality for Bivalve Development

Client: Amec FW
 Project ID: RHMP
 Test No. 18-08-042 to -052

Test Species: M. galloprovincialis
 Start Date/Time: 8/14/2018 1415
 End Date/Time: 8/16/2018 1530

Sample ID	Water Quality Measurements			
	Parameter	0hr	24hr	48hr
B18-10042	Temp. (°C)	15.4	14.8	15.0
	Salinity (ppt)	32.3	32.0	32.1
	pH (units)	7.70	7.69	7.68
	DO (mg/L)	7.9	8.3	8.3
B18-10085	Temp. (°C)	15.5	14.8	15.0
	Salinity (ppt)	32.4	32.1	32.1
	pH (units)	7.69	7.69	7.69
	DO (mg/L)	8.1	8.3	8.3
B18-10086	Temp. (°C)	15.3	14.8	15.0 ^{Am}
	Salinity (ppt)	32.1	31.8	32.1 31.8
	pH (units)	7.72	7.71	7.70
	DO (mg/L)	8.1	8.3	8.4
B18-10087	Temp. (°C)	15.3	14.8 ^{Am}	14.9
	Salinity (ppt)	32.2	32.1 31.9	32.0
	pH (units)	7.71	7.70	7.69
	DO (mg/L)	8.0	8.3	8.4
B18-10088	Temp. (°C)	15.2	14.7	15.0
	Salinity (ppt)	32.2	31.9	32.0
	pH (units)	7.72	7.69	7.70
	DO (mg/L)	8.1	8.3	8.4
	Temp. (°C)			
	Salinity (ppt)			
	pH (units)			
	DO (mg/L)			
	Temp. (°C)			
	Salinity (ppt)			
	pH (units)			
	DO (mg/L)			
Tech Initials:		AD	AD	AD

Source of Animals: Mission Bay

Date Received: 6/4/18 - 8/14/18

Comments: _____

QC Check: AD 11/14/18

Final Review: JV 1/18/19

Ammonia Subsample Analysis

Client: Amec FW
Project ID: Overlying Water
Test No.: 18-08-042 to -052

Test Species: M. galloprovincialis
Start Date: 8/14/2018
End Date: 8/16/2018

DI Blank: 0.0

10 mg/L Ammonia Stock: 8.1 mg/L as NH_3

[illegible]

QC Check: AD 11/14/18

Final Review: SW 1/18/19

Page 1

Final Review: sun 1/18/19

Embryo-Larval Development Test

Stock Preparation Worksheet

Test Species: M. galloprovincialis
 Batch ID: 8/14/18
 Test Type: Mg-d

Test Date: 8/14/18
 Analyst: SW/AG

Task	
Spawning Induction	0940
Spawning Begins	1030
# Males/# Females	5♂ / 4
Spawn Condition	Good
Fertilization Initiated	1220
Fertilization End/Eggs Rinsed	1240
Embryo Counts	1415
Test Initiation	1455

Embryo Density Counts

per 100 µL

Stock #	Stock Volume (mL)	Rep 1	Rep 2	Rep 3	Rep 4	Mean #/100 µL	Mean #/mL (x10)
Stock #1	300	NC					
Stock 2	300	97	85	79	45	89	890
Stock 3	300	47	54	56	48	51	510

Cell Division:

	% Divided
Stock #1	86
Stock 2	100
Stock 3	97

Stock #2: $\frac{890}{500} = 1.78$ Dilution factor

Stock #3: No Dilution

Selected Stock:	2 + 3
-----------------	-------

Stock Density

Dil Factor

Adjust selected embryo stock to 500 embryos/mL.

Dilution Factor = Stock Density/mL/500

500

In 10 mL sample volume add 500 µL of 500 embryo/mL stock to obtain 25 embryos/mL in test vials.

Notes:

QC #1: 184, 224, 181, 182 / 224 Normal
 TD Counts: 289, 207, 217, 212, 197, 233, 256, 188, 234, 204
 TD Average = 224 embryos/vial NC = not counted

QA Review:

AD 11/14/18

Final Review: SW 1/18/19

Bivalve Batch #5

Lab Control #1

8/17/18

48hr Bivalve Development Results

Client: AMEC/WOOD

Project ID: RHMP - SD Bay South

Species *Mytilus galloprovincialis*

Test No. 18-08-074 to 18-08-076

Sample ID	Rand #					
		# Initial Embryos	# Counted	# Normal	Combined % Normal-Alive	Mean Combined % Normal-Alive
Lab Control	14	210	210	206	98.1	94.1
	6	203	198	196	96.6	
	17	206	206	199	96.6	
	19	203	184	180	88.7	
	1	203	186	184	90.6	
B18-10040	12	203	182	174	85.7	86.0
	7	203	188	187	92.1	
	11	203	180	173	85.2	
	16	203	187	176	86.7	
	2	203	165	163	80.3	
B18-10043	5	203	201	188	92.6	89.7
	10	216	216	210	97.2	
	3	203	167	164	80.8	
	18	203	180	174	85.7	
	15	203	192	187	92.1	
B18-10044	20	203	180	177	87.2	92.1
	9	203	176	173	85.2	
	8	203	193	192	94.6	
	13	203	203	200	98.5	
	4	203	195	193	95.1	

QC Check: AD 11/29/18

Final Review:

SW 1/17/19

Unpaired t test		
1	Table Analyzed	Transform of RHMP 8.17 Bivalve
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column B	B18-10040
6		
7	Unpaired t test	
8	P value	0.0082
9	P value summary	**
10	Significantly different (P < 0.05)?	Yes
11	One- or two-tailed P value?	One-tailed
12	t, df	t=3.026 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.338 ± 0.03983, n=5
16	Mean ± SEM of column B	1.191 ± 0.02806, n=5
17	Difference between means	0.1474 ± 0.04873
18	95% confidence interval	0.03507 to 0.2598
19	R squared (eta squared)	0.5336
20		
21	F test to compare variances	
22	F, DFn, Dfd	2.015, 4, 4
23	P value	0.5142
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 8.17 Bivalve
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column C	B18-10043
6		
7	Unpaired t test	
8	P value	0.1178
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=1.283 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.338 ± 0.03983, n=5
16	Mean ± SEM of column C	1.257 ± 0.04926, n=5
17	Difference between means	0.08126 ± 0.06335
18	95% confidence interval	-0.06484 to 0.2273
19	R squared (eta squared)	0.1706
20		
21	F test to compare variances	
22	F, DFn, Dfd	1.529, 4, 4
23	P value	0.6907
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Unpaired t test		
1	Table Analyzed	Transform of RHMP 8.17 Bivalve
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column D	B18-10044
6		
7	Unpaired t test	
8	P value	0.2967
9	P value summary	ns
10	Significantly different (P < 0.05)?	No
11	One- or two-tailed P value?	One-tailed
12	t, df	t=0.5562 df=8
13		
14	How big is the difference?	
15	Mean ± SEM of column A	1.338 ± 0.03983, n=5
16	Mean ± SEM of column D	1.303 ± 0.04995, n=5
17	Difference between means	0.03553 ± 0.06389
18	95% confidence interval	-0.1118 to 0.1829
19	R squared (eta squared)	0.03722
20		
21	F test to compare variances	
22	F, DFn, Dfd	1.572, 4, 4
23	P value	0.6718
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Embryo-Larval Development Test Scoring Worksheet

Client: Amec FW
Project ID: RHMP
Test No.: 18-08-074 to -076

Test Species: *M. galloprovincialis*
Start Date: 8/17/2018
End Date: 8/19/2018

[illegible]

QC Check: AD 11/29/18

Final Review: SW 1/17/19

**Amec FW
RHMP Sediment Testing
Random Numbers**

SAMPLE ID	Rand#
Lab Control	14 6 17 19 1
B18-10040	12 7 11 16 2
B18-10043	5 10 3 18 15
B18-10044	20 9 8 13 4

QC Check - Mussel: PD

Water Quality for Bivalve Development

Client: Amec FW
Project ID: RHMP
Test No. 18-08-074 to -076

Test Species: *M. galloprovincialis*
Start Date/Time: 8/17/2018 1715
End Date/Time: 8/19/2018 1600

Sample ID	Water Quality Measurements			
	Parameter	0hr	24hr	48hr
Lab Control	Temp. (°C)	15.0	15.7	15.5
	Salinity (ppt)	32.1	32.0	32.1
	pH (units)	7.80	7.56	7.60
	DO (mg/L)	8.3	8.2	8.0
B18-10040	Temp. (°C)	14.9	15.3	15.3
	Salinity (ppt)	32.5	32.7	32.8
	pH (units)	7.74	7.58	7.65
	DO (mg/L)	8.2	8.2	8.1
B18-10043	Temp. (°C)	15.0	15.2	15.0
	Salinity (ppt)	32.8	33.1	33.3
	pH (units)	7.72	7.58	7.68
	DO (mg/L)	8.1	8.2	8.1
B18-10044	Temp. (°C)	15.0	15.1	15.0
	Salinity (ppt)	32.8	33.2	33.4
	pH (units)	7.75	7.64	7.73
	DO (mg/L)	7.9	8.2	8.2
	Temp. (°C)			
	Salinity (ppt)			
	pH (units)			
	DO (mg/L)			
	Temp. (°C)			
	Salinity (ppt)			
	pH (units)			
	DO (mg/L)			
	Temp. (°C)			
	Salinity (ppt)			
	pH (units)			
	DO (mg/L)			
Tech Initials:		Alb	AD	AD

Source of Animals: Mission Bay

Date Received: 8/1/18

Comments:

QC Check: AD 11/14/18

Final Review: JW 1/17/19

Ammonia Subsample Analysis

Client: Amec FW - RHMP
Project ID: Overlying Water
Test No.: 18-08-074 to -076

Test Species: *M. galloprovincialis*
Start Date: 8/17/2018
End Date: 8/19/2018

DI Blank: 0.0

10 mg/L Ammonia Stock: 8.4 mg/L as NH_3

[illegible]

QC Check: AD 11/14/18

Final Review: 2w 1/17/19

Unionized Ammonia Calculation for Pressure of 1 atm									
Input 'Shaded' data									
		I		pK					
	1		9.26						
	2		9.27						
	3		9.28						
	4		9.29						
	5		9.30						
	6		9.32						
	7		9.33						
	8		9.34						

Total Ammonia									
Log Number	Beaker	Day	Dilution	Total Ammonia (mg/L)	Temp (C)	Salinity (ppt)	pH	Temp (K)	I
									Rounded
Lab Control #2	✓		0	< 0.5	15	32.1	7.80	288.16	7.11
B18-10040			0	0.5	14.9	32.5	7.74	288.06	7.20
B18-10043			0	0.5	15	32.8	7.72	288.16	7.26
B18-10044			0	0.7	15	32.8	7.75	288.16	7.26
Lab Control #2	✓		2	0.5	15.5	32.1	7.60	288.66	7.11
B18-10040			2	1.1	15.3	32.8	7.65	288.46	7.26
B18-10043			2	1.2	15	33.3	7.68	288.16	7.37
B18-10044			2	0.9	15	33.4	7.73	288.16	7.39

Unionized Ammonia	D.O.	Beaker Num.	Station
< 0.007			0
0.006			0
0.006			0
0.009			0
0.005			0
0.011			0
0.013			0
0.011			0

Final Reviewed: JW 1/17/19

Embryo-Larval Development Test

Stock Preparation Worksheet

Test Species: M. galloprovincialis
 Batch ID: N/A
 Test Type: Mussel Development

Test Date: 8/17/18
 Analyst: aw

Task	
Spawning Induction	1000
Spawning Begins	1200 - 1400
# Males/# Females	3 / 2
Spawn Condition	Moderate
Fertilization Initiated	1500
Fertilization End/Eggs Rinsed	1520
Embryo Counts	1630
Test Initiation	1715

Embryo Density Counts

per 100 μ L

Stock #	Stock Volume (mL)	Rep 1	Rep 2	Rep 3	Rep 4	Mean #/100 μ L	Mean #/mL (x10)
Stock 1	250	42	57	63	65	57	570
Stock 2							
Stock 3							

Cell Division:

	% Divided
Stock 1	96%
Stock 2	82%
Stock 3	

Selected Stock: #1

Adjust selected embryo stock to 500 embryos/mL.
 Dilution Factor = Stock Density/mL/500

Stock Density
 $\frac{570}{500}$

Dil Factor
1.14

In 10 mL sample volume add 500 μ L of 500 embryo/mL stock to obtain 25 embryos/mL in test vials.

Notes:

¹⁹¹
 $TO_1 A = 184/187$, $TO_1 B = 228$, $TO_1 C = 184$, $TO_1 D = 206$, $TO_1 E = 202$ $x = 202$
 $TO_2 A = 200$, $TO_2 B = 194$, $TO_2 C = 199$, $TO_2 D = 222$, $TO_2 E = 201$ $x = 203$
 $QC_1 C = 180/196$ $TO_{average} = 203$

QA Review:

AB 10/18/18

Final Review: SL 10/10/18

Bivalve Batch #6

Lab Control #1

9/14/18

48hr Bivalve Development Results

Client: AMEC/WOOD

Project ID: RHMP - SD Bay South

Species *Mytilus galloprovincialis*

Test No. 18-09-026 ¹⁵

Sample ID	Rand #					
		# Initial Embryos	# Counted	# Normal	Combined % Normal-Alive	Mean Combined % Normal-Alive
Lab Control #1	LCA	276	247	229	83.0	89.0
	LCB	283	283	271	95.8	
	LCC	276	257	238	86.2	
	LCD	276	275	264	95.7	
	LCE	276	258	233	84.4	
B18-10200	A	276	228	212	76.8	71.5
	B	276	201	192	69.6	
	C	276	200	189	68.5	
	D	276	217	206	74.6	
	E	276	199	188	68.1	

QC Check: AD 12/13/18

Final Review: JW 2/17/19

Unpaired t test		
1	Table Analyzed	Transform of RHMP 10.10 Bivalve
2		
3	Column A	Lab Control
4	vs.	vs.
5	Column B	B18-10200
6		
7	Unpaired t test	
8	P value	0.0011
9	P value summary	**
10	Significantly different (P < 0.05)?	Yes
11	One- or two-tailed P value?	One-tailed
12	t, df	t=4.432 df=8
13		
14	How big is the difference?	
15	Mean \pm SEM of column A	1.116 \pm 0.06695, n=5
16	Mean \pm SEM of column B	0.7983 \pm 0.02554, n=5
17	Difference between means	0.3176 \pm 0.07166
18	95% confidence interval	0.1524 to 0.4829
19	R squared (eta squared)	0.7106
20		
21	F test to compare variances	
22	F, DFn, Dfd	6.873, 4, 4
23	P value	0.0886
24	P value summary	ns
25	Significantly different (P < 0.05)?	No

Embryo-Larval Development Test Scoring Worksheet

Client: Amec FW
Project ID: RHMP
Test No.: 18-09-02615

Test Species: *M. galloprovincialis*
Start Date: 9/14/18
End Date: 9/16/18

[illegible]

QC Check: AD 12/13/18

Final Review: 200 1/17/19

Amec FW
RHMP Sediment Testing
Random Numbers

SAMPLE ID	Replicate
Lab Control #1	A B C D E
B18-10200	A B C D E

QC Check - Mussel: gm

Water Quality for Bivalve Development

Client: Amec FW
Project ID: RHMP
Test No. 18-09-015

Test Species: M. galloprovincialis
Start Date/Time: 9/14/18 1500
End Date/Time: 9/16/18 1530

Sample ID	Water Quality Measurements			
	Parameter	0hr	24hr	48hr
Lab Control #1	Temp. (°C)	15.3	15.8	15.7
	Salinity (ppt)	31.3	31.2	31.0
	pH (units)	7.50	7.59	7.66
	DO (mg/L)	8.3	8.1	8.2
B18-10200	Temp. (°C)	15.4	15.3	15.0
	Salinity (ppt)	31.8	31.9	32.2
	pH (units)	7.56	7.73	7.80
	DO (mg/L)	8.1	8.1	8.3
	Temp. (°C)			
	Salinity (ppt)			
	pH (units)			
	DO (mg/L)			
	Temp. (°C)			
	Salinity (ppt)			
	pH (units)			
	DO (mg/L)			
	Temp. (°C)			
	Salinity (ppt)			
	pH (units)			
	DO (mg/L)			
	Temp. (°C)			
	Salinity (ppt)			
	pH (units)			
	DO (mg/L)			
	Temp. (°C)			
	Salinity (ppt)			
	pH (units)			
	DO (mg/L)			
Tech Initials:		AD	AD OBO AG	AD

Source of Animals: Mission Bay

Date Received: June - Sept

Comments: _____

QC Check: AD 11/27/18

Final Review: JW 1/12/19

Embryo-Larval Development Test

Stock Preparation Worksheet

Test Species: M. galloprovincialis
 Batch ID: 9/14/18
 Test Type: mg-d

Test Date: 9/14/18
 Analyst: AG

Task	
Spawning Induction	0950
Spawning Begins	1115
# Males/# Females	3/1
Spawn Condition	below average
Fertilization Initiated	1230
Fertilization End/Eggs Rinsed	1305
Embryo Counts	1415
Test Initiation	1500

Embryo Density Counts

per 100 µL

Stock #	Stock Volume (mL)	Rep 1	Rep 2	Rep 3	Rep 4	Mean #/100 µL	Mean #/mL (x10)
Stock 1	200	79	60	75	59	62.8	628
Stock 2							
Stock 3							

Cell Division:

	% Divided
Stock 1	99%
Stock 2	
Stock 3	

Selected Stock: 1

Adjust selected embryo stock to 500 embryos/mL.
 Dilution Factor = Stock Density/mL/500

Stock Density
500

Dil Factor
1

In 10 mL sample volume add 500 µl of 500 embryo/ml stock to obtain 25 embryos/mL in test vials.

Notes:

TD Counts: 243, 278, 305, 241, 264
TD Average = 276 embryos / vial
* stock density more dense than target at initiation

QA Review:

AD 11/27/18

Final Review: JW 1/17/19

Ammonia Subsample Analysis

Client: Amec FW - RHMP
Project ID: Overlying Water
Test No.: 18-09-015

Test Species: *M. galloprovincialis*
Start Date: 9/14/2018
End Date: 9/16/2018

DI Blank: 0.6

10 mg/L Ammonia Stock: 7.9 mg/L as NH_3

[illegible]

QC Check: AD 11/26/18

Final Review: SW 1/17/19

* Reading below target for 10 mg/L Ammonia stock. Samples were thrown away and could not be ~~re-analyzed~~^{re-anal} re-analyzed; technician error.

Page 1

Final Reviewed: JVV 1/17/19

APPENDIX D

Statistical Comparison Summary

Statistical Results Comparison - Arcsine Square-Root Transformed Data vs. Untransformed Data

Table 1. Amphipod Survival (*Eohaustorius estuarius*) - 10-Day Acute Survival Sediment Toxicity Test

Harbor Area	Location	Site Mean Survival (%)	Control Mean Survival (%)	Site Mean / Control Mean	Arcsine Square Root Transformed Data		Untransformed Data	
					p-value	Statistically Signif. Decrease From Control? (Y/N)	p-value	Statistically Signif. Decrease From Control? (Y/N)
Oceanside Harbor	B18-10072	70.0	97.0	0.72	0.000	Y	0.001	Y
Mission Bay	B18-10017	81.0	95.0	0.85	0.003	Y	0.003	Y
San Diego Bay - North	B18-10080	94.0	99.0	0.95	0.030	Y	0.057	N
	B18-10114	96.0	99.0	0.97	0.033	Y	0.033	Y
	B18-10115	94.0	99.0	0.95	0.023	Y	0.028	Y
	B18-10116	95.0	99.0	0.96	0.002	Y	0.008	Y
	B18-10117	93.0	99.0	0.94	0.024	Y	0.039	Y
San Diego Bay - Central	B18-10036	86.0	96.0	0.90	0.020	Y	0.058	N
	B18-10119	90.0	99.0	0.91	0.001	Y	0.006	Y
	B18-10123	92.0	99.0	0.93	0.018	Y	0.025	Y
	B18-10124	87.0	96.0	0.91	0.028	Y	0.090	N
	B18-10133	89.0	96.0	0.93	0.021	Y	0.083	N
	B18-10137	90.0	96.0	0.94	0.031	Y	0.118	N
San Diego Bay - South	B18-10178	84.0	99.0	0.85	0.001	Y	0.017	Y
	B18-10088	81.0	96.0	0.84	0.008	Y	0.020	Y
	B18-10200	82.0	97.0	0.85	0.002	Y	0.007	Y

red = statistically significant effect (one-tailed t-test)

bold values for the Site Mean = less than 90% survival

Table 2. Bivalve Embryo Development (*Mytilus galloprovincialis*) - 48-Hour Sediment -Water Interface Toxicity Test

Harbor Area	Location	Site Mean Normal-Alive (%)	Control Mean Normal-Alive (%)	Site Mean / Control Mean	Arcsine Square Root Transformed Data		Untransformed Data	
					p-value	Statistically Signif. Decrease From Control? (Y/N)	p-value	Statistically Signif. Decrease From Control? (Y/N)
Dana Point Harbor	B18-10065	83	91	0.91	0.050	Y	0.053	N
Oceanside Harbor	B18-10069	80	91	0.88	0.040	Y	0.037	Y
	B18-10071	82	91	0.89	0.008	Y	0.010	Y
Mission Bay	B18-10073	80	92	0.86	0.016	Y	0.020	Y
	B18-10074	85	92	0.92	0.036	Y	0.068	N
San Diego Bay - North	B18-10082	58	76	0.76	0.005	Y	0.014	Y
San Diego Bay - Central	B18-10144	78	85	0.92	0.013	Y	0.019	Y
San Diego Bay - South	B18-10040	86	94	0.91	0.008	Y	0.008	Y
	B18-10200	72	89	0.80	0.001	Y	0.001	Y

red = statistically significant effect (one-tailed t-test)

APPENDIX E

List of Laboratory Qualifier Codes

Test Qualifier Codes

- QC1: Temperatures out of recommended range; corrective action taken
- QC2: Temperatures out of recommended range; no action taken, test terminated
- QC3: Test initiated on aeration due to anticipated drop in dissolved oxygen
- QC4: Dissolved oxygen percent saturation <110
- QC5: Survival counts not recorded due to poor visibility
- QC6: Inadequate sample volume remaining; 50% renewal performed
- QC7: Inadequate sample volume remaining; no renewal performed

APPENDIX F

Reference Toxicant Tests & Control Charts

Amphipod Reference Toxicant

96-hr Survival

7/13/18

CETIS Summary Report

Report Date: 23 Aug-18 13:07 (p 1 of 1)
Test Code: 180713eera | 04-2185-5907

Reference Toxicant 96-h Acute Survival Test						Amec Foster Wheeler - San Diego					
Batch ID:	09-3041-5265	Test Type:	Survival	Analyst:							
Start Date:	13 Jul-18 15:30	Protocol:	EPA/600/R-94/025 (1994)	Diluent:	Diluted Natural Seawater						
Ending Date:	17 Jul-18 14:15	Species:	Eohaustorius estuarius	Brine:	Not Applicable						
Duration:	95h	Source:	Northwestern Aquatic Science, OR	Age:	3-5mm						
Sample ID:	01-2334-3179	Code:	75A114B 180713eera	Client:	Internal						
Sample Date:	13 Jul-18	Material:	Total Ammonia	Project:							
Receipt Date:	13 Jul-18	Source:	Reference Toxicant								
Sample Age:	16h	Station:									
Multiple Comparison Summary											
Analysis ID	Endpoint	Comparison Method		NOEL	LOEL	TOEL	TU	PMSD		✓	
11-3645-9456	Survival Rate	Steel Many-One Rank Sum Test		107.8	251.8	164.8		8.23%			
Point Estimate Summary											
Analysis ID	Endpoint	Point Estimate Method		Level	mg/L	95% LCL	95% UCL	TU	✓		
05-6355-4552	Survival Rate	Trimmed Spearman-Kärber		LC50	180.6	167.4	194.8				
Survival Rate Summary											
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	4	0.9750	0.8954	1.0000	0.9000	1.0000	0.0250	0.0500	5.13%	0.00%
13.2		4	0.9750	0.8954	1.0000	0.9000	1.0000	0.0250	0.0500	5.13%	0.00%
28.9		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-2.56%
53.3		4	0.9750	0.8954	1.0000	0.9000	1.0000	0.0250	0.0500	5.13%	0.00%
107.8		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-2.56%
251.8		4	0.1750	0.0227	0.3273	0.1000	0.3000	0.0479	0.0957	54.71%	82.05%
Survival Rate Detail											
Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4						
0	LC	1.0000	1.0000	0.9000	1.0000						
13.2		1.0000	1.0000	1.0000	0.9000						
28.9		1.0000	1.0000	1.0000	1.0000						
53.3		1.0000	1.0000	1.0000	0.9000						
107.8		1.0000	1.0000	1.0000	1.0000						
251.8		0.1000	0.3000	0.2000	0.1000						

CETIS Analytical Report

Report Date: 23 Aug-18 13:07 (p 1 of 2)
Test Code: 180713eera | 04-2185-5907

Reference Toxicant 96-h Acute Survival Test								Amec Foster Wheeler - San Diego			
Analysis ID: 11-3645-9456		Endpoint: Survival Rate				CETIS Version: CETISv1.9.3					
Analyzed: 23 Aug-18 13:06		Analysis: Nonparametric-Control vs Treatments				Official Results: Yes					
Data Transform		Alt Hyp				NOEL	LOEL	TOEL	TU	PMSD	
Angular (Corrected)		C > T				107.8	251.8	164.8		8.23%	
Steel Many-One Rank Sum Test											
Control	vs	Conc-mg/L	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)		
Lab Control		13.2	18	10	2	6	Asymp	0.8333	Non-Significant Effect		
		28.9	20	10	1	6	Asymp	0.9516	Non-Significant Effect		
		53.3	18	10	2	6	Asymp	0.8333	Non-Significant Effect		
		107.8	20	10	1	6	Asymp	0.9516	Non-Significant Effect		
		251.8*	10	10	0	6	Asymp	0.0417	Significant Effect		
ANOVA Table											
Source	Sum Squares		Mean Square		DF	F Stat	P-Value	Decision(α:5%)			
Between	3.11767		0.623535		5	105.4	<1.0E-37	Significant Effect			
Error	0.106443		0.0059135		18						
Total	3.22412				23						
Distributional Tests											
Attribute	Test				Test Stat	Critical	P-Value	Decision(α:1%)			
Variances	Levene Equality of Variance Test				5.196	4.248	0.0040	Unequal Variances			
Variances	Mod Levene Equality of Variance Test				1.39	4.248	0.2746	Equal Variances			
Distribution	Shapiro-Wilk W Normality Test				0.822	0.884	6.9E-04	Non-Normal Distribution			
Survival Rate Summary											
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	4	0.9750	0.8954	1.0000	1.0000	0.9000	1.0000	0.0250	5.13%	0.00%
13.2		4	0.9750	0.8954	1.0000	1.0000	0.9000	1.0000	0.0250	5.13%	0.00%
28.9		4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-2.56%
53.3		4	0.9750	0.8954	1.0000	1.0000	0.9000	1.0000	0.0250	5.13%	0.00%
107.8		4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-2.56%
251.8		4	0.1750	0.0227	0.3273	0.1500	0.1000	0.3000	0.0479	54.71%	82.05%
Angular (Corrected) Transformed Summary											
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	4	1.371	1.242	1.501	1.412	1.249	1.412	0.04074	5.94%	0.00%
13.2		4	1.371	1.242	1.501	1.412	1.249	1.412	0.04074	5.94%	0.00%
28.9		4	1.412	1.412	1.412	1.412	1.412	1.412	0	0.00%	-2.97%
53.3		4	1.371	1.242	1.501	1.412	1.249	1.412	0.04074	5.94%	0.00%
107.8		4	1.412	1.412	1.412	1.412	1.412	1.412	0	0.00%	-2.97%
251.8		4	0.4217	0.2232	0.6202	0.3927	0.3218	0.5796	0.06237	29.58%	69.25%

CETIS Analytical Report

Report Date: 23 Aug-18 13:07 (p 2 of 2)
Test Code: 180713eera | 04-2185-5907

Reference Toxicant 96-h Acute Survival Test

Amec Foster Wheeler - San Diego

Analysis ID: 11-3645-9456

Endpoint: Survival Rate

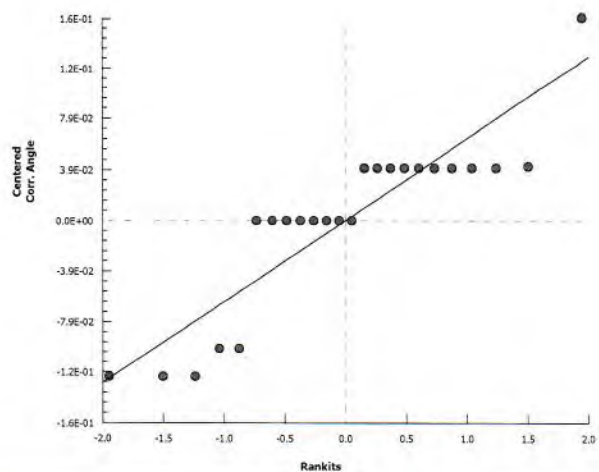
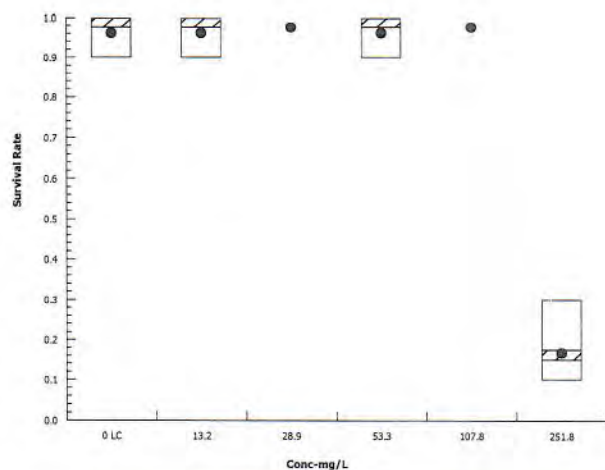
CETIS Version: CETISv1.9.3

Analyzed: 23 Aug-18 13:06

Analysis: Nonparametric-Control vs Treatments

Official Results: Yes

Graphics



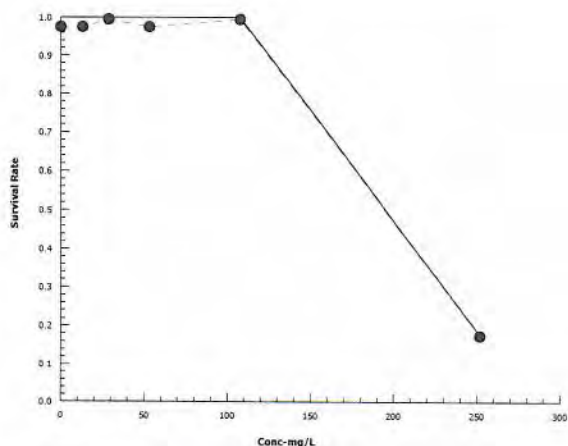
CETIS Analytical Report

Report Date: 23 Aug-18 13:07 (p 1 of 1)
Test Code: 180713eera | 04-2185-5907

Reference Toxicant 96-h Acute Survival Test					Amec Foster Wheeler - San Diego		
Analysis ID:	05-6355-4552	Endpoint:	Survival Rate		CETIS Version:	CETISv1.9.3	
Analyzed:	23 Aug-18 13:07	Analysis:	Trimmed Spearman-Kärber		Official Results:	Yes	
Trimmed Spearman-Kärber Estimates							
Threshold Option	Threshold	Trim	Mu	Sigma	LC50	95% LCL	95% UCL
Control Threshold	0.025	17.77%	2.257	0.01646	180.6	167.4	194.8

Survival Rate Summary			Calculated Variate(A/B)							Isotonic Variate	
Conc-mg/L	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	LC	4	0.9750	0.9000	1.0000	0.0500	5.13%	0.0%	39/40	0.985	0.0%
13.2		4	0.9750	0.9000	1.0000	0.0500	5.13%	0.0%	39/40	0.985	0.0%
28.9		4	1.0000	1.0000	1.0000	0.0000	0.00%	-2.56%	40/40	0.985	0.0%
53.3		4	0.9750	0.9000	1.0000	0.0500	5.13%	0.0%	39/40	0.985	0.0%
107.8		4	1.0000	1.0000	1.0000	0.0000	0.00%	-2.56%	40/40	0.985	0.0%
251.8		4	0.1750	0.1000	0.3000	0.0957	54.71%	82.05%	7/40	0.175	82.23%

Graphics



Reference Toxicant 96-h Acute Survival Test

Amec Foster Wheeler - San Diego

Test Type: Survival

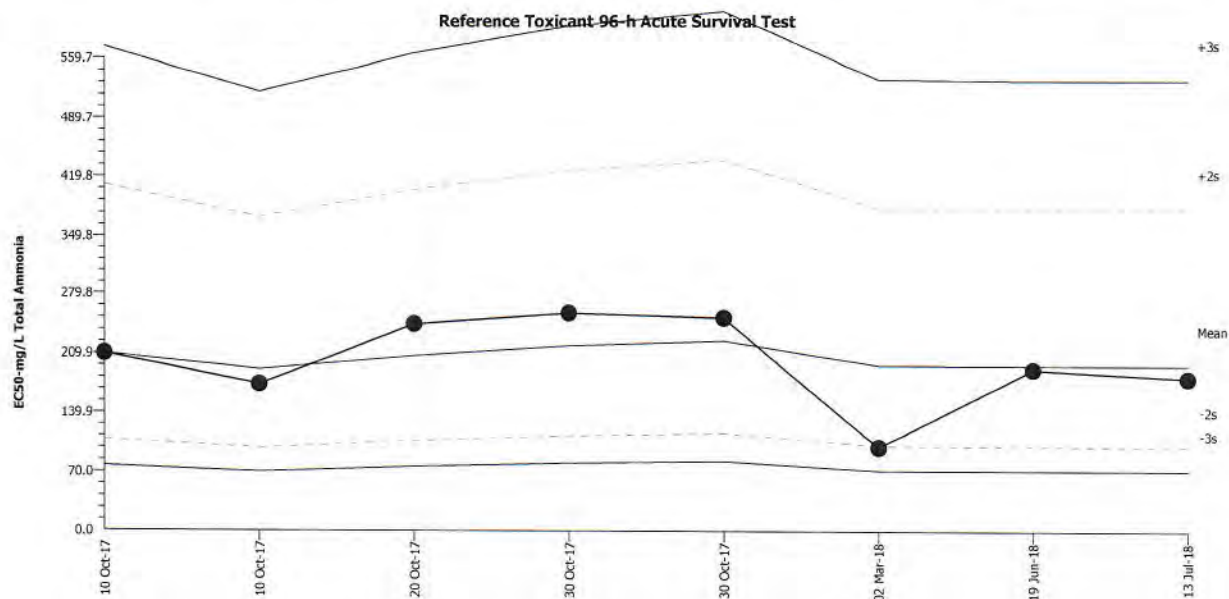
Organism: Eohaustorius estuarius (Amphipod)

Material: Total Ammonia

Protocol: EPA/600/R-94/025 (1994)

Endpoint: Survival Rate

Source: Reference Toxicant-REF



Mean: 195.4

Count: 7

-2s Warning Limit: 100

-3s Action Limit: 71.59

Sigma: n/a

CV: 34.40%

+2s Warning Limit: 381.3

+3s Action Limit: 532.7

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2017	Oct	10	17:30	210	14.63	0.2159			06-5655-2602	17-3273-4016
2			10	18:00	173.5	-21.91	-0.3555			07-8215-6400	00-2955-6732
3			20	12:30	244	48.64	0.6646			03-4937-1003	03-8642-4218
4			30	16:30	256.7	61.33	0.8161			09-3631-4649	14-4314-6082
5			30	16:30	251.4	55.99	0.7532			10-7359-2291	01-9112-8062
6	2018	Mar	2	16:00	98.86	-96.53	-2.037	(-)		01-9608-4409	06-7306-3463
7		Jun	19	15:30	191	-4.399	-0.06808			09-3910-1421	05-3881-9055
8		Jul	13	15:30	180.6	-14.82	-0.2359			04-2185-5907	05-6355-4552

96hr Static Acute Amphipod Test

Client: Internal

Project ID: NH₃ Reftox

Test No. 180713eera

Test Species: *E. estuarius*

Start Date/Time: 7/13/2018 1530

End Date/Time: 7/17/2018 1415

Ammonia Concentration (mg/L)	Rep	Counts					Water Quality						
		0	24	48	72	96	Parameter	0	24	48	72	96	
Lab Control	A	10				10	Temp. (°C)	15.7	15.5	15.5	15.4	15.5	
	B	10				10	Salinity (ppt)	32.1		31.9		31.5	
	C	10				9	pH (units)	7.00		7.77		7.60	
	D	10				10	DO (mg/L)	7.8		7.6		7.6	
15.6 13.2	A	10				10	Temp. (°C)	15.6	15.4	15.0	15.3	15.5	
	B	10				10	Salinity (ppt)	32.2		31.9		31.5	
	C	10				10	pH (units)	7.98		7.82		7.57	
	D	10				9	DO (mg/L)	7.9		7.8		7.7	
31.2 28.9	A	10				10	Temp. (°C)	15.5	15.3	15.0	15.2	15.5	
	B	10				10	Salinity (ppt)	32.3		32.0	JW	31.5	
	C	10				10	pH (units)	7.95		7.85		7.55	
	D	10				10	DO (mg/L)	7.9		7.8		7.9	
62.5 53.3	A	10				10	Temp. (°C)	15.5	15.2	14.4	15.2	15.2	
	B	10				10	Salinity (ppt)	32.4		32.0		31.8	
	C	10				10	pH (units)	7.89		7.85		7.52	
	D	10				9	DO (mg/L)	7.9		7.8		8.0	
125 107.8	A	10				10	Temp. (°C)	15.4	15.1	14.8	15.1	15.1	
	B	10				10	Salinity (ppt)	32.6		32.5		31.5	
	C	10				10	pH (units)	7.78		7.84		7.51	
	D	10				10	DO (mg/L)	7.9		7.9		8.0	
280 251.8	A	10				1	Temp. (°C)	15.4	15.1	14.8	15.1	15.1	
	B	10				3	Salinity (ppt)	33.0		32.8		32.4	
	C	10				2	pH (units)	7.61		7.74		7.48	
	D	10				1	DO (mg/L)	7.9		7.8		7.9	
	A						Temp. (°C)						
	B						Salinity (ppt)						
	C						pH (units)						
	D						DO (mg/L)						
Tech Initials:		AD				JW	Tech Initials:		AD	AD	JW	AD	JW

Date Animals Received: 7/11/18

Age or Size of Animals: 3-5mm

Ammonia Subsamples Taken:

Start: JW

End: JW

Comments:

QC Check: AD 8/1/18

Final Review:

JC 8/23/18

Eoh Reffox Unionized

Unionized Ammonia Calculation for Pressure of 1 atm														
Input 'Shaded' data														
		I		pK										
		1		9.26										
		2		9.27										
		3		9.28										
		4		9.29										
		5		9.30										
		6		9.32										
		7		9.33										
		8		9.34										

Ammonia Subsample Analysis

Client: Internal
Project ID: NH3 Reference Toxicant
Test No.: 180713el5a

Test Species: *E. estuarius*
Start Date: 7/13/2018
End Date: 7/17/2018

DI Blank: 0.0

10 mg/L Ammonia Stock: 9.4 mg/L as NH_3

[illegible]

QC Check: SC 8/23/18

Final Review: 2w 8/27/18

Amphipod Reference Toxicant

96-hr Survival

7/17/18

CETIS Summary Report

Report Date: 22 Aug-18 17:41 (p 1 of 1)
 Test Code: 180717eera | 21-0757-7657

Reference Toxicant 96-h Acute Survival Test						Amec Foster Wheeler - San Diego					
Batch ID:	09-6459-6429	Test Type:	Survival	Analyst:							
Start Date:	17 Jul-18 13:45	Protocol:	EPA/600/R-94/025 (1994)	Diluent:	Diluted Natural Seawater						
Ending Date:	21 Jul-18 13:20	Species:	Eohaustorius estuarius	Brine:	Not Applicable						
Duration:	96h	Source:	Northwestern Aquatic Science, OR	Age:							
Sample ID:	16-7701-8001	Code:	180717eera	Client:	Internal						
Sample Date:	17 Jul-18	Material:	Total Ammonia	Project:							
Receipt Date:	17 Jul-17	Source:	Reference Toxicant								
Sample Age:	14h	Station:									
Multiple Comparison Summary											
Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	TU	PMSD	✓			
10-1535-0660	Survival Rate	Steel Many-One Rank Sum Test	118.1	233.5	166.1		6.89%				
Point Estimate Summary											
Analysis ID	Endpoint	Point Estimate Method	Level	mg/L	95% LCL	95% UCL	TU	✓			
02-6316-5081	Survival Rate	Trimmed Spearman-Kärber	LC50	188.1	171.2	206.8					
Survival Rate Summary											
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	4	0.9750	0.8954	1.0000	0.9000	1.0000	0.0250	0.0500	5.13%	0.00%
14.9		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-2.56%
28.1		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-2.56%
58.1		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-2.56%
118.1		4	0.9750	0.8954	1.0000	0.9000	1.0000	0.0250	0.0500	5.13%	0.00%
233.5		4	0.2750	0.1227	0.4273	0.2000	0.4000	0.0479	0.0957	34.82%	71.79%
Survival Rate Detail											
Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4						
0	LC	1.0000	1.0000	1.0000	0.9000						
14.9		1.0000	1.0000	1.0000	1.0000						
28.1		1.0000	1.0000	1.0000	1.0000						
58.1		1.0000	1.0000	1.0000	1.0000						
118.1		0.9000	1.0000	1.0000	1.0000						
233.5		0.4000	0.2000	0.3000	0.2000						

CETIS Analytical Report

Report Date: 22 Aug-18 17:41 (p 1 of 2)
 Test Code: 180717eera | 21-0757-7657

Reference Toxicant 96-h Acute Survival Test							Amec Foster Wheeler - San Diego																
Analysis ID: 10-1535-0660		Endpoint: Survival Rate		CETIS Version: CETISv1.9.3																			
Analyzed: 22 Aug-18 17:30		Analysis: Nonparametric-Control vs Treatments		Official Results: Yes																			
Data Transform		Alt Hyp		NOEL		LOEL		TOEL		TU		PMSD											
Angular (Corrected)		C > T		118.1		233.5		166.1				6.89%											
Steel Many-One Rank Sum Test																							
Control		vs		Conc-mg/L		Test Stat		Critical		Ties		DF P-Type		P-Value		Decision(α:5%)							
Lab Control		14.9		20		10		1		6		Asymp		0.9516		Non-Significant Effect							
		28.1		20		10		1		6		Asymp		0.9516		Non-Significant Effect							
		58.1		20		10		1		6		Asymp		0.9516		Non-Significant Effect							
		118.1		18		10		2		6		Asymp		0.8333		Non-Significant Effect							
		233.5*		10		10		0		6		Asymp		0.0417		Significant Effect							
ANOVA Table																							
Source		Sum Squares		Mean Square		DF		F Stat		P-Value		Decision(α:5%)											
Between		2.40388		0.480776		5		117.3		<1.0E-37		Significant Effect											
Error		0.0737628		0.0040979		18																	
Total		2.47764				23																	
Distributional Tests																							
Attribute		Test		Test Stat		Critical		P-Value		Decision(α:1%)													
Variances		Levene Equality of Variance Test		6.943		4.248		9.0E-04		Unequal Variances													
Variances		Mod Levene Equality of Variance Test		1.748		4.248		0.1747		Equal Variances													
Distribution		Shapiro-Wilk W Normality Test		0.8295		0.884		9.3E-04		Non-Normal Distribution													
Survival Rate Summary																							
Conc-mg/L		Code		Count		Mean		95% LCL		95% UCL		Median		Min		Max		Std Err		CV%		%Effect	
0		LC		4		0.9750		0.8954		1.0000		1.0000		0.9000		1.0000		0.0250		5.13%		0.00%	
14.9				4		1.0000		1.0000		1.0000		1.0000		1.0000		1.0000		0.0000		0.00%		-2.56%	
28.1				4		1.0000		1.0000		1.0000		1.0000		1.0000		1.0000		0.0000		0.00%		-2.56%	
58.1				4		1.0000		1.0000		1.0000		1.0000		1.0000		1.0000		0.0000		0.00%		-2.56%	
118.1				4		0.9750		0.8954		1.0000		1.0000		0.9000		1.0000		0.0250		5.13%		0.00%	
233.5				4		0.2750		0.1227		0.4273		0.2500		0.2000		0.4000		0.0479		34.82%		71.79%	
Angular (Corrected) Transformed Summary																							
Conc-mg/L		Code		Count		Mean		95% LCL		95% UCL		Median		Min		Max		Std Err		CV%		%Effect	
0		LC		4		1.371		1.242		1.501		1.412		1.249		1.412		0.04074		5.94%		0.00%	
14.9				4		1.412		1.412		1.412		1.412		1.412		1.412		0		0.00%		-2.97%	
28.1				4		1.412		1.412		1.412		1.412		1.412		1.412		0		0.00%		-2.97%	
58.1				4		1.412		1.412		1.412		1.412		1.412		1.412		0		0.00%		-2.97%	
118.1				4		1.371		1.242		1.501		1.412		1.249		1.412		0.04074		5.94%		0.00%	
233.5				4		0.5479		0.3787		0.7171		0.5216		0.4636		0.6847		0.05317		19.41%		60.04%	

Reference Toxicant 96-h Acute Survival Test

Amec Foster Wheeler - San Diego

Analysis ID: 10-1535-0660

Endpoint: Survival Rate

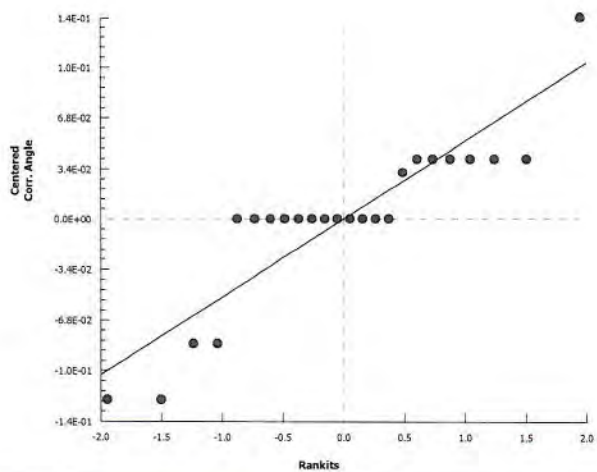
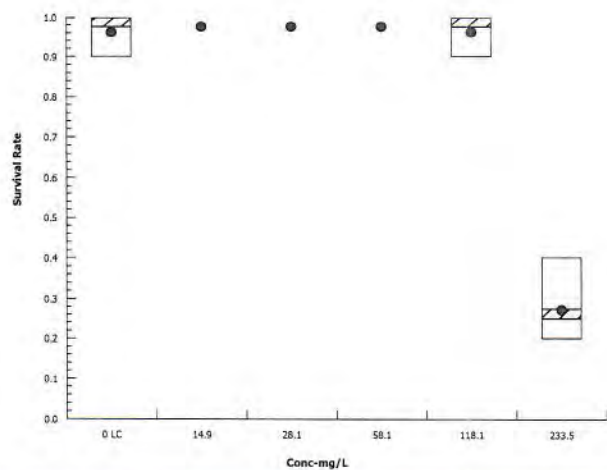
CETIS Version: CETISv1.9.3

Analyzed: 22 Aug-18 17:30

Analysis: Nonparametric-Control vs Treatments

Official Results: Yes

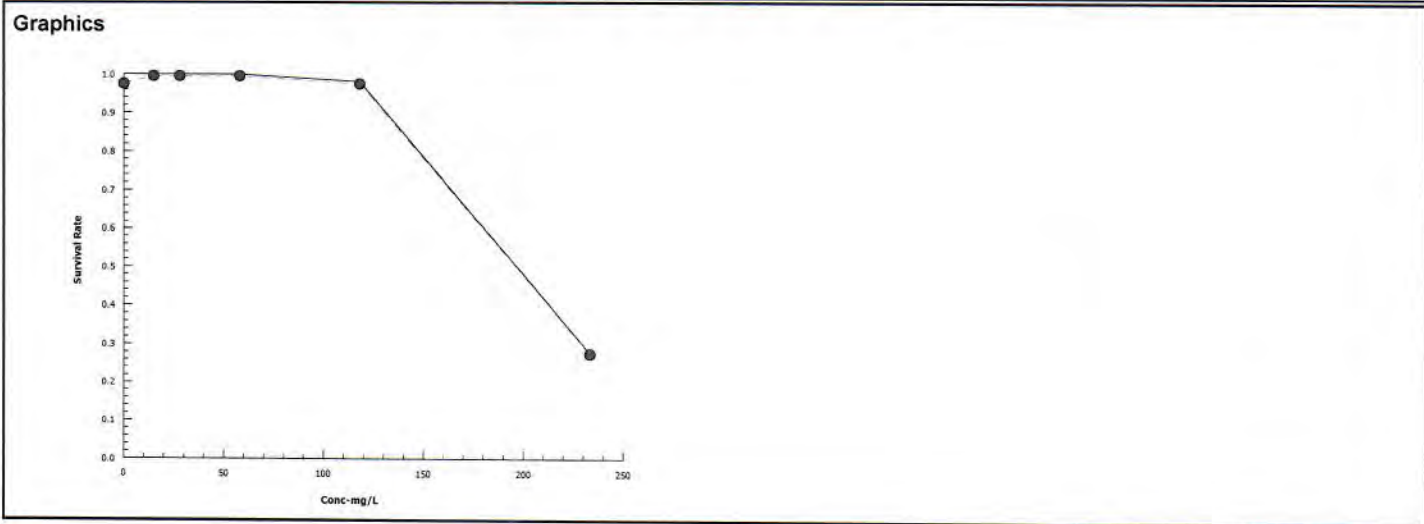
Graphics



CETIS Analytical Report

Report Date: 22 Aug-18 17:41 (p 1 of 1)
 Test Code: 180717eera | 21-0757-7657

Reference Toxicant 96-h Acute Survival Test						Amec Foster Wheeler - San Diego					
Analysis ID: 02-6316-5081		Endpoint: Survival Rate		CETIS Version: CETISv1.9.3							
Analyzed: 22 Aug-18 17:30		Analysis: Trimmed Spearman-Kärber		Official Results: Yes							
Trimmed Spearman-Kärber Estimates											
Threshold Option		Threshold	Trim	Mu	Sigma	LC50	95% LCL	95% UCL			
Control Threshold		0.025	27.67%	2.274	0.02051	188.1	171.2	206.8			
Survival Rate Summary			Calculated Variate(A/B)							Isotonic Variate	
Conc-mg/L	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	LC	4	0.9750	0.9000	1.0000	0.0500	5.13%	0.0%	39/40	0.9937	0.0%
14.9		4	1.0000	1.0000	1.0000	0.0000	0.00%	-2.56%	40/40	0.9937	0.0%
28.1		4	1.0000	1.0000	1.0000	0.0000	0.00%	-2.56%	40/40	0.9937	0.0%
58.1		4	1.0000	1.0000	1.0000	0.0000	0.00%	-2.56%	40/40	0.9937	0.0%
118.1		4	0.9750	0.9000	1.0000	0.0500	5.13%	0.0%	39/40	0.975	1.89%
233.5		4	0.2750	0.2000	0.4000	0.0957	34.82%	71.79%	11/40	0.275	72.33%



Reference Toxicant 96-h Acute Survival Test

Amec Foster Wheeler - San Diego

Test Type: Survival

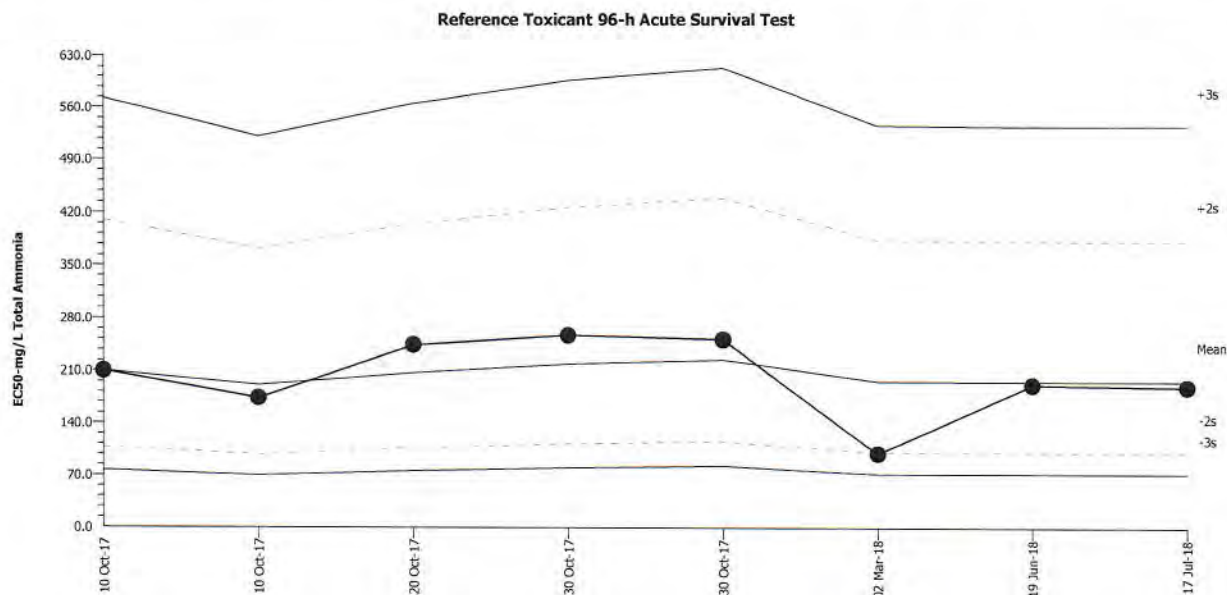
Organism: Eohaustorius estuarius (Amphipod)

Material: Total Ammonia

Protocol: EPA/600/R-94/025 (1994)

Endpoint: Survival Rate

Source: Reference Toxicant-REF



Mean: 195.4

Count: 7

-2s Warning Limit: 100

-3s Action Limit: 71.59

Sigma: n/a

CV: 34.40%

+2s Warning Limit: 381.3

+3s Action Limit: 532.7

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2017	Oct	10	17:30	210	14.63	0.2159			06-5655-2602	17-3273-4016
2			10	18:00	173.5	-21.91	-0.3555			07-8215-6400	00-2955-6732
3			20	12:30	244	48.64	0.6646			03-4937-1003	03-8642-4218
4			30	16:30	256.7	61.33	0.8161			09-3631-4649	14-4314-6082
5			30	16:30	251.4	55.99	0.7532			10-7359-2291	01-9112-8062
6	2018	Mar	2	16:00	98.86	-96.53	-2.037	(-)		01-9608-4409	06-7306-3463
7		Jun	19	15:30	191	-4.399	-0.06808			09-3910-1421	05-3881-9055
8		Jul	17	13:45	188.1	-7.262	-0.1132			21-0757-7657	02-6316-5081

Ammonia Subsample Analysis

Client: Internal
Project ID: NH3 Reference Toxicant
Test No.: 180717.eesa

Test Species: *E. estuarius*
Start Date: 7/17/2018 1345
End Date: 7/21/2018 1320

DI Blank: 0.0

10 mg/L Ammonia Stock: 8.2

[illegible]

QC Check: As

Final Review: Sc 11/20/18

Analyst: ALG

96hr Static Acute Amphipod Test

Client: Internal

Project ID: NH₃ Reftox

Test No. 180717eera

Test Species: *E. estuarius*

Start Date/Time: 7/17/2018 1345

End Date/Time: 7/21/2018 1320

Concentration (mg/L)	Rep	Counts					Water Quality					
		0	24	48	72	96	Parameter	0	24	48	72	96
Lab Control	A	10				10	Temp. (°C)	15.7	15.2	14.6	14.6	15.0
	B	10				10	Salinity (ppt)	31.8		32.1		32.0
	C	10				10	pH (units)	7.88		7.76		7.73
	D	10				9	DO (mg/L)	7.7		7.8		7.5
14.9 15.8 Ag	A	10				10	Temp. (°C)	15.5	15.1	14.7	14.6	14.9
	B	10				10	Salinity (ppt)	32.0		32.1		32.0
	C	10				10	pH (units)	7.88		7.73		7.73
	D	10				10	DO (mg/L)	7.5		7.6		7.6
28.1 31.2 Ag	A	10				10	Temp. (°C)	15.5	15.2	14.7	14.6	14.9
	B	10				10	Salinity (ppt)	32.1		32.1		32.0
	C	10				10	pH (units)	7.88		7.73		7.74
	D	10				10	DO (mg/L)	7.5		7.4		7.6
58.1 62.5 Ag	A	10				10	Temp. (°C)	15.3	15.2	14.7	14.6	14.9
	B	10				10	Salinity (ppt)	32.2		32.1		32.1
	C	10				10	pH (units)	7.82		7.69		7.72
	D	10				10	DO (mg/L)	7.5		7.4		7.7
118.1 125 Ag	A	10				9	Temp. (°C)	15.5	15.2	14.7	14.6	14.9
	B	10				10	Salinity (ppt)	32.4		32.4		32.3
	C	10				10	pH (units)	7.70		7.66		7.71
	D	10				10	DO (mg/L)	7.5		7.6		7.8
233.5 250 Ag	A	10				4	Temp. (°C)	15.3	15.2	14.7	14.6	14.9
	B	10				2	Salinity (ppt)	32.8		32.8		32.7
	C	10				3	pH (units)	7.55		7.59		7.71
	D	10				2	DO (mg/L)	7.5		7.7		7.7
	A						Temp. (°C)					
	B						Salinity (ppt)					
	C						pH (units)					
	D						DO (mg/L)					
Tech Initials: JR						AD	Tech Initials: JW AP Ag AD AD					

Date Animals Received: 7/11/18

Age or Size of Animals: 3-5mm

Ammonia Subsamples Taken:

Start: JW

End: AP

Comments:

QC Check: AG 8/22/18

Final Review: SC 11/20/18

Eoh Reflex Unionized

Unionized Ammonia Calculation for Pressure of 1 atm									
Input 'Shaded' data									
					I	pK			
					1	9.26			
					2	9.27			
					3	9.28			
					4	9.29			
					5	9.30			
					6	9.32			
					7	9.33			
					8	9.34			

Amphipod Reference Toxicant

96-hr Survival

7/24/18

CETIS Summary Report

Report Date: 27 Nov-18 11:56 (p 1 of 1)
Test Code: 180724eera | 15-3046-7177

Reference Toxicant 96-h Acute Survival Test						Amec Foster Wheeler - San Diego					
Batch ID: 07-0844-1858	Test Type: Survival		Analyst:			Diluent: Diluted Natural Seawater					
Start Date: 24 Jul-18 15:00	Protocol: EPA/600/R-94/025 (1994)		Brine: Not Applicable			Age: 3-5 mm					
Ending Date: 28 Jul-18 17:00	Species: Eohaustorius estuarius		Source: Northwestern Aquatic Science, OR								
Duration: 4d 2h											
Sample ID: 11-6135-2855	Code: 180724eera #1		Client: Internal								
Sample Date: 24 Jul-18	Material: Total Ammonia		Project:								
Receipt Date: 24 Jul-18	Source: Reference Toxicant										
Sample Age: 15h	Station:										
Multiple Comparison Summary											
Analysis ID	Endpoint	Comparison Method			NOEL	LOEL	TOEL	TU	PMSD ✓		
13-3609-6399	Survival Rate	Dunnett Multiple Comparison Test			104.1	214.5	149.4		7.25%		
Point Estimate Summary											
Analysis ID	Endpoint	Point Estimate Method			Level	mg/L	95% LCL	95% UCL	TU	✓	
07-7640-7637	Survival Rate	Trimmed Spearman-Kärber			LC50	193.5	160.8	232.8			
Survival Rate Summary											
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
13.7		4	0.9500	0.8581	1.0000	0.9000	1.0000	0.0289	0.0577	6.08%	5.00%
27.1		4	0.9750	0.8954	1.0000	0.9000	1.0000	0.0250	0.0500	5.13%	2.50%
53.6		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
104.1		4	0.9500	0.8581	1.0000	0.9000	1.0000	0.0289	0.0577	6.08%	5.00%
214.5		4	0.4250	0.3454	0.5046	0.4000	0.5000	0.0250	0.0500	11.76%	57.50%
Survival Rate Detail											
Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4						
0	LC	1.0000	1.0000	1.0000	1.0000						
13.7		0.9000	1.0000	0.9000	1.0000						
27.1		1.0000	1.0000	1.0000	0.9000						
53.6		1.0000	1.0000	1.0000	1.0000						
104.1		0.9000	0.9000	1.0000	1.0000						
214.5		0.4000	0.4000	0.5000	0.4000						

CETIS Analytical Report

Report Date: 27 Nov-18 11:56 (p 1 of 2)
Test Code: 180724eera | 15-3046-7177

Reference Toxicant 96-h Acute Survival Test								Amec Foster Wheeler - San Diego					
Analysis ID: 13-3609-6399		Endpoint: Survival Rate		CETIS Version: CETISv1.9.3									
Analyzed: 27 Nov-18 11:54		Analysis: Parametric-Control vs Treatments		Official Results: Yes									
Data Transform		Alt Hyp		NOEL		LOEL		TOEL		TU		PMSD	
Angular (Corrected)		C > T		104.1		214.5		149.4				7.25%	
Dunnett Multiple Comparison Test													
Control	vs	Conc-mg/L	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)				
Lab Control		13.7	1.722	2.407	0.114	6	CDF	0.1642	Non-Significant Effect				
		27.1	0.8608	2.407	0.114	6	CDF	0.4844	Non-Significant Effect				
		53.6	0	2.407	0.114	6	CDF	0.8333	Non-Significant Effect				
		104.1	1.722	2.407	0.114	6	CDF	0.1642	Non-Significant Effect				
		214.5*	14.84	2.407	0.114	6	CDF	2.7E-05	Significant Effect				
ANOVA Table													
Source	Sum Squares		Mean Square		DF		F Stat	P-Value	Decision(α:5%)				
Between	1.48466		0.296932		5		66.28	<1.0E-37	Significant Effect				
Error	0.0806404		0.0044800		18								
Total	1.5653				23								
Distributional Tests													
Attribute	Test				Test Stat		Critical	P-Value	Decision(α:1%)				
Variances	Levene Equality of Variance Test				14.68		4.248	8.2E-06	Unequal Variances				
Variances	Mod Levene Equality of Variance Test				3.58		4.248	0.0201	Equal Variances				
Distribution	Shapiro-Wilk W Normality Test				0.9158		0.884	0.0473	Normal Distribution				
Survival Rate Summary													
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect		
0	LC	4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%		
13.7		4	0.9500	0.8581	1.0000	0.9500	0.9000	1.0000	0.0289	6.08%	5.00%		
27.1		4	0.9750	0.8954	1.0000	1.0000	0.9000	1.0000	0.0250	5.13%	2.50%		
53.6		4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%		
104.1		4	0.9500	0.8581	1.0000	0.9500	0.9000	1.0000	0.0289	6.08%	5.00%		
214.5		4	0.4250	0.3454	0.5046	0.4000	0.4000	0.5000	0.0250	11.76%	57.50%		
Angular (Corrected) Transformed Summary													
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect		
0	LC	4	1.412	1.412	1.412	1.412	1.412	1.412	0	0.00%	0.00%		
13.7		4	1.331	1.181	1.48	1.331	1.249	1.412	0.04705	7.07%	5.77%		
27.1		4	1.371	1.242	1.501	1.412	1.249	1.412	0.04074	5.94%	2.89%		
53.6		4	1.412	1.412	1.412	1.412	1.412	1.412	0	0.00%	0.00%		
104.1		4	1.331	1.181	1.48	1.331	1.249	1.412	0.04705	7.07%	5.77%		
214.5		4	0.7099	0.6298	0.79	0.6847	0.6847	0.7854	0.02517	7.09%	49.73%		

CETIS Analytical Report

Report Date: 27 Nov-18 11:56 (p 2 of 2)
Test Code: 180724eera | 15-3046-7177

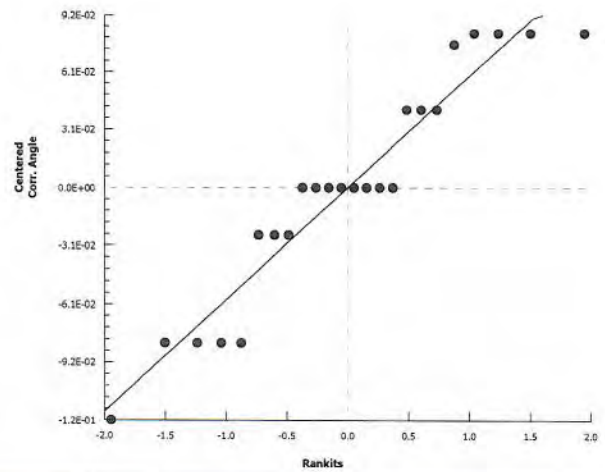
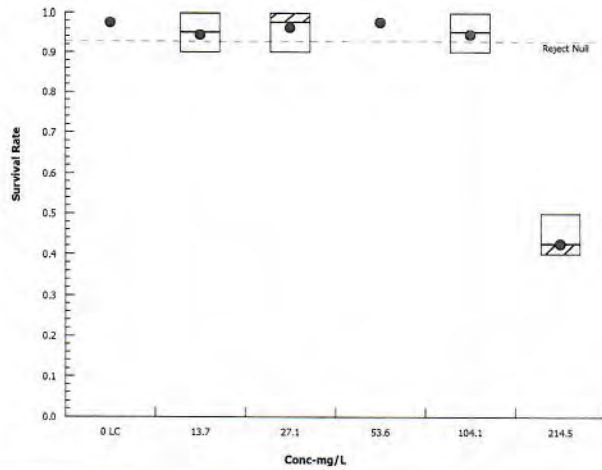
Reference Toxicant 96-h Acute Survival Test

Amec Foster Wheeler - San Diego

Analysis ID: 13-3609-6399 Endpoint: Survival Rate
Analyzed: 27 Nov-18 11:54 Analysis: Parametric-Control vs Treatments

CETIS Version: CETISv1.9.3
Official Results: Yes

Graphics



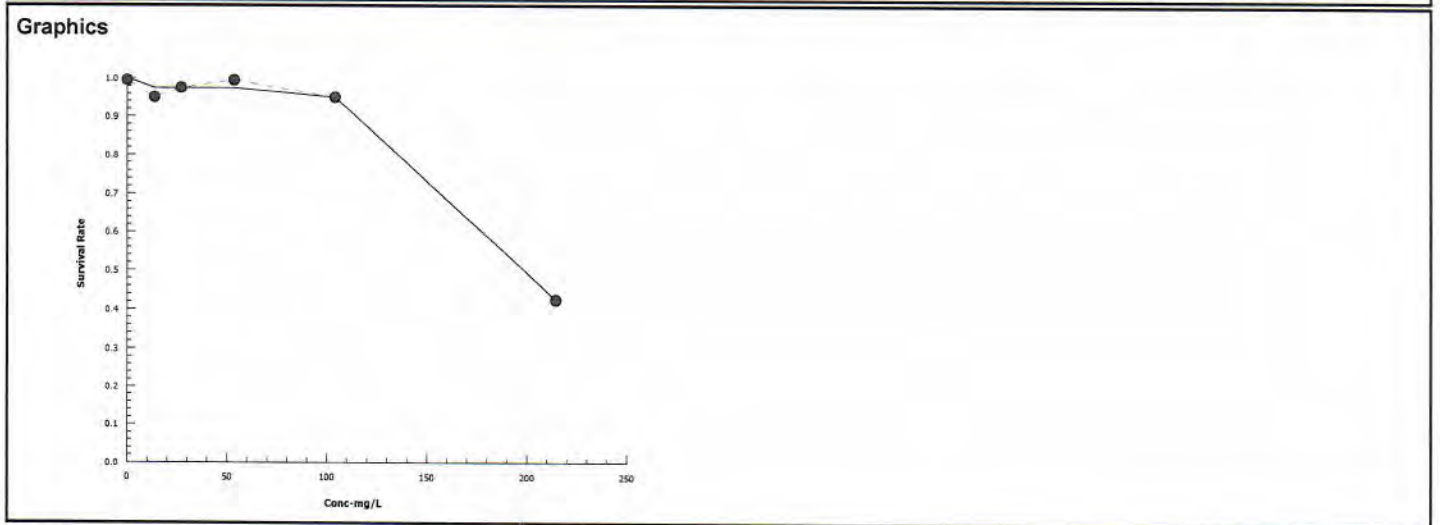
CETIS Analytical Report

Report Date: 27 Nov-18 11:56 (p 1 of 1)
Test Code: 180724eera | 15-3046-7177

Reference Toxicant 96-h Acute Survival Test				Amec Foster Wheeler - San Diego			
Analysis ID:	07-7640-7637	Endpoint:	Survival Rate	CETIS Version:	CETISv1.9.3		
Analyzed:	27 Nov-18 11:54	Analysis:	Trimmed Spearman-Kärber	Official Results:	Yes		

Trimmed Spearman-Kärber Estimates							
Threshold Option	Threshold	Trim	Mu	Sigma	LC50	95% LCL	95% UCL
Control Threshold	0	42.50%	2.287	0.04018	193.5	160.8	232.8

Survival Rate Summary			Calculated Variate(A/B)							Isotonic Variate	
Conc-mg/L	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	LC	4	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	40/40	1	0.0%
13.7		4	0.9500	0.9000	1.0000	0.0577	6.08%	5.0%	38/40	0.975	2.5%
27.1		4	0.9750	0.9000	1.0000	0.0500	5.13%	2.5%	39/40	0.975	2.5%
53.6		4	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	40/40	0.975	2.5%
104.1		4	0.9500	0.9000	1.0000	0.0577	6.08%	5.0%	38/40	0.95	5.0%
214.5		4	0.4250	0.4000	0.5000	0.0500	11.76%	57.5%	17/40	0.425	57.5%



Reference Toxicant 96-h Acute Survival Test

Wood Environment & Infrastructure Solutions

Test Type: Survival

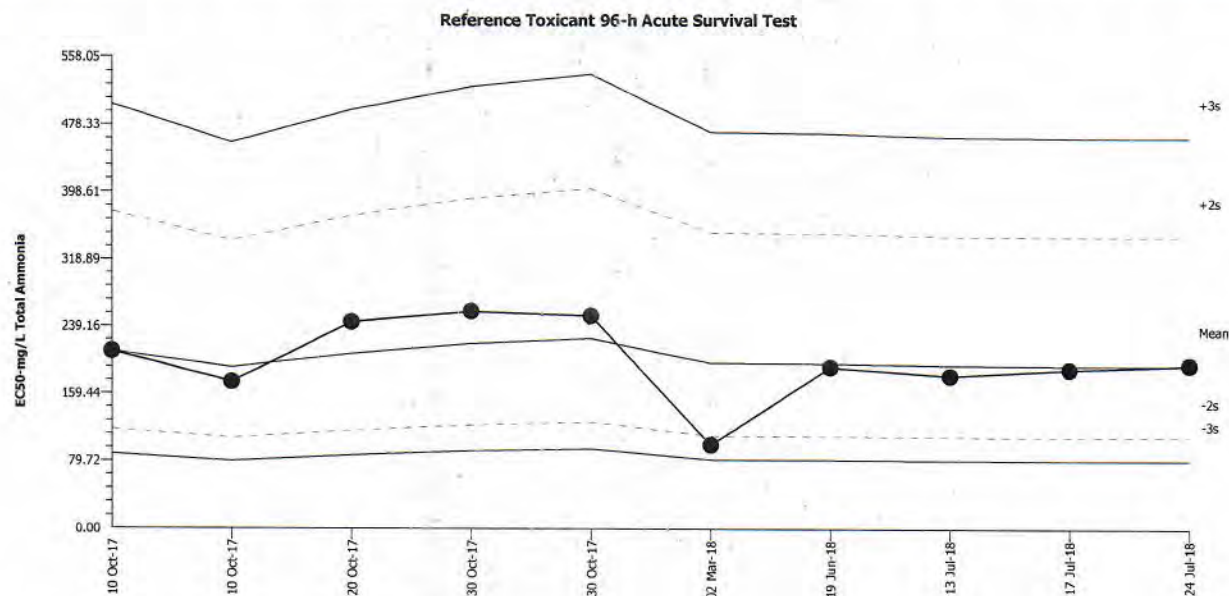
Organism: Eohaustorius estuarius (Amphipod)

Material: Total Ammonia

Protocol: EPA/600/R-94/025 (1994)

Endpoint: Survival Rate

Source: Reference Toxicant-REF



Mean: 192.9

Count: 9

-2s Warning Limit: 107.7

-3s Action Limit: 80.53

Sigma: n/a

CV: 29.70%

+2s Warning Limit: 345

+3s Action Limit: 461.6

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2017	Oct	10	17:30	210	17.16	0.2928			06-5655-2602	17-3273-4016
2			10	18:00	173.5	-19.38	-0.3639			07-8215-6400	00-2955-6732
3			20	12:30	244	51.17	0.8086			03-4937-1003	03-8642-4218
4			30	16:30	256.7	63.85	0.9827			09-3631-4649	14-4314-6082
5			30	16:30	251.4	58.51	0.9105			10-7359-2291	01-9112-8062
6	2018	Mar	2	16:00	98.86	-94	-2.296	(-)		01-9608-4409	06-7306-3463
7		Jun	19	15:30	191	-1.875	-0.03358			09-3910-1421	05-3881-9055
8		Jul	13	15:30	180.6	-12.3	-0.2265			04-2185-5907	05-6355-4552
9			17	13:45	188.1	-4.739	-0.08549			21-0757-7657	02-6316-5081
10			24	15:00	193.5	0.5853	0.01041			15-3046-7177	07-7640-7637

96hr Static Acute Amphipod Test

Client: Internal

Test Species: *E. estuarius*

Project ID: NH₃ Reftox

Start Date/Time: 7/24/2018 1500

Test No. 180717cera-180724cera

End Date/Time: 7/27/2018 1700

Concentration (mg/L)	Rep	Counts					Water Quality						
		0	24	48	72	96	Parameter	0	24	48	72	96	
Lab Control	A	10				10	Temp. (°C)	15.6	15.0	15.0	15.5	14.8	
	B	10				10	Salinity (ppt)	31.5		31.3		31.3	
	C	10				10	pH (units)	7.91		7.72		7.67	
	D	10				10	DO (mg/L)	7.0		7.0		7.7	
13.7 -15.6 AD	A	10				9	Temp. (°C)	15.6	14.9	14.8	15.5	14.7	
	B	10				10	Salinity (ppt)	31.9		31.6		31.7	
	C	10				9	pH (units)	7.83		7.74		7.71	
	D	10				10	DO (mg/L)	6.8		7.3		7.8	
27.1 -31.2 AD	A	10				10	Temp. (°C)	15.7	14.9	14.7	15.4	14.7	
	B	10				10	Salinity (ppt)	31.8		31.7		31.7	
	C	10				10	pH (units)	7.79		7.73		7.70	
	D	10				9	DO (mg/L)	6.8		7.0		7.7	
58.6 -62.5 AD	A	10				10	Temp. (°C)	15.7	14.9	14.7	15.3	14.6	
	B	10				10	Salinity (ppt)	31.8		31.7		31.7	
	C	10				10	pH (units)	7.72		7.72		7.71	
	D	10				10	DO (mg/L)	6.8		7.3		7.7	
104.1 -125 AD	A	10				9	Temp. (°C)	15.8	14.8	14.7	15.3	14.6	
	B	10				9	Salinity (ppt)	32.2		32.0		32.0	
	C	10				10	pH (units)	7.60		7.69		7.69	
	D	10				10	DO (mg/L)	6.8		7.0		7.6	
214.5 -250 AD	A	10				4	Temp. (°C)	15.4	14.8	14.7	15.2	14.6	
	B	10				4	Salinity (ppt)	32.5		32.3		32.4	
	C	10				5	pH (units)	7.45		7.62		7.64	
	D	10				4	DO (mg/L)	6.8		7.2		7.7	
	A						Temp. (°C)						
	B						Salinity (ppt)						
	C						pH (units)						
	D						DO (mg/L)						
Tech Initials:		AD				AD	Tech Initials:		AD	Ab	AD	AD	AD

Tech Initials: AD

Tech Initials: AD AB AD JW AD

Date Animals Received: 7/20/18

Ammonia Subsamples Collected:

Start: AD

End: AD

Age or Size of Animals: 3-5mm

Comments:

QC Check: AD 11/14/18

Final Review:

12/21/18

Eoh Reflex Unionized

Unionized Ammonia Calculation for Pressure of 1 atm									
Input 'Shaded' data									
		I	pK						
		1	9.26						
		2	9.27						
		3	9.28						
		4	9.29						
		5	9.30						
		6	9.32						
		7	9.33						
		8	9.34						

Ammonia Subsample Analysis

Client: Internal
Project ID: NH3 Reference Toxicant
Test No.: 180724 eera

Test Species: *E. estuarius*
 Start Date: 7/24/2018 1500
 End Date: 7/27/2018 1700
 28

DI Blank: 0.0

10 mg/L Ammonia Stock: $7.8 \times 1.22 = 9.5 \text{ mg/L as } \text{NH}_3$

[illegible]

QC Check: AB 11/14/18

Final Review: SC 12/21/18

Amphipod Reference Toxicant

96-hr Survival

7/26/18

CETIS Summary Report

Report Date: 27 Nov-18 11:39 (p 1 of 1)
Test Code: 180726eera | 20-1199-2155

Reference Toxicant 96-h Acute Survival Test Amec Foster Wheeler - San Diego

Batch ID: 18-7562-3155	Test Type: Survival	Analyst: <i>AD</i>
Start Date: 26 Jul-18 16:00	Protocol: EPA/600/R-94/025 (1994)	Diluent: Diluted Natural Seawater
Ending Date: 30 Jul-18 14:15	Species: Eohaustorius estuarius	Brine: Not Applicable
Duration: 94h	Source: Northwestern Aquatic Science, OR	Age: 3-5mm

Sample ID: 19-5641-7654	Code: 180726eera	Client: Internal
Sample Date: 26 Jul-18	Material: Total Ammonia	Project:
Receipt Date: 26 Jul-18	Source: Reference Toxicant	
Sample Age: 16h	Station:	

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	TU	PMSD ✓
08-1061-9063	Survival Rate	Steel Many-One Rank Sum Test	117.5	191.5	150		6.63%

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	mg/L	95% LCL	95% UCL	TU	✓
06-4886-8502	Survival Rate	Trimmed Spearman-Kärber	LC50	165.7	153.8	178.5		

Survival Rate Summary

Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
21.1		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
28.3		4	0.9750	0.8954	1.0000	0.9000	1.0000	0.0250	0.0500	5.13%	2.50%
59.5		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
117.5		4	0.9750	0.8954	1.0000	0.9000	1.0000	0.0250	0.0500	5.13%	2.50%
191.5		4	0.3000	0.1701	0.4299	0.2000	0.4000	0.0408	0.0817	27.22%	70.00%

Survival Rate Detail

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	LC	1.0000	1.0000	1.0000	1.0000
21.1		1.0000	1.0000	1.0000	1.0000
28.3		1.0000	0.9000	1.0000	1.0000
59.5		1.0000	1.0000	1.0000	1.0000
117.5		1.0000	0.9000	1.0000	1.0000
191.5		0.2000	0.3000	0.4000	0.3000

CETIS Analytical Report

Report Date: 27 Nov-18 11:39 (p 1 of 2)
Test Code: 180726era | 20-1199-2155

Reference Toxicant 96-h Acute Survival Test
Amec Foster Wheeler - San Diego

Analysis ID: 08-1061-9063 Endpoint: Survival Rate
Analyzed: 27 Nov-18 11:38 Analysis: Nonparametric-Control vs Treatments
CETIS Version: CETISv1.9.3
Official Results: Yes

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	C > T	117.5	191.5	150		6.63%

Control	vs	Conc-mg/L	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		21.1	18	10	1	6	Asymp	0.8333	Non-Significant Effect
		28.3	16	10	1	6	Asymp	0.6105	Non-Significant Effect
		59.5	18	10	1	6	Asymp	0.8333	Non-Significant Effect
		117.5	16	10	1	6	Asymp	0.6105	Non-Significant Effect
		191.5*	10	10	0	6	Asymp	0.0417	Significant Effect

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.24279	0.448557	5	125.6	<1.0E-37	Significant Effect
Error	0.0643051	0.0035725	18			
Total	2.30709		23			

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	3.564	4.248	0.0205	Equal Variances
Variances	Mod Levene Equality of Variance Test	0.9001	4.248	0.5022	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.7597	0.884	6.9E-05	Non-Normal Distribution

Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
21.1		4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
28.3		4	0.9750	0.8954	1.0000	1.0000	0.9000	1.0000	0.0250	5.13%	2.50%
59.5		4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
117.5		4	0.9750	0.8954	1.0000	1.0000	0.9000	1.0000	0.0250	5.13%	2.50%
191.5		4	0.3000	0.1701	0.4299	0.3000	0.2000	0.4000	0.0408	27.22%	70.00%

Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	4	1.412	1.412	1.412	1.412	1.412	1.412	0	0.00%	0.00%
21.1		4	1.412	1.412	1.412	1.412	1.412	1.412	0	0.00%	0.00%
28.3		4	1.371	1.242	1.501	1.412	1.249	1.412	0.04074	5.94%	2.89%
59.5		4	1.412	1.412	1.412	1.412	1.412	1.412	0	0.00%	0.00%
117.5		4	1.371	1.242	1.501	1.412	1.249	1.412	0.04074	5.94%	2.89%
191.5		4	0.5769	0.4332	0.7206	0.5796	0.4636	0.6847	0.04515	15.65%	59.14%

CETIS Analytical Report

Report Date: 27 Nov-18 11:39 (p 2 of 2)
Test Code: 180726eera | 20-1199-2155

Reference Toxicant 96-h Acute Survival Test

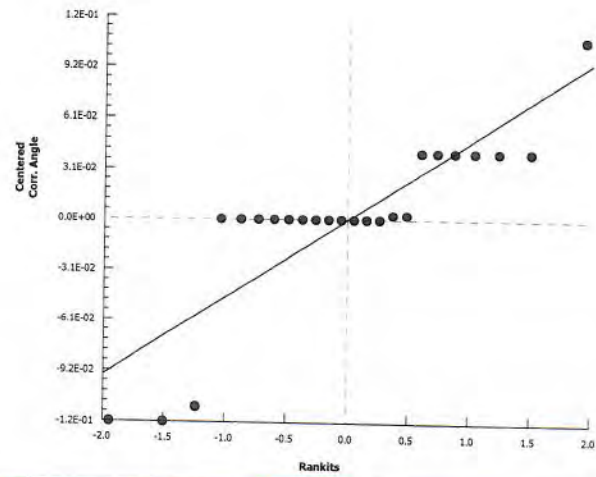
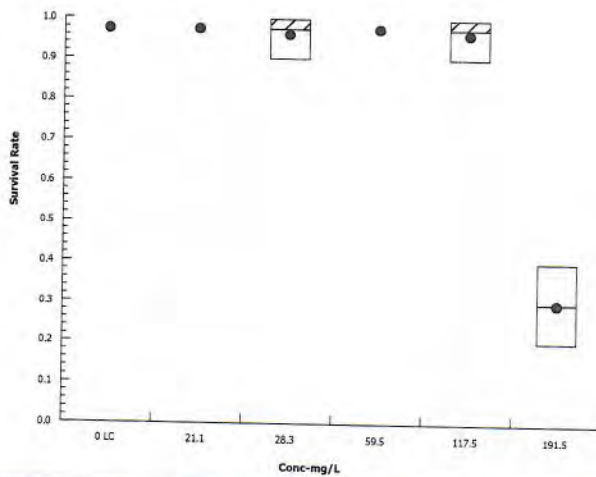
Amec Foster Wheeler - San Diego

Analysis ID: 08-1061-9063
Analyzed: 27 Nov-18 11:38

Endpoint: Survival Rate
Analysis: Nonparametric-Control vs Treatments

CETIS Version: CETISv1.9.3
Official Results: Yes

Graphics



CETIS Analytical Report

Report Date: 27 Nov-18 11:39 (p 1 of 1)
Test Code: 180726eera | 20-1199-2155

Reference Toxicant 96-h Acute Survival Test

Amec Foster Wheeler - San Diego

Analysis ID: 06-4886-8502 Endpoint: Survival Rate
Analyzed: 27 Nov-18 11:39 Analysis: Trimmed Spearman-Kärber

CETIS Version: CETISv1.9.3

Official Results: Yes

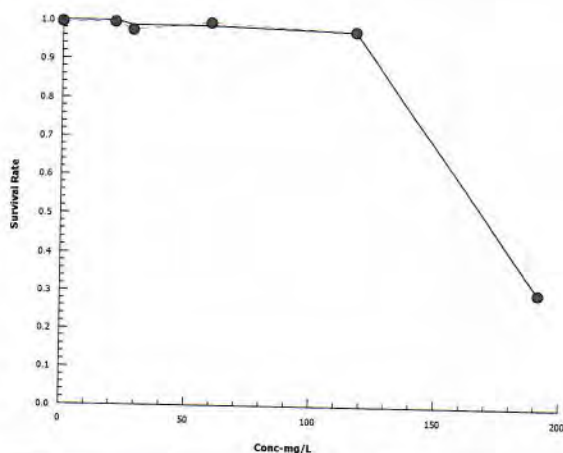
Trimmed Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	LC50	95% LCL	95% UCL
Control Threshold	0	30.00%	2.219	0.01619	165.7	153.8	178.5

Survival Rate Summary

Conc-mg/L	Code	Count	Calculated Variate(A/B)							Isotonic Variate	
			Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	LC	4	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	40/40	1	0.0%
21.1		4	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	40/40	1	0.0%
28.3		4	0.9750	0.9000	1.0000	0.0500	5.13%	2.5%	39/40	0.9875	1.25%
59.5		4	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	40/40	0.9875	1.25%
117.5		4	0.9750	0.9000	1.0000	0.0500	5.13%	2.5%	39/40	0.975	2.5%
191.5		4	0.3000	0.2000	0.4000	0.0817	27.22%	70.0%	12/40	0.3	70.0%

Graphics



Reference Toxicant 96-h Acute Survival Test

Wood Environment & Infrastructure Solutions

Test Type: Survival

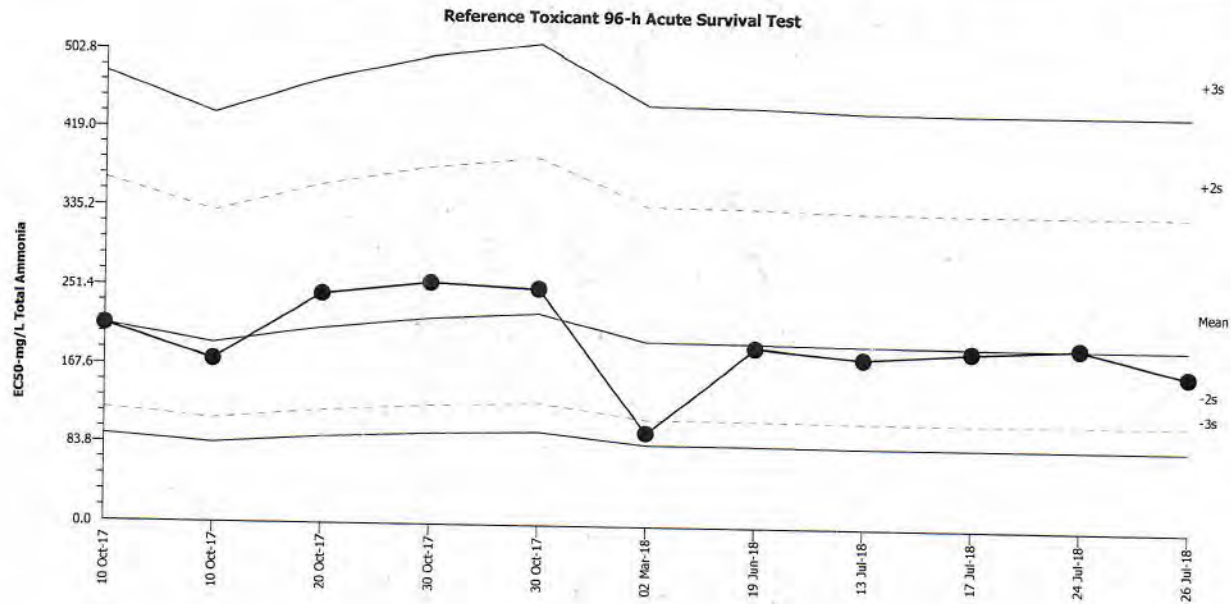
Organism: Eohaustorius estuarius (Amphipod)

Material: Total Ammonia

Protocol: EPA/600/R-94/025 (1994)

Endpoint: Survival Rate

Source: Reference Toxicant-REF



Mean: 192.9

Count: 10

-2s Warning Limit: 111.4

-3s Action Limit: 84.67

Sigma: n/a

CV: 28.00%

+2s Warning Limit: 333.9

+3s Action Limit: 439.3

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2017	Oct	10	17:30	210	17.16	0.3105			06-5655-2602	17-3273-4016
2			10	18:00	173.5	-19.38	-0.386			07-8215-6400	00-2955-6732
3			20	12:30	244	51.17	0.8575			03-4937-1003	03-8642-4218
4			30	16:30	256.7	63.85	1.042			09-3631-4649	14-4314-6082
5			30	16:30	251.4	58.51	0.9656			10-7359-2291	01-9112-8062
6	2018	Mar	2	16:00	98.86	-94	-2.435	(-)		01-9608-4409	06-7306-3463
7		Jun	19	15:30	191	-1.875	-0.03561			09-3910-1421	05-3881-9055
8		Jul	13	15:30	180.6	-12.3	-0.2402			04-2185-5907	05-6355-4552
9			17	13:45	188.1	-4.739	-0.09066			21-0757-7657	02-6316-5081
10			24	15:00	193.5	0.5853	0.01104			15-3046-7177	07-7640-7637
11			26	16:00	165.7	-27.17	-0.5533			20-1199-2155	06-4886-8502

Ammonia Subsample Analysis

Client: Internal
Project ID: NH3 Reference Toxicant
Test No.: 180726 eeva

Test Species: *E. estuarius*

Start Date:	7/26/2018	1600
End Date:	7/30/2018	1415

DI Blank: 0.0

10 mg/L Ammonia Stock: 8.7 mg/L as NH_3

[illegible]

QC Check: AD 11/14/18

Final Review: EC 12/21/18

96hr Static Acute Amphipod Test

Client: Internal

Project ID: NH₃ Reftox

Test No. 180717 ~~ceera~~ 180726 ~~ceera~~

Test Species: *E. estuarius*

Start Date/Time: 7/26/2018 1600

End Date/Time: 7/30/2018 1415

Concentration (mg/L)	Rep	Counts					Water Quality					
		0	24	48	72	96	Parameter	0	24	48	72	96
Lab Control	A	10				10	Temp. (°C)	15.7	15.7	14.7	14.8	15.0
	B	10				10	Salinity (ppt)	31.6		31.6		31.5
	C	10				10	pH (units)	8.09		7.78		7.65
	D	10				10	DO (mg/L)	6.8		7.6		7.7
21.1 15.6 AD	A	10				10	Temp. (°C)	15.9	15.5	14.5	14.7	14.7
	B	10				10	Salinity (ppt)	31.6		31.7		31.7
	C	10				10	pH (units)	8.01		7.79		7.67
	D	10				10	DO (mg/L)	6.8		7.7		7.9
28.3 31.2 AD	A	10			2W	410	Temp. (°C)	16.0	15.1	14.5	14.6	14.6
	B	10				9	Salinity (ppt)	31.7		31.7		31.7
	C	10				10	pH (units)	7.98		7.80		7.68
	D	10				10	DO (mg/L)	6.9		7.7		7.9
59.5 62.5 AD	A	10				10	Temp. (°C)	16.0	14.9	14.5	14.6	14.4
	B	10				10	Salinity (ppt)	31.8		31.9		31.9
	C	10				10	pH (units)	7.90		7.78		7.67
	D	10				10	DO (mg/L)	6.9		7.6		7.9
117.5 125 AD	A	10				10	Temp. (°C)	16.0	14.8	14.6	14.5	14.4
	B	10				9	Salinity (ppt)	31.7		32.1		32.1
	C	10				10	pH (units)	7.77		7.74		7.65
	D	10				10	DO (mg/L)	6.7		7.4		7.8
191.5 250 AD	A	10				2	Temp. (°C)	15.9	14.8	14.6	14.5	14.6
	B	10				3	Salinity (ppt)	32.4		32.5		32.7
	C	10				4	pH (units)	7.59		7.66		7.53
	D	10				3	DO (mg/L)	6.8		7.5		7.9
	A						Temp. (°C)					
	B						Salinity (ppt)					
	C						pH (units)					
	D						DO (mg/L)					
Tech Initials: AD/SC						2W	Tech Initials: AD 2W AD 2W AD					

Date Animals Received: 7/24/18

Age or Size of Animals: 3-5mm

Ammonia Subsamples Collected:

Start: 2W/AD

End: 2W

Comments:

QC Check: AD 11/14/18

Final Review: SC 12/21/18

Unionized Ammonia Calculation for Pressure of 1 atm

Input 'Shaded' data

I	pK
1	9.26
2	9.27
3	9.28
4	9.29
5	9.30
6	9.32
7	9.33
8	9.34

Log Number	Beaker	Day	Dilution	Total Ammonia (mg/L)	Temp (C)	Salinity (ppt)	pH	Temp (K)	I	I Rounded	pK	Unionized Ammonia (mg/L)	D.O. (mg/L)	Beaker Num.	Station
180726eera			0	0.6	15.7	31.6	8.09	288.86	7.00	7	9.33	0.017		0	
180726eera			0	21.1	15.9	31.6	8.01	289.06	7.00	7	9.33	0.506		0	
180726eera			0	28.3	16	31.7	7.98	289.16	7.02	7	9.33	0.639		0	
180726eera			0	59.5	16	31.8	7.90	289.16	7.05	7	9.33	1.121		0	
180726eera			0	117.5	16	31.7	7.77	289.16	7.02	7	9.33	1.649		0	
180726eera			0	191.5	15.9	32.4	7.59	289.06	7.17	7	9.33	1.771		0	
180726eera			4	1	15	31.5	7.65	288.16	6.98	7	9.33	0.010		0	
180726eera			4	21.7	14.7	31.7	7.67	287.86	7.02	7	9.33	0.220		0	
180726eera			4	27.7	14.6	31.7	7.68	287.76	7.02	7	9.33	0.286		0	
180726eera			4	58.6	14.4	31.9	7.67	287.56	7.07	7	9.33	0.582		0	
180726eera			4	114.20	14.6	32.1	7.65	287.76	7.11	7	9.33	1.100		0	
180726eera			4	240.30	14.6	32.7	7.53	287.76	7.24	7	9.33	1.761		0	

Amphipod Reference Toxicant

96-hr Survival

8/3/18

CETIS Summary Report

Report Date: 27 Nov-18 11:31 (p 1 of 1)
 Test Code: 73F624B5-19-4551-1093

Reference Toxicant 96-h Acute Survival Test										Amec Foster Wheeler - San Diego	
Batch ID: 03-2975-0662	Test Type: Survival		Analyst:								
Start Date: 03 Aug-18 17:30	Protocol: EPA/600/R-94/025 (1994)		Diluent: Diluted Natural Seawater								
Ending Date: 07 Aug-18 18:10	Species: Eohaustorius estuarius		Brine: Not Applicable								
Duration: 4d 1h	Source: Northwestern Aquatic Science, OR		Age: 3-5mm								
Sample ID: 21-0876-7462	Code: 180803eera		Client: Internal								
Sample Date: 03 Aug-18	Material: Total Ammonia		Project:								
Receipt Date: 03 Aug-18	Source: Reference Toxicant										
Sample Age: 17h	Station:										
Multiple Comparison Summary											
Analysis ID	Endpoint	Comparison Method		NOEL	LOEL	TOEL	TU	PMSD		✓	
13-3251-7585	Survival Rate	Dunnett Multiple Comparison Test		107.8	178.6	138.8		15.2%			
Point Estimate Summary											
Analysis ID	Endpoint	Point Estimate Method		Level	mg/L	95% LCL	95% UCL	TU	✓		
09-4084-7224	Survival Rate	Trimmed Spearman-Kärber		LC50	153.5	137.2	171.7				
Survival Rate Summary											
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
14.4		4	0.9250	0.8454	1.0000	0.9000	1.0000	0.0250	0.0500	5.41%	7.50%
26.4		4	0.9000	0.6750	1.0000	0.7000	1.0000	0.0707	0.1414	15.71%	10.00%
57.1		4	0.9000	0.7701	1.0000	0.8000	1.0000	0.0408	0.0817	9.07%	10.00%
107.8		4	0.8500	0.5744	1.0000	0.6000	1.0000	0.0866	0.1732	20.38%	15.00%
178.6		4	0.3500	0.1909	0.5091	0.3000	0.5000	0.0500	0.1000	28.57%	65.00%
Survival Rate Detail											
Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4						
0	LC	1.0000	1.0000	1.0000	1.0000						
14.4		1.0000	0.9000	0.9000	0.9000						
26.4		0.9000	0.7000	1.0000	1.0000						
57.1		1.0000	0.9000	0.9000	0.8000						
107.8		1.0000	0.9000	0.6000	0.9000						
178.6		0.3000	0.3000	0.3000	0.5000						

CETIS Analytical Report

Report Date: 27 Nov-18 11:31 (p 1 of 2)
Test Code: 73F624B5 | 19-4551-1093

Reference Toxicant 96-h Acute Survival Test								Amec Foster Wheeler - San Diego															
Analysis ID: 13-3251-7585		Endpoint: Survival Rate		CETIS Version: CETISv1.9.3																			
Analyzed: 27 Nov-18 11:30		Analysis: Parametric-Control vs Treatments		Official Results: Yes																			
Data Transform		Alt Hyp		NOEL		LOEL		TOEL		TU		PMSD											
Angular (Corrected)		C > T		107.8		178.6		138.8				15.25%											
Dunnett Multiple Comparison Test																							
Control		vs		Conc-mg/L		Test Stat		Critical		MSD		DF P-Type		P-Value		Decision(α:5%)							
Lab Control		14.4		1.214		2.407		0.242		6		CDF		0.3315		Non-Significant Effect							
		26.4		1.449		2.407		0.242		6		CDF		0.2446		Non-Significant Effect							
		57.1		1.566		2.407		0.242		6		CDF		0.2074		Non-Significant Effect							
		107.8		2.115		2.407		0.242		6		CDF		0.0854		Non-Significant Effect							
		178.6*		7.755		2.407		0.242		6		CDF		2.8E-05		Significant Effect							
ANOVA Table																							
Source		Sum Squares		Mean Square		DF		F Stat		P-Value		Decision(α:5%)											
Between		1.52145		0.30429		5		15		7.0E-06		Significant Effect											
Error		0.365028		0.0202794		18																	
Total		1.88648				23																	
Distributional Tests																							
Attribute		Test		Test Stat		Critical		P-Value		Decision(α:1%)													
Variances		Levene Equality of Variance Test		2.034		4.248		0.1221		Equal Variances													
Variances		Mod Levene Equality of Variance Test		1.047		4.248		0.4207		Equal Variances													
Distribution		Shapiro-Wilk W Normality Test		0.9104		0.884		0.0359		Normal Distribution													
Survival Rate Summary																							
Conc-mg/L		Code		Count		Mean		95% LCL		95% UCL		Median		Min		Max		Std Err		CV%		%Effect	
0		LC		4		1.0000		1.0000		1.0000		1.0000		1.0000		1.0000		0.0000		0.00%		0.00%	
14.4				4		0.9250		0.8454		1.0000		0.9000		0.9000		1.0000		0.0250		5.41%		7.50%	
26.4				4		0.9000		0.6750		1.0000		0.9500		0.7000		1.0000		0.0707		15.71%		10.00%	
57.1				4		0.9000		0.7701		1.0000		0.9000		0.8000		1.0000		0.0408		9.07%		10.00%	
107.8				4		0.8500		0.5744		1.0000		0.9000		0.6000		1.0000		0.0866		20.38%		15.00%	
178.6				4		0.3500		0.1909		0.5091		0.3000		0.3000		0.5000		0.0500		28.57%		65.00%	
Angular (Corrected) Transformed Summary																							
Conc-mg/L		Code		Count		Mean		95% LCL		95% UCL		Median		Min		Max		Std Err		CV%		%Effect	
0		LC		4		1.412		1.412		1.412		1.412		1.412		1.412		0		0.00%		0.00%	
14.4				4		1.29		1.16		1.419		1.249		1.249		1.412		0.04074		6.32%		8.66%	
26.4				4		1.266		0.9499		1.582		1.331		0.9912		1.412		0.09936		15.70%		10.34%	
57.1				4		1.254		1.056		1.453		1.249		1.107		1.412		0.06231		9.93%		11.17%	
107.8				4		1.199		0.8453		1.553		1.249		0.8861		1.412		0.1112		18.54%		15.08%	
178.6				4		0.6311		0.4674		0.7948		0.5796		0.5796		0.7854		0.05144		16.30%		55.31%	

Unionized Ammonia Calculation for Pressure of 1 atm

Input 'Shaded' data

I	pK
1	9.26
2	9.27
3	9.28
4	9.29
5	9.30
6	9.32
7	9.33
8	9.34

Log Number	Beaker	Day	Dilution	Total Ammonia (mg/L)	Temp (C)	Salinity (ppt)	pH	Temp (K)	I	I Rounded	pK	Unionized Ammonia (mg/L)	D.O. (mg/L)	Beaker Num.	Station
180803eera			0	0.5	15.4	31.8	7.83	288.56	7.05	7	9.33	0.008		0	
180803eera			0	14.4	15.6	32.1	7.80	288.76	7.11	7	9.33	0.210		0	
180803eera			0	26.4	15.5	32.2	7.77	288.66	7.13	7	9.33	0.357		0	
180803eera			0	57.1	15.4	32.3	7.70	288.56	7.15	7	9.33	0.654		0	
180803eera			0	107.8	15.5	32.5	7.60	288.66	7.20	7	9.33	0.990		0	
180803eera			0	178.6	15.4	32.7	7.50	288.56	7.24	7	9.33	1.296		0	
180803eera			4	0.5	14.9	32.2	7.68	288.06	7.13	7	9.33	0.005		0	
180803eera			4	12.8	14.8	32.3	7.66	287.96	7.15	7	9.33	0.128		0	
180803eera			4	25.0	14.8	32.3	7.65	287.96	7.15	7	9.33	0.244		0	
180803eera			4	52.5	14.8	32.5	7.64	287.96	7.20	7	9.33	0.502		0	
180803eera			4	103.5	14.8	32.6	7.62	287.96	7.22	7	9.33	0.945		0	
180803eera			4	195.4	14.8	33.1	7.56	287.96	7.32	7	9.33	1.556		0	

Final Reviewed: ~ 1/22/19

Ammonia Subsample Analysis

Client: Internal
Project ID: NH3 Reference Toxicant
Test No.: 180803 eeva

Test Species: *E. estuarius*
 Start Date: 8/3/2018 1730
 End Date: 8/7/2018 1810

DI Blank: 0.0

10 mg/L Ammonia Stock: 8.7 mg/L as NH_3

[illegible]

QC Check: AD 11/14/18

Final Review: XC 12/21/18

Analyst: AD

96hr Static Acute Amphipod Test

Client: Internal

Project ID: NH₃ Reftox

Test No. 180803 eeva

Test Species: *E. estuarius*

Start Date/Time: 8/3/2018 1730

End Date/Time: 8/7/2018 1810

Concentration (mg/L)	Rep	Counts					Water Quality					
		0	24	48	72	96	Parameter	0	24	48	72	96
Lab Control	A	10				10	Temp. (°C)	15.4	15.3	15.0	15.0	14.9
	B	10				10	Salinity (ppt)	31.8		32.0		32.2
	C	10				10	pH (units)	7.83		7.68		7.68
	D	10				10	DO (mg/L)	7.6		7.8		7.2
14.4 15.6 AD	A	10				10	Temp. (°C)	15.6	15.0	14.8	14.9	14.8
	B	10				9	Salinity (ppt)	32.1		32.3		32.3
	C	10				9	pH (units)	7.80		7.65		7.66
	D	10				9	DO (mg/L)	7.7		7.8		7.3
26.4 31.2 AD	A	10				9	Temp. (°C)	15.5	14.8	14.8	14.8	14.8
	B	10				7	Salinity (ppt)	32.2		32.3		32.3
	C	10				10	pH (units)	7.77		7.67		7.65
	D	10				10	DO (mg/L)	7.7		7.7		7.5
51.1 62.5 AD	A	10				10	Temp. (°C)	15.4	14.8	14.8	14.8	14.8
	B	10				9	Salinity (ppt)	32.3		32.5		32.5
	C	10				9	pH (units)	7.70		7.67		7.64
	D	10				8	DO (mg/L)	7.7		7.7		7.6
107.8 125 AD	A	10				10	Temp. (°C)	15.5	14.8	14.8	14.8	14.8
	B	10				9	Salinity (ppt)	32.5		32.6		32.6
	C	10				6	pH (units)	7.60		7.65		7.62
	D	10				9	DO (mg/L)	7.8		7.7		7.6
178.6 250 AD	A	10				10	Temp. (°C)	15.5	14.8	14.8	14.8	14.8
	B	10				3	Salinity (ppt)	32.7		33.1		33.1
	C	10				3	pH (units)	7.50		7.58		7.56
	D	10				5	DO (mg/L)	7.8		7.7		7.5
	A						Temp. (°C)					
	B						Salinity (ppt)					
	C						pH (units)					
	D						DO (mg/L)					
Tech Initials: AD/AD						AD	Tech Initials: AD AD on AD AD					

Date Animals Received: 8/1/18

Age or Size of Animals: 3-5 mm

Ammonia Subsamples Collected:

Start: AG

End: AD AD

Comments:

QC Check: AD 11/14/18

Final Review: JC 4/30/19

Amphipod Reference Toxicant

96-hr Survival

8/10/18

CETIS Summary Report

Report Date: 27 Nov-18 11:26 (p 1 of 1)
 Test Code: 180810eera | 02-1422-9338

Reference Toxicant 96-h Acute Survival Test						Amec Foster Wheeler - San Diego						
Batch ID: 17-0601-0979	Test Type: Survival		Analyst:			Diluent: Diluted Natural Seawater						
Start Date: 10 Aug-18 14:00	Protocol: EPA/600/R-94/025 (1994)		Brine: Not Applicable									
Ending Date: 14 Aug-18 13:30	Species: Eohaustorius estuarius		Age: 3-5mm									
Duration: 95h	Source: Northwestern Aquatic Science, OR											
Sample ID: 16-2217-4412	Code: 180810eera		Client: Internal									
Sample Date: 10 Aug-18	Material: Total Ammonia		Project:									
Receipt Date: 10 Aug-18	Source: Reference Toxicant											
Sample Age: 14h	Station:											
Multiple Comparison Summary												
Analysis ID	Endpoint	Comparison Method		NOEL	LOEL	TOEL	TU	PMSD		✓		
07-9326-6951	Survival Rate	Dunnett Multiple Comparison Test		58.3	120.8	83.92		12.5%				
Point Estimate Summary												
Analysis ID	Endpoint	Point Estimate Method		Level	mg/L	95% LCL	95% UCL	TU	✓			
07-4510-0224	Survival Rate	Trimmed Spearman-Kärber		LC50	191.3	149.2	245.3					
Survival Rate Summary												
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect	
0	LC	4	0.9750	0.8954	1.0000	0.9000	1.0000	0.0250	0.0500	5.13%	0.00%	
17		4	0.9500	0.7909	1.0000	0.8000	1.0000	0.0500	0.1000	10.53%	2.56%	
32.3		4	0.9500	0.8581	1.0000	0.9000	1.0000	0.0289	0.0577	6.08%	2.56%	
58.3		4	0.9000	0.7701	1.0000	0.8000	1.0000	0.0408	0.0817	9.07%	7.69%	
120.8		4	0.7000	0.5163	0.8837	0.6000	0.8000	0.0577	0.1155	16.50%	28.21%	
231.2		4	0.4000	0.2701	0.5299	0.3000	0.5000	0.0408	0.0817	20.41%	58.97%	
Survival Rate Detail												
Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4							
0	LC	0.9000	1.0000	1.0000	1.0000							
17		0.8000	1.0000	1.0000	1.0000							
32.3		0.9000	1.0000	1.0000	0.9000							
58.3		0.9000	0.9000	0.8000	1.0000							
120.8		0.8000	0.6000	0.6000	0.8000							
231.2		0.3000	0.4000	0.5000	0.4000							

CETIS Analytical Report

Report Date: 27 Nov-18 11:26 (p 1 of 2)

Test Code: 180810eera | 02-1422-9338

Reference Toxicant 96-h Acute Survival Test								Amec Foster Wheeler - San Diego					
Analysis ID: 07-9326-6951		Endpoint: Survival Rate		CETIS Version: CETISv1.9.3									
Analyzed: 27 Nov-18 11:25		Analysis: Parametric-Control vs Treatments		Official Results: Yes									
Data Transform		Alt Hyp		NOEL		LOEL		TOEL		TU		PMSD	
Angular (Corrected)		C > T		58.3		120.8		83.92				12.49%	
Dunnett Multiple Comparison Test													
Control	vs	Conc-mg/L	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)				
Lab Control		17	0.4411	2.407	0.194	6	CDF	0.6728	Non-Significant Effect				
		32.3	0.5066	2.407	0.194	6	CDF	0.6447	Non-Significant Effect				
		58.3	1.454	2.407	0.194	6	CDF	0.2429	Non-Significant Effect				
		120.8*	4.659	2.407	0.194	6	CDF	4.6E-04	Significant Effect				
		231.2*	8.551	2.407	0.194	6	CDF	2.7E-05	Significant Effect				
ANOVA Table													
Source		Sum Squares		Mean Square		DF		F Stat		P-Value		Decision(α:5%)	
Between		1.46851		0.293702		5		22.71		3.4E-07		Significant Effect	
Error		0.232816		0.0129342		18							
Total		1.70133				23							
Distributional Tests													
Attribute		Test			Test Stat		Critical		P-Value		Decision(α:1%)		
Variances		Bartlett Equality of Variance Test			1.732		15.09		0.8848		Equal Variances		
Distribution		Shapiro-Wilk W Normality Test			0.9363		0.884		0.1349		Normal Distribution		
Survival Rate Summary													
Conc-mg/L		Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect	
0		LC	4	0.9750	0.8954	1.0000	1.0000	0.9000	1.0000	0.0250	5.13%	0.00%	
17			4	0.9500	0.7909	1.0000	1.0000	0.8000	1.0000	0.0500	10.53%	2.56%	
32.3			4	0.9500	0.8581	1.0000	0.9500	0.9000	1.0000	0.0289	6.08%	2.56%	
58.3			4	0.9000	0.7701	1.0000	0.9000	0.8000	1.0000	0.0408	9.07%	7.69%	
120.8			4	0.7000	0.5163	0.8837	0.7000	0.6000	0.8000	0.0577	16.50%	28.21%	
231.2			4	0.4000	0.2701	0.5299	0.4000	0.3000	0.5000	0.0408	20.41%	58.97%	
Angular (Corrected) Transformed Summary													
Conc-mg/L		Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect	
0		LC	4	1.371	1.242	1.501	1.412	1.249	1.412	0.04074	5.94%	0.00%	
17			4	1.336	1.093	1.578	1.412	1.107	1.412	0.07622	11.41%	2.59%	
32.3			4	1.331	1.181	1.48	1.331	1.249	1.412	0.04705	7.07%	2.97%	
58.3			4	1.254	1.056	1.453	1.249	1.107	1.412	0.06231	9.93%	8.53%	
120.8			4	0.9966	0.7935	1.2	0.9966	0.8861	1.107	0.06382	12.81%	27.32%	
231.2			4	0.6836	0.5499	0.8173	0.6847	0.5796	0.7854	0.04201	12.29%	50.15%	

CETIS Analytical Report

Report Date: 27 Nov-18 11:26 (p 2 of 2)

Test Code: 180810eera | 02-1422-9338

Reference Toxicant 96-h Acute Survival Test

Amec Foster Wheeler - San Diego

Analysis ID: 07-9326-6951

Endpoint: Survival Rate

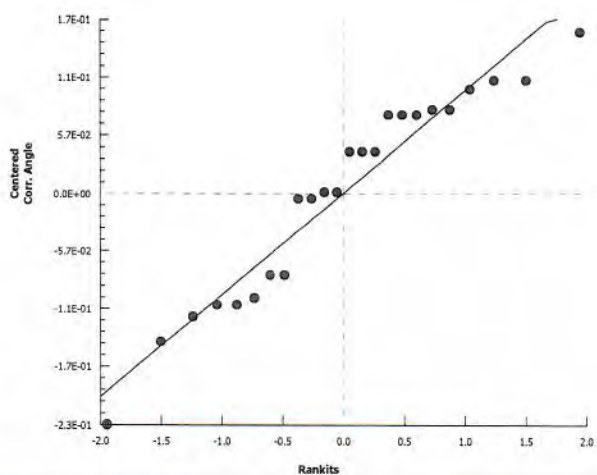
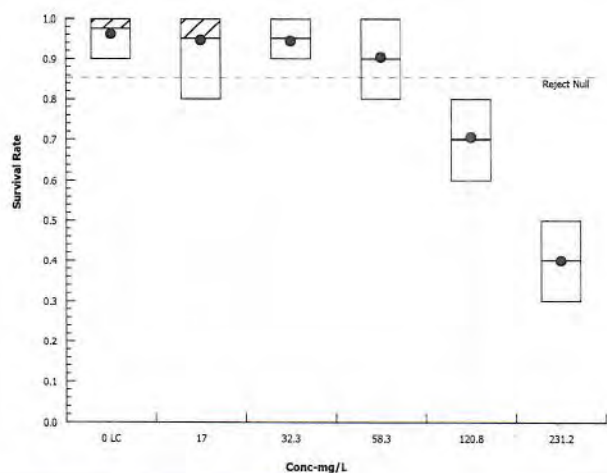
CETIS Version: CETISv1.9.3

Analyzed: 27 Nov-18 11:25

Analysis: Parametric-Control vs Treatments

Official Results: Yes

Graphics



CETIS Analytical Report

Report Date: 27 Nov-18 11:26 (p 1 of 1)

Test Code: 180810eera | 02-1422-9338

Reference Toxicant 96-h Acute Survival Test

Amec Foster Wheeler - San Diego

Analysis ID: 07-4510-0224

Endpoint: Survival Rate

CETIS Version: CETISv1.9.3

Analyzed: 27 Nov-18 11:25

Analysis: Trimmed Spearman-Kärber

Official Results: Yes

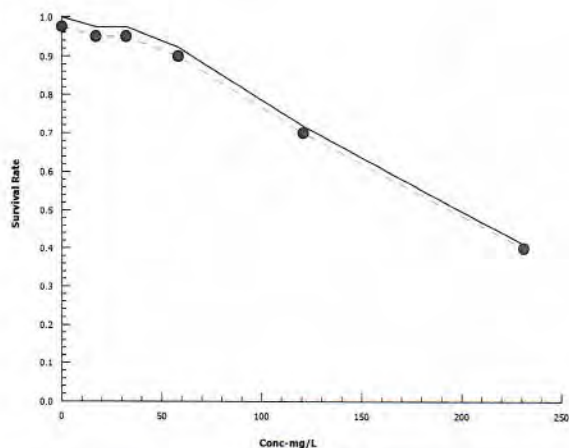
Trimmed Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	LC50	95% LCL	95% UCL
Control Threshold	0.025	41.03%	2.282	0.05394	191.3	149.2	245.3

Survival Rate Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-mg/L	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	LC	4	0.9750	0.9000	1.0000	0.0500	5.13%	0.0%	39/40	0.975	0.0%
17		4	0.9500	0.8000	1.0000	0.1000	10.53%	2.56%	38/40	0.95	2.56%
32.3		4	0.9500	0.9000	1.0000	0.0577	6.08%	2.56%	38/40	0.95	2.56%
58.3		4	0.9000	0.8000	1.0000	0.0817	9.07%	7.69%	36/40	0.9	7.69%
120.8		4	0.7000	0.6000	0.8000	0.1155	16.50%	28.21%	28/40	0.7	28.21%
231.2		4	0.4000	0.3000	0.5000	0.0817	20.41%	58.97%	16/40	0.4	58.97%

Graphics



Reference Toxicant 96-h Acute Survival Test

Wood Environment & Infrastructure Solutions

Test Type: Survival

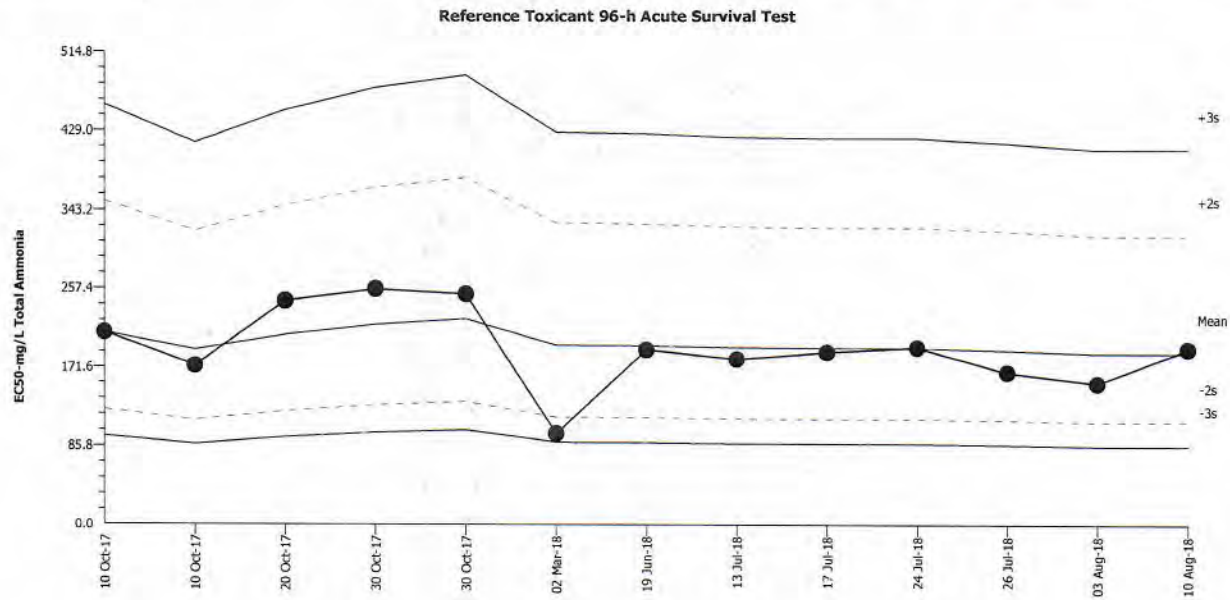
Organism: Eohaustorius estuarius (Amphipod)

Material: Total Ammonia

Protocol: EPA/600/R-94/025 (1994)

Endpoint: Survival Rate

Source: Reference Toxicant-REF



Mean: 186.8

Count: 12

-2s Warning Limit: 111.2

-3s Action Limit: 85.78

Sigma: n/a

CV: 26.40%

+2s Warning Limit: 314

+3s Action Limit: 407

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2017	Oct	10	17:30	210	23.23	0.4517			06-5655-2602	17-3273-4016
2			10	18:00	173.5	-13.31	-0.2848			07-8215-6400	00-2955-6732
3			20	12:30	244	57.24	1.03			03-4937-1003	03-8642-4218
4			30	16:30	256.7	69.92	1.225			09-3631-4649	14-4314-6082
5			30	16:30	251.4	64.59	1.144			10-7359-2291	01-9112-8062
6	2018	Mar	2	16:00	98.86	-87.93	-2.452	(-)		01-9608-4409	06-7306-3463
7		Jun	19	15:30	191	4.199	0.08566			09-3910-1421	05-3881-9055
8		Jul	13	15:30	180.6	-6.226	-0.1306			04-2185-5907	05-6355-4552
9			17	13:45	188.1	1.335	0.02745			21-0757-7657	02-6316-5081
10			24	15:00	193.5	6.659	0.135			15-3046-7177	07-7640-7637
11			26	16:00	165.7	-21.1	-0.4618			20-1199-2155	06-4886-8502
12		Aug	3	17:30	153.5	-33.29	-0.7565			19-4551-1093	09-4084-7224
13			10	14:00	191.3	4.527	0.09229			02-1422-9338	07-4510-0224

Eoh Reftox Unionized

[illegible]

Final Review - on 1/21/15

Ammonia Subsample Analysis

Client: Internal
Project ID: NH3 Reference Toxicant
Test No.: 180810 eera

Test Species: *E. estuarius*
Start Date: ~~8/8/18~~ 8/10/18 1400
End Date: ~~8/12/18~~ 8/14/18 1330

DI Blank: 0.0

10 mg/L Ammonia Stock: 9.0 mg/L as NH_3

[illegible]

QC Check: AD 11/14/18

Final Review: sc 12/21/18

96hr Static Acute Amphipod Test

Client: Internal

Project ID: NH₃ Reftox

Test No. 180810 eera

Test Species: *E. estuarius*

Start Date/Time: 8/8/2018 1400

End Date/Time: 8/22/2018 1330

Concentration (mg/L)	Rep	Counts					Water Quality					
		0	24	48	72	96	Parameter	0	24	48	72	96
Lab Control	A	10				9	Temp. (°C)	15.7	14.7	14.8	14.8	15.0
	B	10				10	Salinity (ppt)	31.9		32.1		31.7
	C	10				10	pH (units)	7.76		7.74		7.66
	D	10				10	DO (mg/L)	7.7		7.6		7.3
17.0 -15.6 AD	A	10				8	Temp. (°C)	15.6	14.7	14.9	14.8	14.9
	B	10				10	Salinity (ppt)	31.8		31.9		31.9
	C	10				10	pH (units)	7.76		7.74		7.65
	D	10				10	DO (mg/L)	7.6		7.5		7.4
32.3 -31.2 AD	A	10				9	Temp. (°C)	15.5	14.7	14.8	14.8	14.6
	B	10				10	Salinity (ppt)	31.9		32.1		31.8
	C	10				10	pH (units)	7.73		7.74		7.66
	D	10				9	DO (mg/L)	7.6		7.7		7.5
58.3 -62.5 AD	A	10				9	Temp. (°C)	15.4	14.7	14.8	14.7	14.8
	B	10				9	Salinity (ppt)	32.1		32.3		32.0
	C	10				8	pH (units)	7.65		7.67		7.64
	D	10				10	DO (mg/L)	7.7		7.7		7.5
120.8 -125 AD	A	10				8	Temp. (°C)	15.3	14.8	14.9	14.7	14.8
	B	10				6	Salinity (ppt)	32.1		32.2		32.1
	C	10				6	pH (units)	7.45		7.46		7.60
	D	10				8	DO (mg/L)	7.6		7.7		7.7
231.2 -250 AD	A	10				3	Temp. (°C)	15.1	14.8	14.9	14.6	14.7
	B	10				4	Salinity (ppt)	32.7		32.8		32.6
	C	10				5	pH (units)	7.36		7.37		7.52
	D	10				4	DO (mg/L)	7.6		7.7		7.4
	A						Temp. (°C)					
	B						Salinity (ppt)					
	C						pH (units)					
	D						DO (mg/L)					
Tech Initials: AG						AG	Tech Initials: AG		SW	AB	SW	AD

Date Animals Received: NAs 8/8/18

Age or Size of Animals: 35mm

Ammonia Subsamples Collected:

Start: AG

End: AG

Comments:

QC Check: AD 8/31/18

Final Review: JC 12/21/18

Amphipod Reference Toxicant

96-hr Survival

8/22/18

CETIS Summary Report

Report Date: 27 Nov-18 12:06 (p 1 of 1)
Test Code: 180822eera | 13-3972-1221

Reference Toxicant 96-h Acute Survival Test

Amec Foster Wheeler - San Diego

Batch ID: 06-0507-5028	Test Type: Survival	Analyst:
Start Date: 22 Aug-18 12:50	Protocol: EPA/600/R-94/025 (1994)	Diluent: Diluted Natural Seawater
Ending Date: 26 Aug-18 11:20	Species: Eohaustorius estuarius	Brine: Not Applicable
Duration: 94h	Source: Northwestern Aquatic Science, OR	Age: 3-5mm

Sample ID: 19-4887-9421	Code: 180822eera	Client: Internal
Sample Date: 22 Aug-18	Material: Total Ammonia	Project:
Receipt Date: 22 Aug-18	Source: Reference Toxicant	
Sample Age: 13h	Station:	

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	TU	PMSD ✓
07-4349-8778	Survival Rate	Dunnett Multiple Comparison Test	113.5	226.3	160.3		13.8%

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	mg/L	95% LCL	95% UCL	TU	✓
10-4694-7981	Survival Rate	Trimmed Spearman-Kärber	LC50	169.1	157.1	181.9		

Survival Rate Summary

Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	4	0.9250	0.7727	1.0000	0.8000	1.0000	0.0479	0.0957	10.35%	0.00%
14.1		4	0.9500	0.8581	1.0000	0.9000	1.0000	0.0289	0.0577	6.08%	-2.70%
28.1		4	0.9500	0.8581	1.0000	0.9000	1.0000	0.0289	0.0577	6.08%	-2.70%
55.9		4	0.9000	0.7701	1.0000	0.8000	1.0000	0.0408	0.0817	9.07%	2.70%
113.5		4	0.8750	0.7954	0.9546	0.8000	0.9000	0.0250	0.0500	5.71%	5.41%
226.3		4	0.1750	0.0227	0.3273	0.1000	0.3000	0.0479	0.0957	54.71%	81.08%

Survival Rate Detail

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	LC	0.8000	1.0000	1.0000	0.9000
14.1		0.9000	1.0000	1.0000	0.9000
28.1		1.0000	0.9000	0.9000	1.0000
55.9		1.0000	0.8000	0.9000	0.9000
113.5		0.9000	0.8000	0.9000	0.9000
226.3		0.1000	0.2000	0.3000	0.1000

CETIS Analytical Report

Report Date: 27 Nov-18 12:06 (p 1 of 2)
Test Code: 180822eera | 13-3972-1221

Reference Toxicant 96-h Acute Survival Test								Amec Foster Wheeler - San Diego					
Analysis ID: 07-4349-8778		Endpoint: Survival Rate		CETIS Version: CETISv1.9.3									
Analyzed: 27 Nov-18 12:06		Analysis: Parametric-Control vs Treatments		Official Results: Yes									
Data Transform		Alt Hyp		NOEL		LOEL		TOEL		TU		PMSD	
Angular (Corrected)		C > T		113.5		226.3		160.3				13.77%	
Dunnett Multiple Comparison Test													
Control	vs	Conc-mg/L	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)				
Lab Control		14.1	-0.4475	2.407	0.191	6	CDF	0.9320	Non-Significant Effect				
		28.1	-0.4475	2.407	0.191	6	CDF	0.9320	Non-Significant Effect				
		55.9	0.5139	2.407	0.191	6	CDF	0.6415	Non-Significant Effect				
		113.5	1.028	2.407	0.191	6	CDF	0.4097	Non-Significant Effect				
		226.3*	11.02	2.407	0.191	6	CDF	2.7E-05	Significant Effect				
ANOVA Table													
Source		Sum Squares		Mean Square		DF		F Stat		P-Value		Decision(α:5%)	
Between		2.52432		0.504865		5		40.16		<1.0E-37		Significant Effect	
Error		0.226273		0.0125707		18							
Total		2.7506				23							
Distributional Tests													
Attribute		Test		Test Stat		Critical		P-Value		Decision(α:1%)			
Variances		Bartlett Equality of Variance Test		1.728		15.09		0.8854		Equal Variances			
Distribution		Shapiro-Wilk W Normality Test		0.948		0.884		0.2454		Normal Distribution			
Survival Rate Summary													
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect		
0	LC	4	0.9250	0.7727	1.0000	0.9500	0.8000	1.0000	0.0479	10.35%	0.00%		
14.1		4	0.9500	0.8581	1.0000	0.9500	0.9000	1.0000	0.0289	6.08%	-2.70%		
28.1		4	0.9500	0.8581	1.0000	0.9500	0.9000	1.0000	0.0289	6.08%	-2.70%		
55.9		4	0.9000	0.7701	1.0000	0.9000	0.8000	1.0000	0.0408	9.07%	2.70%		
113.5		4	0.8750	0.7954	0.9546	0.9000	0.8000	0.9000	0.0250	5.71%	5.41%		
226.3		4	0.1750	0.0227	0.3273	0.1500	0.1000	0.3000	0.0479	54.71%	81.08%		
Angular (Corrected) Transformed Summary													
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect		
0	LC	4	1.295	1.061	1.529	1.331	1.107	1.412	0.07348	11.35%	0.00%		
14.1		4	1.331	1.181	1.48	1.331	1.249	1.412	0.04705	7.07%	-2.74%		
28.1		4	1.331	1.181	1.48	1.331	1.249	1.412	0.04705	7.07%	-2.74%		
55.9		4	1.254	1.056	1.453	1.249	1.107	1.412	0.06231	9.93%	3.15%		
113.5		4	1.214	1.101	1.326	1.249	1.107	1.249	0.03547	5.85%	6.29%		
226.3		4	0.4217	0.2232	0.6202	0.3927	0.3218	0.5796	0.06237	29.58%	67.44%		

CETIS Analytical Report

Report Date: 27 Nov-18 12:06 (p 2 of 2)

Test Code: 180822eera | 13-3972-1221

Reference Toxicant 96-h Acute Survival Test

Amec Foster Wheeler - San Diego

Analysis ID: 07-4349-8778

Endpoint: Survival Rate

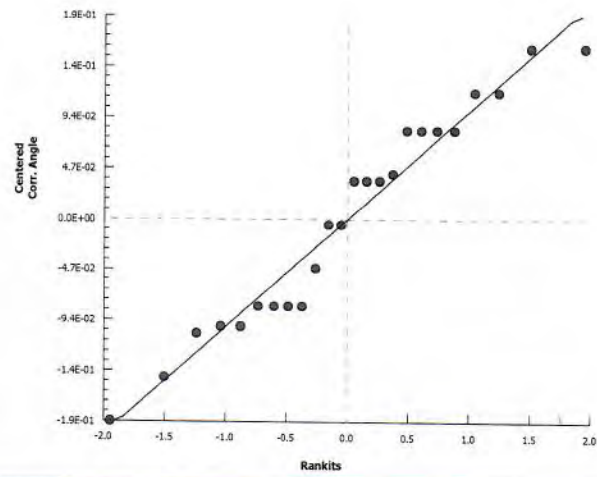
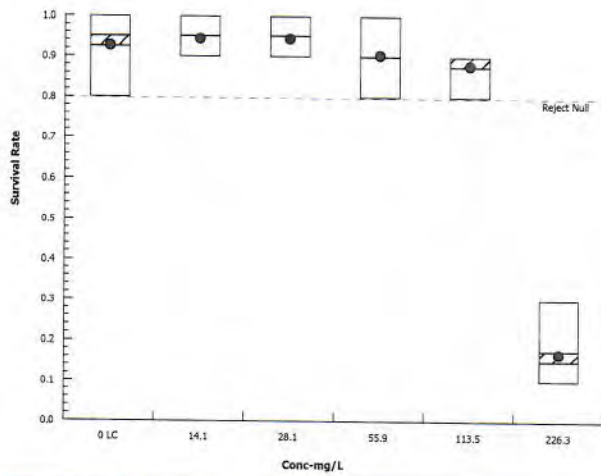
CETIS Version: CETISv1.9.3

Analyzed: 27 Nov-18 12:06

Analysis: Parametric-Control vs Treatments

Official Results: Yes

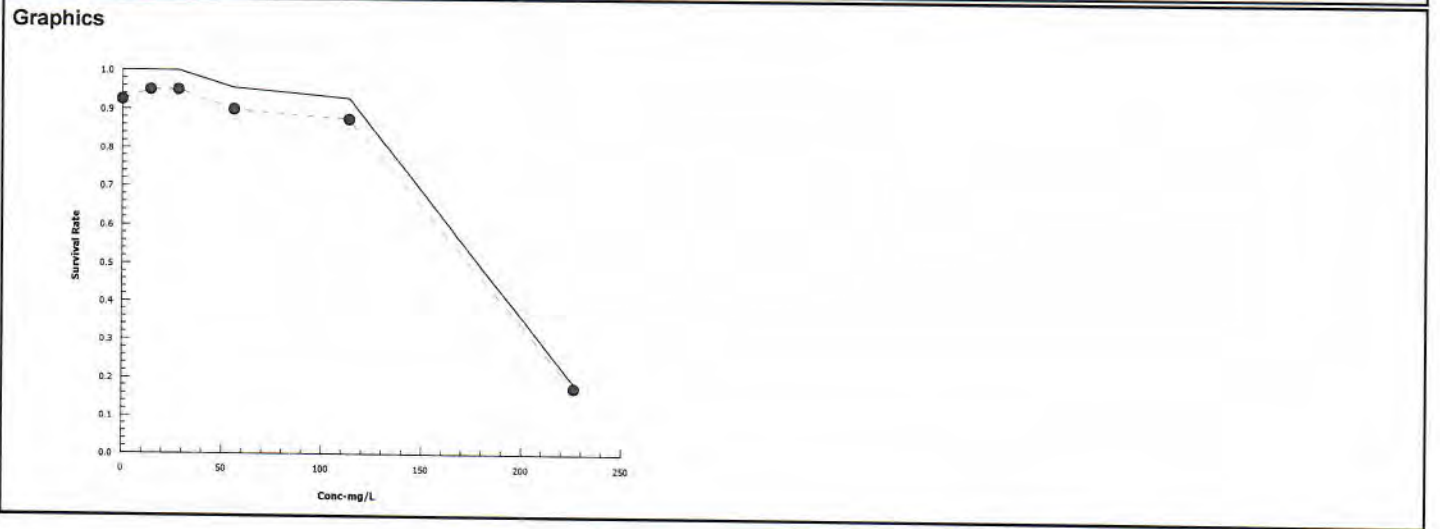
Graphics



CETIS Analytical Report

Report Date: 27 Nov-18 12:06 (p 1 of 1)
Test Code: 180822eera | 13-3972-1221

Reference Toxicant 96-h Acute Survival Test					Amec Foster Wheeler - San Diego						
Analysis ID: 10-4694-7981		Endpoint: Survival Rate		CETIS Version: CETISv1.9.3							
Analyzed: 27 Nov-18 12:06		Analysis: Trimmed Spearman-Kärber		Official Results: Yes							
Trimmed Spearman-Kärber Estimates											
Threshold Option	Threshold	Trim	Mu	Sigma	LC50	95% LCL	95% UCL				
Control Threshold	0.075	18.58%	2.228	0.0159	169.1	157.1	181.9				
Survival Rate Summary			Calculated Variate(A/B)						Isotonic Variate		
Conc-mg/L	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	LC	4	0.9250	0.8000	1.0000	0.0957	10.35%	0.0%	37/40	0.9417	0.0%
14.1		4	0.9500	0.9000	1.0000	0.0577	6.08%	-2.7%	38/40	0.9417	0.0%
28.1		4	0.9500	0.9000	1.0000	0.0577	6.08%	-2.7%	38/40	0.9417	0.0%
55.9		4	0.9000	0.8000	1.0000	0.0817	9.07%	2.7%	36/40	0.9	4.43%
113.5		4	0.8750	0.8000	0.9000	0.0500	5.71%	5.41%	35/40	0.875	7.08%
226.3		4	0.1750	0.1000	0.3000	0.0957	54.71%	81.08%	7/40	0.175	81.42%



Reference Toxicant 96-h Acute Survival Test

Wood Environment & Infrastructure Solutions

Test Type: Survival

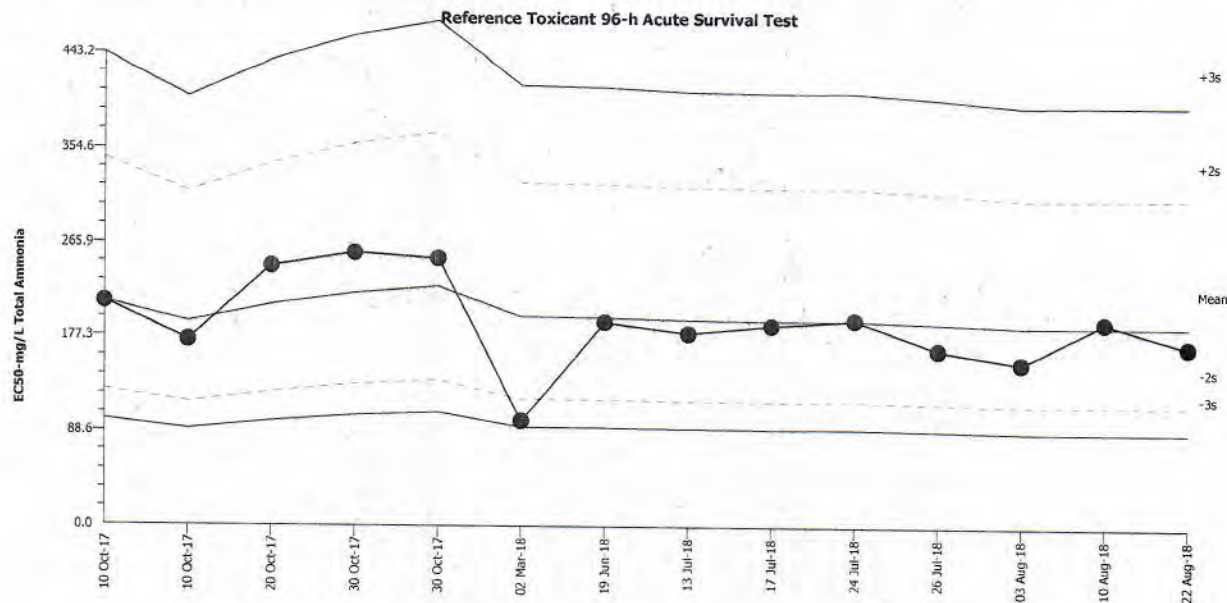
Organism: Eohaustorius estuarius (Amphipod)

Material: Total Ammonia

Protocol: EPA/600/R-94/025 (1994)

Endpoint: Survival Rate

Source: Reference Toxicant-REF



Mean: 187.2

Count: 13

-2s Warning Limit: 113.9

-3s Action Limit: 88.82

Sigma: n/a

CV: 25.20%

+2s Warning Limit: 307.7

+3s Action Limit: 394.5

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2017	Oct	10	17:30	210	22.86	0.4636			06-5655-2602	17-3273-4016
2			10	18:00	173.5	-13.68	-0.3055			07-8215-6400	00-2955-6732
3			20	12:30	244	56.87	1.068			03-4937-1003	03-8642-4218
4			30	16:30	256.7	69.55	1.272			09-3631-4649	14-4314-6082
5			30	16:30	251.4	64.21	1.187			10-7359-2291	01-9112-8062
6	2018	Mar	2	16:00	98.86	-88.3	-2.568	(-)		01-9608-4409	06-7306-3463
7		Jun	19	15:30	191	3.825	0.0814			09-3910-1421	05-3881-9055
8		Jul	13	15:30	180.6	-6.6	-0.1445			04-2185-5907	05-6355-4552
9			17	13:45	188.1	0.9613	0.02062			21-0757-7657	02-6316-5081
10			24	15:00	193.5	6.285	0.1329			15-3046-7177	07-7640-7637
11			26	16:00	165.7	-21.47	-0.4903			20-1199-2155	06-4886-8502
12		Aug	3	17:30	153.5	-33.67	-0.798			19-4551-1093	09-4084-7224
13			10	14:00	191.3	4.153	0.08832			02-1422-9338	07-4510-0224
14			22	12:50	169.1	-18.11	-0.4095			13-3972-1221	10-4694-7981

Eoh Reflox Unionized

Unionized Ammonia Calculation for Pressure of 1 atm

Input 'Shaded' data

I	pK
1	9.26
2	9.27
3	9.28
4	9.29
5	9.30
6	9.32
7	9.33
8	9.34

Total Ammonia (mg/L)

Salinity (ppt)

pH

Temp (K)

I

Rounded

pK

Unionized Ammonia (mg/L)

D.O. (mg/L)

Beaker Num.

Station

Log Number	Beaker	Day	Dilution	Total Ammonia (mg/L)	Salinity (ppt)	pH	Temp (K)	I	Rounded	pK	Unionized Ammonia (mg/L)	D.O. (mg/L)	Beaker Num.	Station
180822eera	0	0	0	0.9	31.9	7.91	289.06	7.07	7	9.33	0.017		0	0
180822eera	0	0	15.6	14.1	31.9	7.91	289.06	7.07	7	9.33	0.270		0	0
180822eera	0	0	31.2	28.1	32.0	7.87	289.06	7.09	7	9.33	0.491		0	0
180822eera	0	0	62.5	55.9	32.2	7.80	289.06	7.13	7	9.33	0.834		0	0
180822eera	0	0	125	113.5	32.2	7.70	289.06	7.13	7	9.33	1.349		0	0
180822eera	0	0	250	226.3	32.7	7.53	289.06	7.24	7	9.33	1.825		0	0
180822eera	4	4	0	1.2	31.9	7.60	288.06	7.07	7	9.33	0.011		0	0
180822eera	4	4	15.6	14.3	32.1	7.58	287.96	7.11	7	9.33	0.119		0	0
180822eera	4	4	31.2	29	32.1	7.54	287.96	7.11	7	9.33	0.221		0	0
180822eera	4	4	62.5	56.9	32.2	7.51	287.96	7.13	7	9.33	0.404		0	0
180822eera	4	4	125	107.60	32.4	7.50	287.96	7.17	7	9.33	0.747		0	0
180822eera	4	4	250	217.80	32.8	7.49	288.06	7.26	7	9.33	1.489		0	0

Final Reviewed: Jun 11/19/19

Ammonia Subsample Analysis

Client: Internal
Project ID: NH3 Reference Toxicant
Test No.: 190822eera

Test Species: *E. estuarius*
Start Date: 8/22/2018 1250
End Date: 8/26/2018 1120

DI Blank: 0-0

10 mg/L Ammonia Stock: 8.2 mg/L as NH_3

[illegible]

QC Check: AD 11/26/18

Final Review: Sc 12/21/18

96hr Static Acute Amphipod Test

Client: Internal

Project ID: NH₃ Reftox

Test No. 180822 cera

Test Species: *E. estuarius*

Start Date/Time: 8/22/2018 1250

End Date/Time: 8/26/2018 1120

Concentration (mg/L)	Rep	Counts					Water Quality					
		0	24	48	72	96	Parameter	0	24	48	72	96
Lab Control	A	10				8	Temp. (°C)	15.9	14.9	14.8	14.8	14.9
	B	10				10	Salinity (ppt)	31.9		31.8		31.9
	C	10				10	pH (units)	7.91		7.68		7.60
	D	10				9	DO (mg/L)	7.8		7.6		7.3
14.1 -15.6 AD	A	10				9	Temp. (°C)	15.9	14.8	14.6	14.8	14.8
	B	10				10	Salinity (ppt)	31.9		32.0		32.1
	C	10				10	pH (units)	7.91		7.70		7.58
	D	10				9	DO (mg/L)	7.8		7.7		7.2
28.1 -31.2 AD	A	10				10	Temp. (°C)	15.9	14.7	14.6	14.8	14.8
	B	10				9	Salinity (ppt)	32.0		32.1		32.1
	C	10				9	pH (units)	7.87		7.70		7.54
	D	10				10	DO (mg/L)	7.7		7.8		7.6
55.9 -62.5 AD	A	10				10	Temp. (°C)	15.9	14.7	14.6	14.7	14.8
	B	10				8	Salinity (ppt)	32.2		32.2		32.2
	C	10				9	pH (units)	7.80		7.67		7.51
	D	10				9	DO (mg/L)	7.8		7.9		7.6
1135 -125 AD	A	10				9	Temp. (°C)	15.9	14.7	14.5	14.7	14.8
	B	10				8	Salinity (ppt)	32.2		32.3		32.4
	C	10				9	pH (units)	7.70		7.64		7.50
	D	10				9	DO (mg/L)	7.7		7.9		7.7
226.3 -250 AD	A	10				1	Temp. (°C)	15.9	14.7	14.5	14.8	14.9
	B	10				2	Salinity (ppt)	32.7		32.7		32.8
	C	10				3	pH (units)	7.53		7.52		7.49
	D	10				1	DO (mg/L)	7.8		7.7		7.6
	A						Temp. (°C)					
	B						Salinity (ppt)					
	C						pH (units)					
	D						DO (mg/L)					
Tech Initials: AD/AG						AG	Tech Initials: AD AD AD AD AG					

QC JUV
Date Animals Received: 8/16/18

Age or Size of Animals: 3-5mm

Ammonia Subsamples Collected:

Start: AD

End: AG

Comments:

QC Check: AD 11/14/18

Final Review: SC 12/21/18

Amphipod Reference Toxicant

96-hr Survival

10/10/18

ETIS Summary Report

Report Date: 27 Nov-18 13:15 (p 1 of 1)
Test Code: 181010eera | 08-2532-3011

Amec Foster Wheeler - San Diego

Reference Toxicant 96-h Acute Survival Test

Batch ID: 14-2090-0444 Test Type: Survival
Start Date: 10 Oct-18 13:15 Protocol: EPA/600/R-94/025 (1994)
Ending Date: 14 Oct-18 15:00 Species: Eohaustorius estuarius
Duration: 4d 2h Source: Northwestern Aquatic Science, OR
Analyst:
Diluent: Diluted Natural Seawater
Brine: Not Applicable
Age: *Size AD* 3-5mm

Sample ID: 20-4675-6751 Code: 181010eera
Sample Date: 10 Oct-18 Material: Total Ammonia
Receipt Date: 10 Oct-18 Source: Reference Toxicant
Sample Age: 13h Station:
Client: Internal
Project:

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	TU	PMSD ✓
02-8454-8604	Survival Rate	Dunnett Multiple Comparison Test	111.6	224.5	158.3		14.1%

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	mg/L	95% LCL	95% UCL	TU	✓
06-6044-8622	Survival Rate	Trimmed Spearman-Kärber	LC50	161.5	155.3	167.9		

Survival Rate Summary

Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	4	0.9500	0.7909	1.0000	0.8000	1.0000	0.0500	0.1000	10.53%	0.00%
12.2		4	0.9750	0.8954	1.0000	0.9000	1.0000	0.0250	0.0500	5.13%	-2.63%
26.7		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-5.26%
57.8		4	0.9750	0.8954	1.0000	0.9000	1.0000	0.0250	0.0500	5.13%	-2.63%
111.6		4	0.9500	0.8581	1.0000	0.9000	1.0000	0.0289	0.0577	6.08%	0.00%
224.5		4	0.0750	0.0000	0.3137	0.0000	0.3000	0.0750	0.1500	200.00%	92.11%

Survival Rate Detail

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	LC	1.0000	1.0000	0.8000	1.0000
12.2		0.9000	1.0000	1.0000	1.0000
26.7		1.0000	1.0000	1.0000	1.0000
57.8		0.9000	1.0000	1.0000	1.0000
111.6		0.9000	1.0000	0.9000	1.0000
224.5		0.0000	0.0000	0.0000	0.3000

CETIS Analytical Report

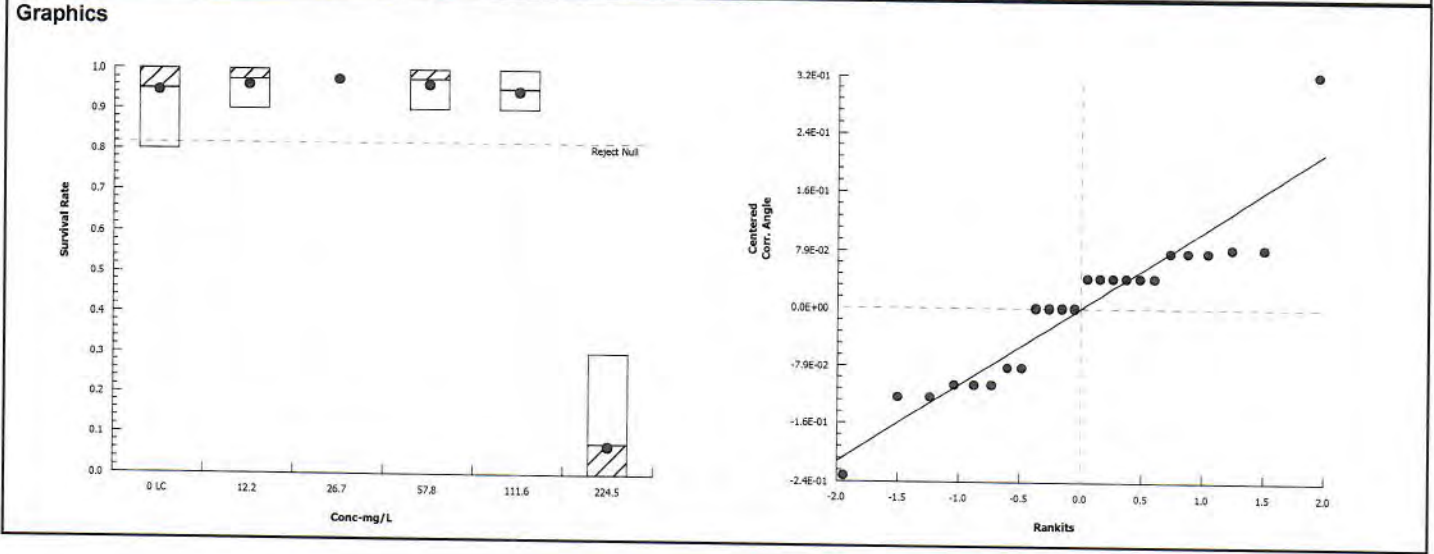
Report Date: 27 Nov-18 13:15 (p 1 of 2)
Test Code: 181010eera | 08-2532-3011

Reference Toxicant 96-h Acute Survival Test								Amec Foster Wheeler - San Diego															
Analysis ID: 02-8454-8604		Endpoint: Survival Rate		CETIS Version: CETISv1.9.3																			
Analyzed: 27 Nov-18 13:14		Analysis: Parametric-Control vs Treatments		Official Results: Yes																			
Data Transform		Alt Hyp		NOEL		LOEL		TOEL		TU		PMSD											
Angular (Corrected)		C > T		111.6		224.5		158.3				14.08%											
Dunnett Multiple Comparison Test																							
Control		vs		Conc-mg/L		Test Stat		Critical		MSD		DF P-Type		P-Value		Decision(α:5%)							
Lab Control		12.2		-0.4104		2.407		0.208		6		CDF		0.9262		Non-Significant Effect							
		26.7		-0.8818		2.407		0.208		6		CDF		0.9764		Non-Significant Effect							
		57.8		-0.4104		2.407		0.208		6		CDF		0.9262		Non-Significant Effect							
		111.6		0.06095		2.407		0.208		6		CDF		0.8147		Non-Significant Effect							
		224.5*		12.4		2.407		0.208		6		CDF		2.7E-05		Significant Effect							
ANOVA Table																							
Source		Sum Squares		Mean Square		DF		F Stat		P-Value		Decision(α:5%)											
Between		4.05199		0.810397		5		54.24		<1.0E-37		Significant Effect											
Error		0.268948		0.0149416		18																	
Total		4.32093				23																	
Distributional Tests																							
Attribute		Test		Test Stat		Critical		P-Value		Decision(α:1%)													
Variances		Levene Equality of Variance Test		3.409		4.248		0.0243		Equal Variances													
Variances		Mod Levene Equality of Variance Test		0.42		4.248		0.8287		Equal Variances													
Distribution		Shapiro-Wilk W Normality Test		0.9031		0.884		0.0250		Normal Distribution													
Survival Rate Summary																							
Conc-mg/L		Code		Count		Mean		95% LCL		95% UCL		Median		Min		Max		Std Err		CV%		%Effect	
0		LC		4		0.9500		0.7909		1.0000		1.0000		0.8000		1.0000		0.0500		10.53%		0.00%	
12.2				4		0.9750		0.8954		1.0000		1.0000		0.9000		1.0000		0.0250		5.13%		-2.63%	
26.7				4		1.0000		1.0000		1.0000		1.0000		1.0000		1.0000		0.0000		0.00%		-5.26%	
57.8				4		0.9750		0.8954		1.0000		1.0000		0.9000		1.0000		0.0250		5.13%		-2.63%	
111.6				4		0.9500		0.8581		1.0000		0.9500		0.9000		1.0000		0.0289		6.08%		0.00%	
224.5				4		0.0750		0.0000		0.3137		0.0000		0.0000		0.3000		0.0750		200.00%		92.11%	
Angular (Corrected) Transformed Summary																							
Conc-mg/L		Code		Count		Mean		95% LCL		95% UCL		Median		Min		Max		Std Err		CV%		%Effect	
0		LC		4		1.336		1.093		1.578		1.412		1.107		1.412		0.07622		11.41%		0.00%	
12.2				4		1.371		1.242		1.501		1.412		1.249		1.412		0.04074		5.94%		-2.66%	
26.7				4		1.412		1.412		1.412		1.412		1.412		1.412		0		0.00%		-5.71%	
57.8				4		1.371		1.242		1.501		1.412		1.249		1.412		0.04074		5.94%		-2.66%	
111.6				4		1.331		1.181		1.48		1.331		1.249		1.412		0.04705		7.07%		0.39%	
224.5				4		0.264		-0.07085		0.5988		0.1588		0.1588		0.5796		0.1052		79.71%		80.24%	

CETIS Analytical Report

Report Date: 27 Nov-18 13:15 (p 2 of 2)
 Test Code: 181010eera | 08-2532-3011

Reference Toxicant 96-h Acute Survival Test			Amec Foster Wheeler - San Diego	
Analysis ID:	02-8454-8604	Endpoint:	Survival Rate	CETIS Version: CETISv1.9.3
Analyzed:	27 Nov-18 13:14	Analysis:	Parametric-Control vs Treatments	Official Results: Yes



CETIS Analytical Report

Report Date: 27 Nov-18 13:15 (p 1 of 1)
 Test Code: 181010eera | 08-2532-3011

Reference Toxicant 96-h Acute Survival Test

Amec Foster Wheeler - San Diego

Analysis ID: 06-6044-8622

Endpoint: Survival Rate

CETIS Version: CETISv1.9.3

Analyzed: 27 Nov-18 13:15

Analysis: Trimmed Spearman-Kärber

Official Results: Yes

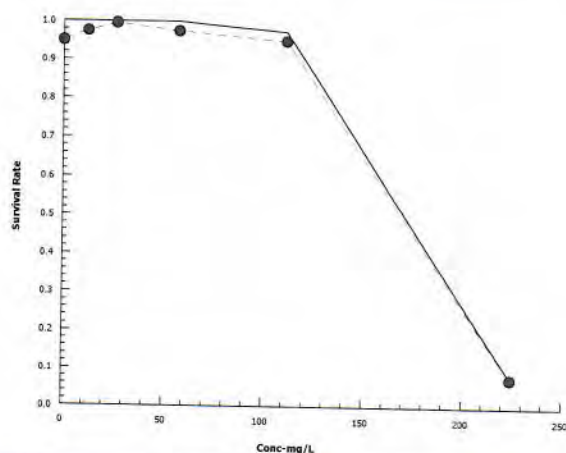
Trimmed Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	LC50	95% LCL	95% UCL
Control Threshold	0.05	7.69%	2.208	0.008522	161.5	155.3	167.9

Survival Rate Summary

Conc-mg/L	Code	Count	Calculated Variate(A/B)							Isotonic Variate	
			Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	LC	4	0.9500	0.8000	1.0000	0.1000	10.53%	0.0%	38/40	0.975	0.0%
12.2		4	0.9750	0.9000	1.0000	0.0500	5.13%	-2.63%	39/40	0.975	0.0%
26.7		4	1.0000	1.0000	1.0000	0.0000	0.00%	-5.26%	40/40	0.975	0.0%
57.8		4	0.9750	0.9000	1.0000	0.0500	5.13%	-2.63%	39/40	0.975	0.0%
111.6		4	0.9500	0.9000	1.0000	0.0577	6.08%	0.0%	38/40	0.95	2.56%
224.5		4	0.0750	0.0000	0.3000	0.1500	200.00%	92.11%	3/40	0.075	92.31%

Graphics



Reference Toxicant 96-h Acute Survival Test

Amec Foster Wheeler - San Diego

Test Type: Survival

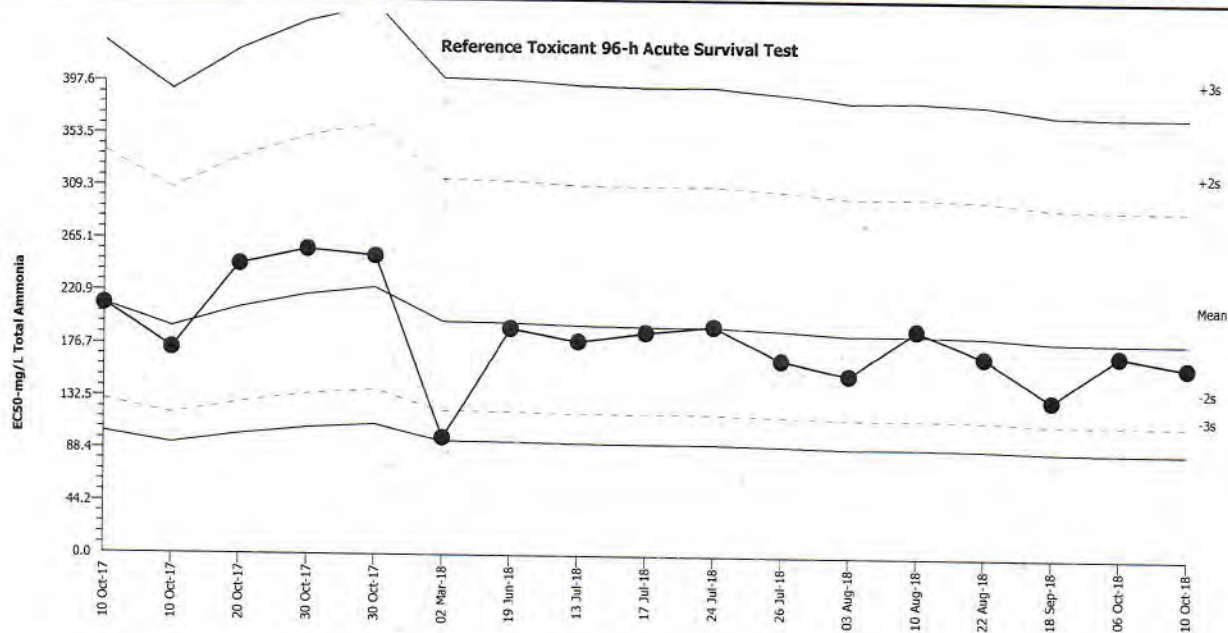
Organism: Eohaustorius estuarius (Amphipod)

Material: Total Ammonia

Protocol: EPA/600/R-94/025 (1994)

Endpoint: Survival Rate

Source: Reference Toxicant-REF



Mean: 181.1

Count: 16

-2s Warning Limit: 112.2

-3s Action Limit: 88.37

Sigma: n/a

CV: 24.30%

+2s Warning Limit: 292.1

+3s Action Limit: 371

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2017	Oct	10	17:30	210	28.93	0.6199			06-5655-2602	17-3273-4016
2			10	18:00	173.5	-7.606	-0.1795			07-8215-6400	00-2955-6732
3			20	12:30	244	62.94	1.248			03-4937-1003	03-8642-4218
4			30	16:30	256.7	75.62	1.46			09-3631-4649	14-4314-6082
5			30	16:30	251.4	70.29	1.372			10-7359-2291	01-9112-8062
6	2018	Mar	2	16:00	98.86	-82.23	-2.531	(-)		01-9608-4409	06-7306-3463
7		Jun	19	15:30	191	9.9	0.2226			09-3910-1421	05-3881-9055
8		Jul	13	15:30	180.6	-0.5244	-0.01213			04-2185-5907	05-6355-4552
9			17	13:45	188.1	7.037	0.1594			21-0757-7657	02-6316-5081
10			24	15:00	193.5	12.36	0.2762			15-3046-7177	07-7640-7637
11			26	16:00	165.7	-15.39	-0.3716			20-1199-2155	06-4886-8502
12		Aug	3	17:30	153.5	-27.59	-0.6914			19-4551-1093	09-4084-7224
13			10	14:00	191.3	10.23	0.2298			02-1422-9338	07-4510-0224
14			22	12:50	169.1	-12.04	-0.2876			13-3972-1221	10-4694-7981
15		Sep	18	13:45	133.3	-47.8	-1.282			03-9292-6241	11-0295-8556
16		Oct	6	15:30	171	-10.14	-0.2409			08-6045-8534	01-4335-0007
17			10	13:15	161.5	-19.61	-0.4794			08-2532-3011	06-6044-8622

Ammonia Subsample Analysis

Client: Internal
Project ID: NH3 Reference Toxicant
Test No.: 181010eera

Test Species: *E. estuarius*
 Start Date: 10/10/2018 1315
 End Date: 10/14/2018 1500

DI Blank: 0.0 mg/L AgN^+13

10 mg/L Ammonia Stock: 8.5 mg/L as NH_3

[illegible]

QC Check: AB 11/24/8

Final Review: EC 12/21/18

Unionized Ammonia Calculation for Pressure of 1 atm

Input 'Shaded' data

I	pK
1	9.26
2	9.27
3	9.28
4	9.29
5	9.30
6	9.32
7	9.33
8	9.34

Log Number	Beaker	Day	Dilution	Total Ammonia (mg/L)	Temp (C)	Salinity (ppt)	pH	Temp (K)	I	I Rounded	pK	Unionized Ammonia (mg/L)	D.O. (mg/L)	Beaker Num.	Station
181010eera			0	1.2	15.8	31.5	8.15	288.96	6.98	7	9.33	0.039		0	0
181010eera			0	12.2	15.8	31.7	8.12	288.96	7.02	7	9.33	0.371		0	0
181010eera			0	26.7	15.8	31.8	8.07	288.96	7.05	7	9.33	0.727		0	0
181010eera			0	57.8	15.9	31.9	7.99	289.06	7.07	7	9.33	1.325		0	0
181010eera			0	111.6	16	32	7.87	289.16	7.09	7	9.33	1.965		0	0
181010eera			0	224.5	16	32.4	7.72	289.16	7.17	7	9.33	2.813		0	0
181010eera			4	1.3	15	31.3	7.64	288.16	6.94	7	9.33	0.013		0	0
181010eera			4	12	14.9	31.4	7.65	288.06	6.96	7	9.33	0.118		0	0
181010eera			4	26.4	14.9	31.5	7.65	288.06	6.98	7	9.33	0.260		0	0
181010eera			4	54.9	14.9	31.6	7.62	288.06	7.00	7	9.33	0.505		0	0
181010eera			4	110.20	14.80	31.7	7.62	287.96	7.02	7	9.33	1.006		0	0
181010eera			4	220.20	14.80	32.3	7.53	287.96	7.15	7	9.33	1.637		0	0

Final Reviewed: 12/20/19

96hr Static Acute Amphipod Test

Client: Internal

Project ID: NH₃ Reftox

Test No. 181010 eera

Test Species: *E. estuarius*

Start Date/Time: 10/10/2018

1315

End Date/Time: 10/14/2018

1500

Concentration (mg/L)	Rep	Counts					Water Quality						
		0	24	48	72	96	Parameter	0	24	48	72	96	
Lab Control	A	10				10	Temp. (°C)	15.8	14.7	14.7	14.8	15.0	
	B	10				10	Salinity (ppt)	31.5		31.5		31.3	
	C	10				8	pH (units)	8.15	AD 8.81			7.64	
	D	10				10	DO (mg/L)	7.9		7.7		7.5	
12.2 15.6 AD	A	10				9	Temp. (°C)	15.8	14.6	14.7	14.7	14.9	
	B	10				10	Salinity (ppt)	31.7		31.6		31.4	
	C	10				10	pH (units)	8.12	7.84			7.65	
	D	10				10	DO (mg/L)	7.8		7.7		7.5	
26.7 31.2 AD	A	10				10	Temp. (°C)	15.8	14.6	14.6	14.7	14.9	
	B	10				10	Salinity (ppt)	31.8		31.6		31.5	
	C	10				10	pH (units)	8.07		7.80		7.65	
	D	10				10	DO (mg/L)	7.8		7.5		7.5	
57.8 62.5 AD	A	10				9	Temp. (°C)	15.9	14.6	14.6	14.7	14.9	
	B	10				10	Salinity (ppt)	31.9		31.7		31.6	
	C	10				10	pH (units)	7.99		7.75		7.62	
	D	10				10	DO (mg/L)	7.7		7.6		7.6	
114 125 AD	A	10				9	Temp. (°C)	16.0	14.6	14.6	14.7	14.8	
	B	10				10	Salinity (ppt)	32.0		31.8		31.7	
	C	10				9	pH (units)	7.87		7.72		7.62	
	D	10				10	DO (mg/L)	7.7		7.7		7.6	
245 250 AD	A	10				0	Temp. (°C)	16.0	14.6	14.5	14.7	14.8	
	B	10				0	Salinity (ppt)	32.4		32.3		32.3	
	C	10				0	pH (units)	7.72		7.62		7.53	
	D	10				3	DO (mg/L)	7.7		7.8		7.7	
	A						Temp. (°C)						
	B						Salinity (ppt)						
	C						pH (units)						
	D						DO (mg/L)						
Tech Initials:		AD/AG					Tech Initials:		AG AG AD AG AD				

Tech Initials: AD/AG

Tech Initials: AG AG AD AG AD

Date Animals Received: 10/9/18

Ammonia Subsamples Collected:

Start: AD

End: AD

Age or Size of Animals: 3-5mm

Comments:

QC Check: AD 11/14/18

Final Review: SC 12/21/18

Bivalve Reference Toxicant
48-hr Survival & Development
7/18/18

CETIS Summary Report

Report Date: 27 Aug-18 14:44 (p 1 of 3)
 Test Code: 180718mgrdNH3 | 14-1933-2999

Bivalve Larval Survival and Development Test				Amec Foster Wheeler - San Diego								
Batch ID:	11-4376-7744		Test Type:	Development-Survival				Analyst:				
Start Date:	18 Jul-18 13:10		Protocol:	EPA/600/R-95/136 (1995)				Diluent:	Diluted Natural Seawater			
Ending Date:	20 Jul-18 12:30		Species:	Mytilis galloprovincialis				Brine:	Not Applicable			
Duration:	47h		Source:	Field Collected				Age:				
Sample ID:	11-2906-9587		Code:	180718mgrdNH3				Client:	Internal			
Sample Date:	18 Jul-18		Material:	Total Ammonia				Project:				
Receipt Date:	18 Jul-18		Source:	Reference Toxicant								
Sample Age:	13h		Station:									
Multiple Comparison Summary												
Analysis ID	Endpoint	Comparison Method				NOEL	LOEL	TOEL	TU	PMSD	✓	
20-9923-6901	Combined Proportion Normal	Dunnett Multiple Comparison Test				4.8	5.9	5.322		4.11%	✓	
16-8209-9562	Proportion Normal	Dunnett Multiple Comparison Test				4.8	5.9	5.322		3.69%	✓	
15-3994-1838	Survival Rate	Steel Many-One Rank Sum Test				17.3	> 17.3	n/a		1.83%		
Point Estimate Summary												
Analysis ID	Endpoint	Point Estimate Method				Level	mg/L	95% LCL	95% UCL	TU	✓	
09-8220-2485	Combined Proportion Normal	Trimmed Spearman-Kärber				EC50	7.574	7.441	7.709			
Test Acceptability												
Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits		Lower	Upper	Overlap	Decision			
16-8209-9562	Proportion Normal	Control Resp	0.9168	0.9	>>	Yes	Passes Criteria					
15-3994-1838	Survival Rate	Control Resp	0.9972	0.5	>>	Yes	Passes Criteria					
20-9923-6901	Combined Proportion Normal	PMSD	0.04106	<<	0.25	No	Passes Criteria					
Combined Proportion Normal Summary												
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect	
0	LC	5	0.9143	0.8836	0.9450	0.8744	0.9331	0.0111	0.0247	2.70%	0.00%	
1.1		5	0.9137	0.8978	0.9296	0.8918	0.9241	0.0057	0.0128	1.40%	0.06%	
3.3		5	0.8910	0.8556	0.9265	0.8458	0.9225	0.0128	0.0286	3.20%	2.55%	
4.8		5	0.8847	0.8568	0.9126	0.8489	0.9110	0.0101	0.0225	2.54%	3.24%	
5.9		5	0.6987	0.6230	0.7744	0.6419	0.7992	0.0273	0.0610	8.73%	23.58%	
9.3		5	0.2169	0.1899	0.2440	0.1964	0.2534	0.0097	0.0218	10.05%	76.27%	
17.3		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%	
Proportion Normal Summary												
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect	
0	LC	5	0.9168	0.8921	0.9415	0.8868	0.9331	0.0089	0.0199	2.17%	0.00%	
1.1		5	0.9137	0.8978	0.9296	0.8918	0.9241	0.0057	0.0128	1.40%	0.33%	
3.3		5	0.8936	0.8559	0.9312	0.8458	0.9225	0.0136	0.0303	3.39%	2.53%	
4.8		5	0.8847	0.8568	0.9126	0.8489	0.9110	0.0101	0.0225	2.54%	3.50%	
5.9		5	0.7254	0.6641	0.7867	0.6696	0.7992	0.0221	0.0494	6.80%	20.87%	
9.3		5	0.2169	0.1899	0.2440	0.1964	0.2534	0.0097	0.0218	10.05%	76.34%	
17.3		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%	
Survival Rate Summary												
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect	
0	LC	5	0.9972	0.9895	1.0000	0.9860	1.0000	0.0028	0.0062	0.63%	0.00%	
1.1		5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-0.28%	
3.3		5	0.9972	0.9895	1.0000	0.9860	1.0000	0.0028	0.0062	0.63%	0.00%	
4.8		5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-0.28%	
5.9		5	0.9637	0.8886	1.0000	0.8605	1.0000	0.0271	0.0605	6.28%	3.36%	
9.3		5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-0.28%	
17.3		5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-0.28%	

CETIS Summary Report

Report Date: 27 Aug-18 14:44 (p 2 of 3)
 Test Code: 180718mgrdNH3 | 14-1933-2999

Bivalve Larval Survival and Development Test							Amec Foster Wheeler - San Diego
Combined Proportion Normal Detail							
Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	
0	LC	0.9060	0.9298	0.9331	0.8744	0.9283	
1.1		0.9167	0.8918	0.9149	0.9241	0.9211	
3.3		0.9225	0.8992	0.8458	0.9023	0.8852	
4.8		0.8855	0.8489	0.8908	0.9110	0.8871	
5.9		0.6696	0.6419	0.7992	0.6744	0.7083	
9.3		0.2134	0.2052	0.1964	0.2534	0.2162	
17.3		0.0000	0.0000	0.0000	0.0000	0.0000	
Proportion Normal Detail							
Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	
0	LC	0.9060	0.9298	0.9331	0.8868	0.9283	
1.1		0.9167	0.8918	0.9149	0.9241	0.9211	
3.3		0.9225	0.8992	0.8458	0.9151	0.8852	
4.8		0.8855	0.8489	0.8908	0.9110	0.8871	
5.9		0.6696	0.7459	0.7992	0.7039	0.7083	
9.3		0.2134	0.2052	0.1964	0.2534	0.2162	
17.3		0.0000	0.0000	0.0000	0.0000	0.0000	
Survival Rate Detail							
Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	
0	LC	1.0000	1.0000	1.0000	0.9860	1.0000	
1.1		1.0000	1.0000	1.0000	1.0000	1.0000	
3.3		1.0000	1.0000	1.0000	0.9860	1.0000	
4.8		1.0000	1.0000	1.0000	1.0000	1.0000	
5.9		1.0000	0.8605	1.0000	0.9581	1.0000	
9.3		1.0000	1.0000	1.0000	1.0000	1.0000	
17.3		1.0000	1.0000	1.0000	1.0000	1.0000	

CETIS Summary Report

Report Date: 27 Aug-18 14:44 (p 3 of 3)
 Test Code: 180718mgrdNH3 | 14-1933-2999

Bivalve Larval Survival and Development Test							Amec Foster Wheeler - San Diego
Combined Proportion Normal Binomials							
Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	
0	LC	212/234	225/242	237/254	188/215	233/251	
1.1		220/240	206/231	215/235	207/224	257/279	
3.3		238/258	232/258	203/240	194/215	216/244	
4.8		201/227	191/225	204/229	215/236	220/248	
5.9		152/227	138/215	211/264	145/215	153/216	
9.3		51/239	47/229	44/224	56/221	48/222	
17.3		0/254	0/217	0/229	0/239	0/229	
Proportion Normal Binomials							
Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	
0	LC	212/234	225/242	237/254	188/212	233/251	
1.1		220/240	206/231	215/235	207/224	257/279	
3.3		238/258	232/258	203/240	194/212	216/244	
4.8		201/227	191/225	204/229	215/236	220/248	
5.9		152/227	138/185	211/264	145/206	153/216	
9.3		51/239	47/229	44/224	56/221	48/222	
17.3		0/254	0/217	0/229	0/239	0/229	
Survival Rate Binomials							
Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	
0	LC	215/215	215/215	215/215	212/215	215/215	
1.1		215/215	215/215	215/215	215/215	215/215	
3.3		215/215	215/215	215/215	212/215	215/215	
4.8		215/215	215/215	215/215	215/215	215/215	
5.9		215/215	185/215	215/215	206/215	215/215	
9.3		215/215	215/215	215/215	215/215	215/215	
17.3		215/215	215/215	215/215	215/215	215/215	

CETIS Analytical Report

Report Date: 27 Aug-18 14:44 (p 1 of 6)

Test Code: 180718mgrdNH3 | 14-1933-2999

Bivalve Larval Survival and Development Test				Amec Foster Wheeler - San Diego			
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Analysis ID: 20-9923-6901	Endpoint: Combined Proportion Normal	CETIS Version: CETISv1.9.3
Analyzed: 27 Aug-18 14:39	Analysis: Parametric-Control vs Treatments	Official Results: Yes

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	C > T	4.8	5.9	5.322		4.11%

Dunnett Multiple Comparison Test									
Control	vs	Conc-mg/L	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		1.1	0.09569	2.362	0.064	8	CDF	0.8035	Non-Significant Effect
		3.3	1.462	2.362	0.064	8	CDF	0.2365	Non-Significant Effect
		4.8	1.868	2.362	0.064	8	CDF	0.1253	Non-Significant Effect
		5.9*	10.54	2.362	0.064	8	CDF	7.6E-07	Significant Effect
		9.3*	29.35	2.362	0.064	8	CDF	7.6E-07	Significant Effect

ANOVA Table						
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.4208	0.48416	5	266.1	<1.0E-37	Significant Effect
Error	0.0436674	0.0018195	24			
Total	2.46447		29			

Distributional Tests					
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	6.107	15.09	0.2960	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9559	0.9031	0.2431	Normal Distribution

Combined Proportion Normal Summary											
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9143	0.8836	0.9450	0.9283	0.8744	0.9331	0.0111	2.70%	0.00%
1.1		5	0.9137	0.8978	0.9296	0.9167	0.8918	0.9241	0.0057	1.40%	0.06%
3.3		5	0.8910	0.8556	0.9265	0.8992	0.8458	0.9225	0.0128	3.20%	2.55%
4.8		5	0.8847	0.8568	0.9126	0.8871	0.8489	0.9110	0.0101	2.54%	3.24%
5.9		5	0.6987	0.6230	0.7744	0.6744	0.6419	0.7992	0.0273	8.73%	23.58%
9.3		5	0.2169	0.1899	0.2440	0.2134	0.1964	0.2534	0.0097	10.05%	76.27%
17.3		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%

Angular (Corrected) Transformed Summary											
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.276	1.223	1.328	1.3	1.209	1.309	0.01897	3.32%	0.00%
1.1		5	1.273	1.246	1.301	1.278	1.236	1.292	0.009876	1.73%	0.20%
3.3		5	1.236	1.181	1.292	1.248	1.167	1.289	0.02004	3.62%	3.09%
4.8		5	1.225	1.182	1.268	1.228	1.172	1.268	0.01547	2.82%	3.95%
5.9		5	0.9915	0.906	1.077	0.9636	0.9292	1.106	0.03081	6.95%	22.28%
9.3		5	0.4841	0.4518	0.5165	0.4802	0.4592	0.5275	0.01165	5.38%	62.05%
17.3		5	0.03275	0.03157	0.03394	0.03305	0.03138	0.03395	0.0004276	2.92%	97.43%

CETIS Analytical Report

Report Date: 27 Aug-18 14:44 (p 2 of 6)
 Test Code: 180718mgrdNH3 | 14-1933-2999

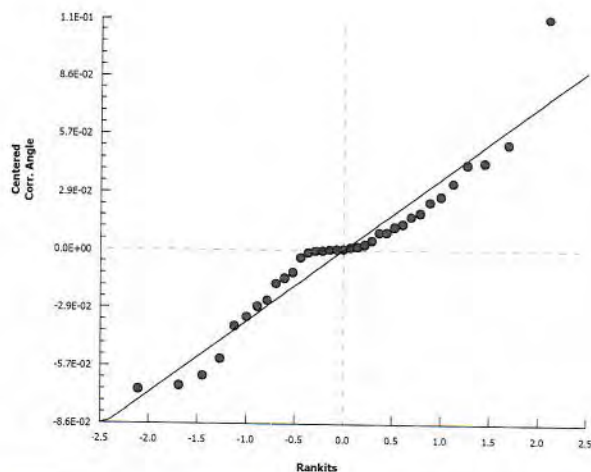
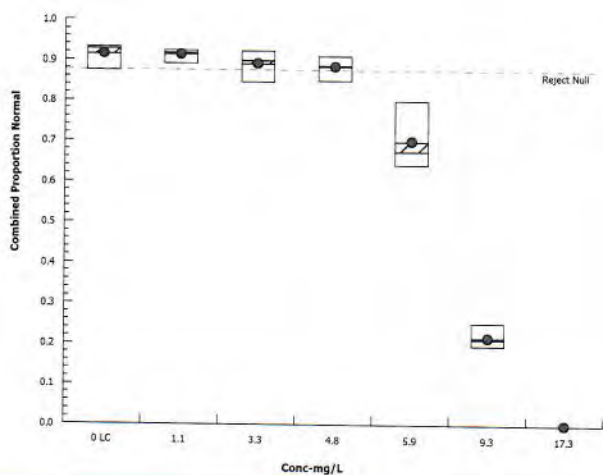
Bivalve Larval Survival and Development Test

Amec Foster Wheeler - San Diego

Analysis ID: 20-9923-6901
 Analyzed: 27 Aug-18 14:39
 Endpoint: Combined Proportion Normal
 Analysis: Parametric-Control vs Treatments

CETIS Version: CETISv1.9.3
 Official Results: Yes

Graphics



CETIS Analytical Report

Report Date: 27 Aug-18 14:44 (p 3 of 6)
 Test Code: 180718mgrdNH3 | 14-1933-2999

Bivalve Larval Survival and Development Test										Amec Foster Wheeler - San Diego			
Analysis ID: 16-8209-9562		Endpoint: Proportion Normal		CETIS Version: CETISv1.9.3									
Analyzed: 27 Aug-18 14:43		Analysis: Parametric-Control vs Treatments		Official Results: Yes									
Data Transform		Alt Hyp		NOEL		LOEL		TOEL		TU		PMSD	
Angular (Corrected)		C > T		4.8		5.9		5.322				3.69%	
Dunnett Multiple Comparison Test													
Control	vs	Conc-mg/L	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)				
Lab Control		1.1	0.2603	2.362	0.058	8	CDF	0.7452	Non-Significant Effect				
		3.3	1.579	2.362	0.058	8	CDF	0.1992	Non-Significant Effect				
		4.8	2.205	2.362	0.058	8	CDF	0.0680	Non-Significant Effect				
		5.9*	10.54	2.362	0.058	8	CDF	7.6E-07	Significant Effect				
		9.3*	32.36	2.362	0.058	8	CDF	7.6E-07	Significant Effect				
ANOVA Table													
Source	Sum Squares		Mean Square		DF		F Stat		P-Value		Decision(α:5%)		
Between	2.41236		0.482471		5		319.4		<1.0E-37		Significant Effect		
Error	0.0362561		0.0015107		24								
Total	2.44861				29								
Distributional Tests													
Attribute	Test				Test Stat		Critical		P-Value		Decision(α:1%)		
Variances	Bartlett Equality of Variance Test				4.405		15.09		0.4927		Equal Variances		
Distribution	Shapiro-Wilk W Normality Test				0.9844		0.9031		0.9274		Normal Distribution		
Proportion Normal Summary													
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect		
0	LC	5	0.9168	0.8921	0.9415	0.9283	0.8868	0.9331	0.0089	2.17%	0.00%		
1.1		5	0.9137	0.8978	0.9296	0.9167	0.8918	0.9241	0.0057	1.40%	0.33%		
3.3		5	0.8936	0.8559	0.9312	0.8992	0.8458	0.9225	0.0136	3.39%	2.53%		
4.8		5	0.8847	0.8568	0.9126	0.8871	0.8489	0.9110	0.0101	2.54%	3.50%		
5.9		5	0.7254	0.6641	0.7867	0.7083	0.6696	0.7992	0.0221	6.80%	20.87%		
9.3		5	0.2169	0.1899	0.2440	0.2134	0.1964	0.2534	0.0097	10.05%	76.34%		
17.3		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%		
Angular (Corrected) Transformed Summary													
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect		
0	LC	5	1.28	1.236	1.323	1.3	1.228	1.309	0.01568	2.74%	0.00%		
1.1		5	1.273	1.246	1.301	1.278	1.236	1.292	0.009876	1.73%	0.50%		
3.3		5	1.241	1.181	1.3	1.248	1.167	1.289	0.0214	3.86%	3.03%		
4.8		5	1.225	1.182	1.268	1.228	1.172	1.268	0.01547	2.82%	4.24%		
5.9		5	1.021	0.9505	1.091	1	0.9584	1.106	0.02522	5.53%	20.24%		
9.3		5	0.4841	0.4518	0.5165	0.4802	0.4592	0.5275	0.01165	5.38%	62.17%		
17.3		5	0.03275	0.03157	0.03394	0.03305	0.03138	0.03395	0.0004276	2.92%	97.44%		

CETIS Analytical Report

Report Date: 27 Aug-18 14:44 (p 4 of 6)
 Test Code: 180718mgrdNH3 | 14-1933-2999

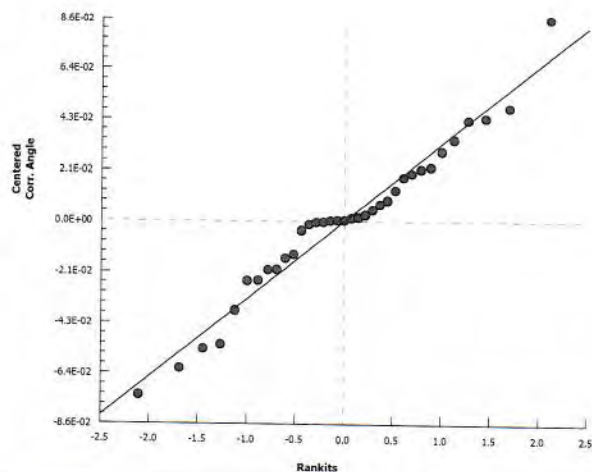
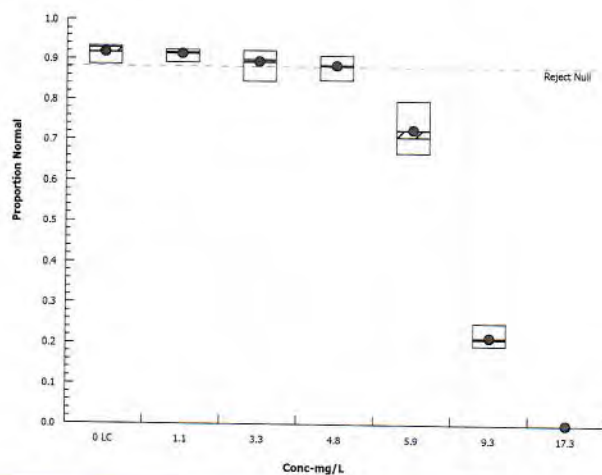
Bivalve Larval Survival and Development Test

Amec Foster Wheeler - San Diego

Analysis ID: 16-8209-9562
 Analyzed: 27 Aug-18 14:43
 Endpoint: Proportion Normal
 Analysis: Parametric-Control vs Treatments

CETIS Version: CETISv1.9.3
 Official Results: Yes

Graphics



CETIS Analytical Report

Report Date: 27 Aug-18 14:44 (p 5 of 6)
Test Code: 180718mgrdNH3 | 14-1933-2999

Bivalve Larval Survival and Development Test										Amec Foster Wheeler - San Diego			
Analysis ID: 15-3994-1838		Endpoint: Survival Rate		CETIS Version: CETISv1.9.3									
Analyzed: 27 Aug-18 14:41		Analysis: Nonparametric-Control vs Treatments				Official Results: Yes							
Data Transform		Alt Hyp		NOEL		LOEL		TOEL		TU		PMSD	
Angular (Corrected)		C > T		17.3		> 17.3		n/a				1.83%	
Steel Many-One Rank Sum Test													
Control	vs	Conc-mg/L	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)				
Lab Control		1.1	30	16	1	8	Asymp	0.9557	Non-Significant Effect				
		3.3	27.5	16	2	8	Asymp	0.8571	Non-Significant Effect				
		4.8	30	16	1	8	Asymp	0.9557	Non-Significant Effect				
		5.9	24	16	1	8	Asymp	0.5746	Non-Significant Effect				
		9.3	30	16	1	8	Asymp	0.9557	Non-Significant Effect				
		17.3	30	16	1	8	Asymp	0.9557	Non-Significant Effect				
ANOVA Table													
Source	Sum Squares		Mean Square		DF	F Stat	P-Value	Decision(α:5%)					
Between	0.0434875		0.0072479		6	1.874	0.1208	Non-Significant Effect					
Error	0.108322		0.0038686		28								
Total	0.151809				34								
Distributional Tests													
Attribute	Test				Test Stat	Critical	P-Value	Decision(α:1%)					
Variances	Levene Equality of Variance Test				12.7	3.528	6.9E-07	Unequal Variances					
Variances	Mod Levene Equality of Variance Test				2.023	3.812	0.1077	Equal Variances					
Distribution	Shapiro-Wilk W Normality Test				0.6457	0.9146	5.9E-08	Non-Normal Distribution					
Survival Rate Summary													
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect		
0	LC	5	0.9972	0.9895	1.0000	1.0000	0.9860	1.0000	0.0028	0.63%	0.00%		
1.1		5	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-0.28%		
3.3		5	0.9972	0.9895	1.0000	1.0000	0.9860	1.0000	0.0028	0.63%	0.00%		
4.8		5	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-0.28%		
5.9		5	0.9637	0.8886	1.0000	1.0000	0.8605	1.0000	0.0271	6.28%	3.36%		
9.3		5	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-0.28%		
17.3		5	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-0.28%		
Angular (Corrected) Transformed Summary													
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect		
0	LC	5	1.52	1.473	1.567	1.537	1.452	1.537	0.01686	2.48%	0.00%		
1.1		5	1.537	1.536	1.537	1.537	1.537	1.537	0	0.00%	-1.11%		
3.3		5	1.52	1.473	1.567	1.537	1.452	1.537	0.01686	2.48%	0.00%		
4.8		5	1.537	1.536	1.537	1.537	1.537	1.537	0	0.00%	-1.11%		
5.9		5	1.433	1.239	1.626	1.537	1.188	1.537	0.06962	10.87%	5.74%		
9.3		5	1.537	1.536	1.537	1.537	1.537	1.537	0	0.00%	-1.11%		
17.3		5	1.537	1.536	1.537	1.537	1.537	1.537	0	0.00%	-1.11%		

CETIS Analytical Report

Report Date: 27 Aug-18 14:44 (p 6 of 6)

Test Code: 180718mgrdNH3 | 14-1933-2999

Bivalve Larval Survival and Development Test

Amec Foster Wheeler - San Diego

Analysis ID: 15-3994-1838

Endpoint: Survival Rate

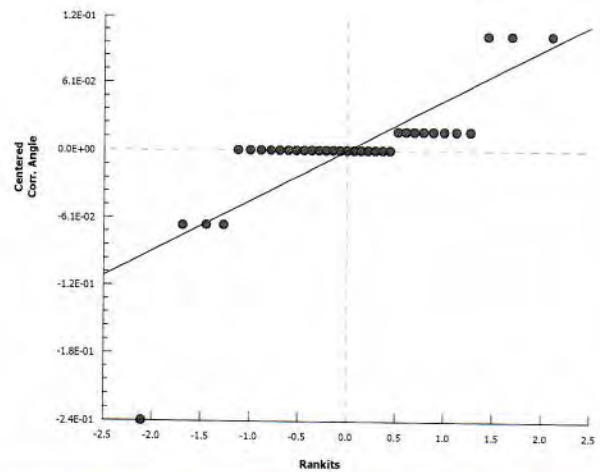
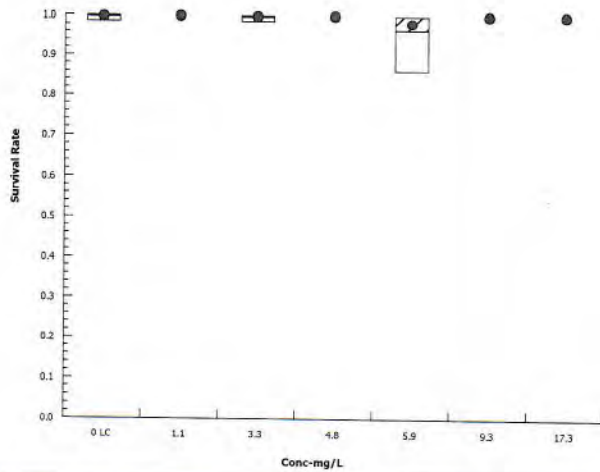
CETIS Version: CETISv1.9.3

Analyzed: 27 Aug-18 14:41

Analysis: Nonparametric-Control vs Treatments

Official Results: Yes

Graphics



CETIS Analytical Report

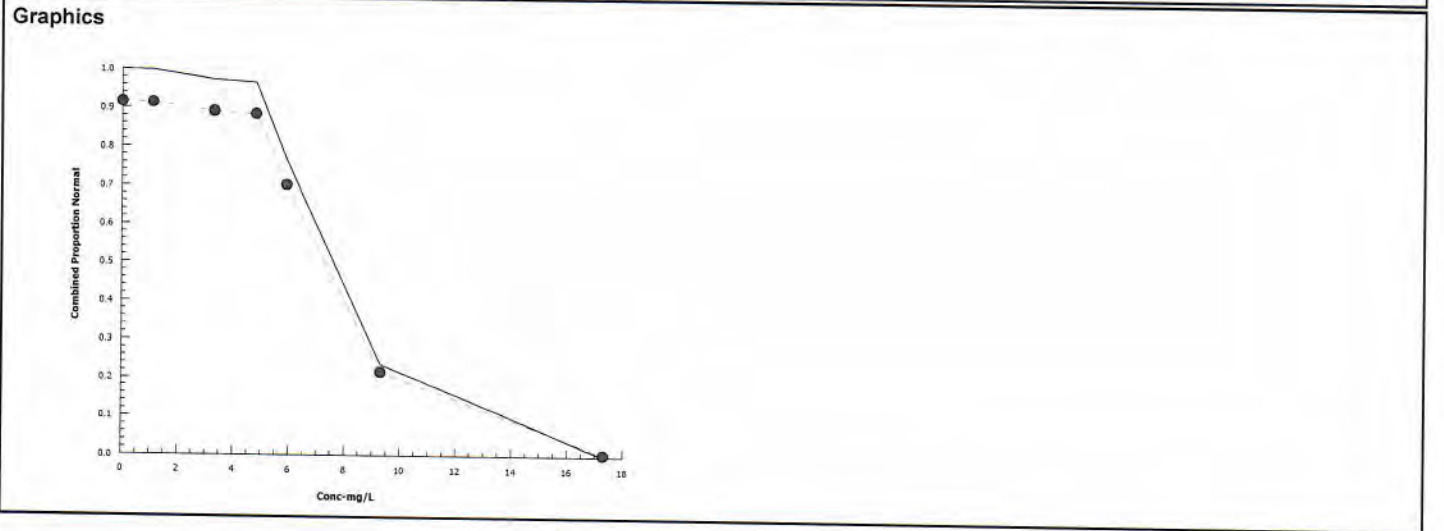
Report Date: 27 Aug-18 14:44 (p 1 of 1)
 Test Code: 180718mgrdNH3 | 14-1933-2999

Bivalve Larval Survival and Development Test Amec Foster Wheeler - San Diego

Analysis ID: 09-8220-2485 Endpoint: Combined Proportion Normal CETIS Version: CETISv1.9.3
 Analyzed: 27 Aug-18 14:39 Analysis: Trimmed Spearman-Kärber Official Results: Yes

Trimmed Spearman-Kärber Estimates							
Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0.08445	0.17%	0.8793	0.003836	7.574	7.441	7.709

Combined Proportion Normal Summary				Calculated Variate(A/B)					Isotonic Variate		
Conc-mg/L	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	LC	5	0.9143	0.8744	0.9331	0.0247	2.71%	0.0%	1095/1196	0.9143	0.0%
1.1		5	0.9137	0.8918	0.9241	0.0128	1.40%	0.06%	1105/1209	0.9137	0.06%
3.3		5	0.8910	0.8458	0.9225	0.0286	3.20%	2.55%	1083/1215	0.891	2.55%
4.8		5	0.8847	0.8489	0.9110	0.0225	2.54%	3.24%	1031/1165	0.8847	3.24%
5.9		5	0.6987	0.6419	0.7992	0.0610	8.73%	23.58%	799/1137	0.6987	23.58%
9.3		5	0.2169	0.1964	0.2534	0.0218	10.05%	76.27%	246/1135	0.2169	76.27%
17.3		5	0.0000	0.0000	0.0000	0.0000		100.0%	0/1168	0	100.0%



Bivalve Larval Survival and Development Test

Amec Foster Wheeler - San Diego

Test Type: Development-Survival

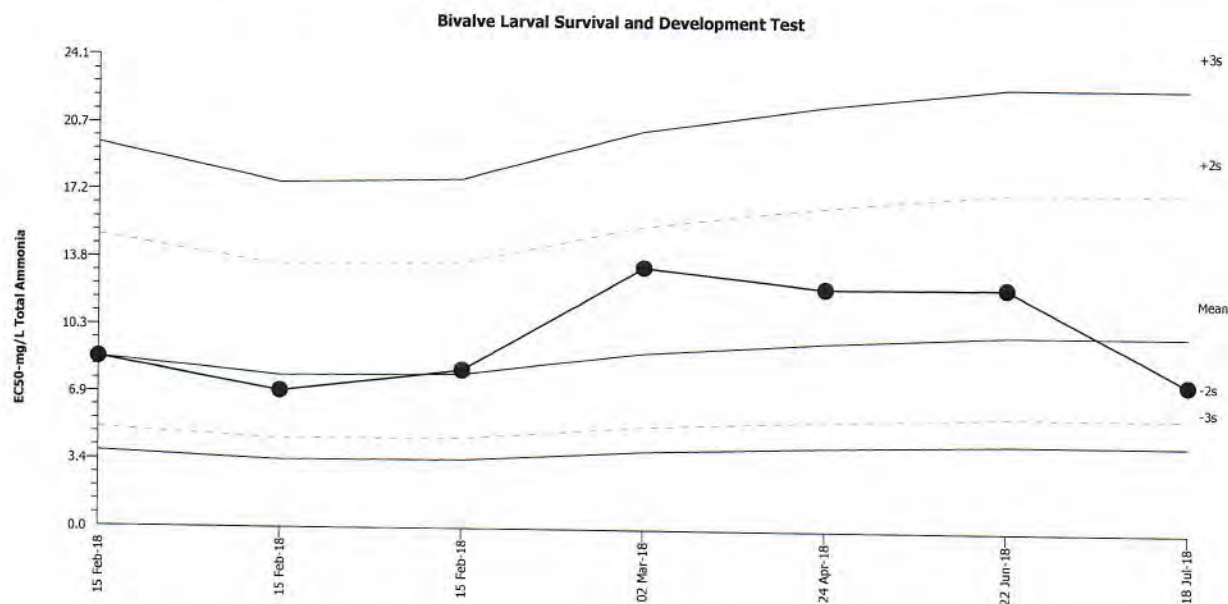
Organism: Mytilus galloprovincialis (Bay Mussel)

Material: Total Ammonia

Protocol: EPA/600/R-95/136 (1995)

Endpoint: Combined Proportion Normal

Source: Reference Toxicant-REF



Mean: 10.01

Count: 6

-2s Warning Limit: 5.812

-3s Action Limit: 4.428

Sigma: n/a

CV: 27.70%

+2s Warning Limit: 17.25

+3s Action Limit: 22.64

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2018	Feb	15	15:05	8.664	-1.35	-0.5326			16-0331-5698	20-5403-3529
2			15	15:05	7	-3.014	-1.317			14-0965-7275	10-9849-1324
3			15	15:05	8.087	-1.927	-0.7858			09-2789-8921	00-6375-0145
4		Mar	2	14:22	13.4	3.382	1.07			03-7955-5640	21-0844-6141
5		Apr	24	13:50	12.35	2.34	0.7721			07-6862-1383	14-0887-3900
6		Jun	22	18:15	12.41	2.401	0.79			14-3626-7506	07-2831-7429
7		Jul	18	13:10	7.574	-2.44	-1.027			14-1933-2999	09-8220-2485

CETIS Test Data Worksheet

Report Date: 16 Jul-18 13:05 (p 1 of 1)
 Test Code/ID: 14-1933-2999/180718mgrdNH3

Bivalve Larval Survival and Development Test

Amec Foster Wheeler - San Diego

Start Date: 18 Jul-18 13:10 Species: Mytilus galloprovincialis
 End Date: 20 Jul-18 12:30 Protocol: EPA/600/R-95/136 (1995)
 Sample Date: 18 Jul-18 Material: Total Ammonia

Sample Code: 180718mgrdNH3
 Sample Source: Reference Toxicant
 Sample Station:

Conc-mg/L	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
			31			224	44	
			32			279	257	
			33			229	0	
			34			216	153	
			35			254	237	
			36			212	188	
			37			258	232	
			38			251	233	
			39			185	138	
			40			206	145	
			41			227	201	
			42			242	225	
			43			227	152	
			44			239	51	
			45			225	191	
			46			235	215	
			47			229	6	
			48			212	194	
			49			231	206	
			50			244	216	
			51			239	0	
			52			264	211	
			53			221	56	
			54			234	212	
			55			217	0	
			56			240	203	
			57			254	0	
			58			236	215	
			59			258	238	
			60			224	207	
			61			248	220	
			62			229	204	
			63			229	47	
			64			222	48	
			65			240	220	

CETIS Test Data Worksheet

Report Date: 16 Jul-18 13:05 (p 1 of 1)
 Test Code/ID: 14-1933-2999/180718mgrdNH3

Bivalve Larval Survival and Development Test

Amec Foster Wheeler - San Diego

Start Date: 18 Jul-18 Species: Mytilis galloprovincialis
 End Date: 20 Jul-18 Protocol: EPA/600/R-95/136 (1995)
 Sample Date: 18 Jul-18 Material: Total Ammonia

Sample Code: 180718mgrdNH3
 Sample Source: Reference Toxicant
 Sample Station:

Conc-mg/L	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
0	LC	1	54					
0	LC	2	42					
0	LC	3	35					
0	LC	4	36					
0	LC	5	38					
1.1	2	1	65					
↓	2	2	49					
↓	2	3	46					
↓	2	4	60					
↓	2	5	32					
3.3	4	1	59					
↓	4	2	37					
↓	4	3	56					
↓	4	4	48					
↓	4	5	50					
4.8	6	1	41					
↓	6	2	45					
↓	6	3	62					
↓	6	4	58					
↓	6	5	61					
5.9	8	1	43					
↓	8	2	39					
↓	8	3	52					
↓	8	4	40					
↓	8	5	34					
9.3	10	1	44					
↓	10	2	63					
↓	10	3	31					
↓	10	4	53					
↓	10	5	64					
17.3	20	1	57					
↓	20	2	55					
↓	20	3	47					
↓	20	4	51					
↓	20	5	33					

QC: AD

Water Quality for Bivalve Development

Client: Internal
Project ID: NH₃ Reftox
Test No. 180718mgrd NH₃

Test Species: M. galloprovincialis
Start Date/Time: 7/18/2018 1310
End Date/Time: 7/20/2018 1230

Concentration (mg/L)	Water Quality Measurements			
	Parameter	0hr	24hr	48hr
Lab Control	Temp. (°C)	15.8	15.3	15.7
	Salinity (ppt)	31.0	31.2	31.1
	pH (units)	7.92	7.72	7.76
	DO (mg/L)	7.9	8.4	8.3
2 (1.1)	Temp. (°C)	15.6	15.2	15.5
	Salinity (ppt)	31.5	31.6	31.6
	pH (units)	7.95	7.77	7.78
	DO (mg/L)	8.0	8.3	8.4
4 (3.3)	Temp. (°C)	15.5	15.3	15.4
	Salinity (ppt)	31.5	31.6	31.5
	pH (units)	7.95	7.80	7.79
	DO (mg/L)	8.0	8.3	8.3
6 (4.8)	Temp. (°C)	15.4	15.3	15.5
	Salinity (ppt)	31.6	31.5	31.6
	pH (units)	7.75	7.83	7.79
	DO (mg/L)	8.0	8.3	8.3
8 (5.6)	Temp. (°C)	15.3	15.2	15.6
	Salinity (ppt)	31.5	31.5	31.5
	pH (units)	7.95	7.83	7.79
	DO (mg/L)	8.0	8.3	8.4
10 (9.3)	Temp. (°C)	15.4	15.3	15.5
	Salinity (ppt)	31.5	31.4	31.6
	pH (units)	7.94	7.84	7.78
	DO (mg/L)	8.0	8.2	8.3
20 (17.3)	Temp. (°C)	15.4	15.4	15.7
	Salinity (ppt)	31.2	31.2	31.2
	pH (units)	8.02	7.84	7.79
	DO (mg/L)	8.0	8.2	8.4
Tech Initials:		AD	AG	AD

Source of Animals: Mission Bay

Date Received: 7/18/18

Comments:

QC Check: AG 8/24/18

Final Review: SC 8/24/18

Unionized Ammonia Calculation for Pressure of 1 atm

Page 1

Final Review - 200 (3/31/19)

Ammonia Subsample Analysis

Client: Internal
Project ID: Reference Toxicant
Test No.: 1807 mgcd M43

Test Species: *M. galloprovincialis*
Start Date: 7/18/2018
End Date: 7/20/2018

DI Blank: _____

10 mg/L Ammonia Stock:

[illegible]

QC Check: sw 8/27/18

Final Review: 8-4/30/19

Embryo-Larval Development Test Stock Preparation Worksheet

Test Species: M. galloprovincialis

Batch ID: _____

Test Type: Embryo Development

Test Date: 7/18/2018

Analyst: BCS, JV, AD

Initiated = 12:30 - 13:10

Task	
Spawning Induction	0700
Spawning Begins	0820
# Males/# Females	3/2
Spawn Condition	Moderate
Fertilization Initiated	Stock 1: 0913 Stock 2: 1002
Fertilization End/Eggs Rinsed	0933
Embryo Counts	1200
Test Initiation	1230 - 1310

Embryo Density Counts

per 100 μ L

Stock #	Stock Volume (mL)	Rep 1	Rep 2	Rep 3	Rep 4	Mean #/100 μ L	Mean #/mL (x10)
Stock 1	300	27, 29	30, 34	32, 34	45	33	330
Stock 2							
Stock 3							

Cell Division:

	% Divided
Stock 1	
Stock 2	
Stock 3	

Selected Stock:	1
-----------------	---

Adjust selected embryo stock to 500 embryos/mL.

Dilution Factor = Stock Density/mL/500

Stock Density

330
500

Dil Factor

0.46

In 10 mL sample volume add 500 μ L of 500 embryo/mL stock to obtain 25 embryos/mL in test vials.

Notes:

* Approx 15% of embryos do not appearance

$QL1 = 204/216 = 94.4\%$

$T\phi_1 = 210, T\phi_2 = 232, T\phi_3 = 227, T\phi_4 = 193, T\phi_5 = 215$ Average = 215

QA Review:

AB 8/28/18

Final Review: sw 1/2/19

Bivalve Reference Toxicant
48-hr Survival & Development
8/2/18

CETIS Summary Report

Report Date: 12 Dec-18 10:52 (p 1 of 3)
Test Code: 180802mgrd | 15-4398-7435

Bivalve Larval Survival and Development Test						Amec Foster Wheeler - San Diego					
Batch ID: 03-4461-0353		Test Type: Development-Survival		Analyst:							
Start Date: 02 Aug-18 14:15		Protocol: EPA/600/R-95/136 (1995)		Diluent: Diluted Natural Seawater							
Ending Date: 04 Aug-18 13:30		Species: Mytilis galloprovincialis		Brine: Not Applicable							
Duration: 47h		Source: Field Collected		Age:							
Sample ID: 00-3326-3102		Code: 180802mgrd		Client: Internal							
Sample Date: 02 Aug-18		Material: Total Ammonia		Project:							
Receipt Date: 02 Aug-18		Source: Reference Toxicant									
Sample Age: 14h		Station:									
Multiple Comparison Summary											
Analysis ID	Endpoint	Comparison Method		NOEL	LOEL	TOEL	TU	PMSD		✓	
10-6474-4821	Combined Proportion Normal	Dunnett Multiple Comparison Test		8.4	9.3	8.839		9.11%			
03-3396-3955	Proportion Normal	Dunnett Multiple Comparison Test		6.6	8.4	7.446		6.55%		✓	
06-3256-2903	Survival Rate	Steel Many-One Rank Sum Test		17.7	> 17.7	n/a		4.77%			
Point Estimate Summary											
Analysis ID	Endpoint	Point Estimate Method		Level	mg/L	95% LCL	95% UCL	TU	✓		
08-1276-4615	Combined Proportion Normal	Trimmed Spearman-Kärber		EC50	11.26	11.13	11.4				
Test Acceptability											
Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits		Lower	Upper	Overlap	Decision		
03-3396-3955	Proportion Normal	Control Resp	0.8875	0.9	>>	Yes	Below Criteria				
06-3256-2903	Survival Rate	Control Resp	0.9534	0.5	>>	Yes	Passes Criteria				
10-6474-4821	Combined Proportion Normal	PMSD	0.0911	<<	0.25	No	Passes Criteria				
Combined Proportion Normal Summary											
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.8465	0.7634	0.9296	0.7621	0.9272	0.0299	0.0669	7.91%	0.00%
3.2		5	0.8439	0.8309	0.8568	0.8301	0.8592	0.0047	0.0105	1.24%	0.31%
4.8		5	0.8066	0.7526	0.8605	0.7427	0.8571	0.0194	0.0435	5.39%	4.71%
6.6		5	0.7994	0.7001	0.8987	0.6650	0.8786	0.0358	0.0800	10.00%	5.56%
8.4		5	0.7833	0.7227	0.8438	0.7416	0.8664	0.0218	0.0488	6.22%	7.46%
9.3		5	0.6508	0.5712	0.7303	0.5603	0.7081	0.0287	0.0641	9.85%	23.12%
17.7		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%
Proportion Normal Summary											
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.8875	0.8563	0.9187	0.8611	0.9272	0.0112	0.0251	2.83%	0.00%
3.2		5	0.8523	0.8321	0.8724	0.8411	0.8806	0.0073	0.0163	1.91%	3.97%
4.8		5	0.8113	0.7587	0.8638	0.7463	0.8571	0.0189	0.0423	5.22%	8.59%
6.6		5	0.8280	0.7560	0.9000	0.7446	0.9005	0.0259	0.0580	7.01%	6.70%
8.4		5	0.7833	0.7227	0.8438	0.7416	0.8664	0.0218	0.0488	6.22%	11.75%
9.3		5	0.6652	0.5845	0.7460	0.5603	0.7222	0.0291	0.0650	9.77%	25.04%
17.7		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%
Survival Rate Summary											
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9534	0.8737	1.0000	0.8738	1.0000	0.0287	0.0642	6.73%	0.00%
3.2		5	0.9903	0.9738	1.0000	0.9757	1.0000	0.0059	0.0133	1.34%	-3.87%
4.8		5	0.9942	0.9811	1.0000	0.9757	1.0000	0.0047	0.0105	1.06%	-4.28%
6.6		5	0.9641	0.9089	1.0000	0.8932	1.0000	0.0199	0.0444	4.61%	-1.12%
8.4		5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-4.89%
9.3		5	0.9786	0.9433	1.0000	0.9369	1.0000	0.0127	0.0284	2.91%	-2.65%
17.7		5	0.9951	0.9817	1.0000	0.9757	1.0000	0.0049	0.0109	1.09%	-4.38%

CETIS Summary Report

Report Date: 12 Dec-18 10:52 (p 2 of 3)
 Test Code: 180802mgrd | 15-4398-7435

Bivalve Larval Survival and Development Test				Amec Foster Wheeler - San Diego		
Combined Proportion Normal Detail						
Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9272	0.7961	0.7621	0.8611	0.8857
3.2		0.8458	0.8430	0.8301	0.8411	0.8592
4.8		0.7427	0.8348	0.8010	0.7971	0.8571
6.6		0.6650	0.8155	0.8082	0.8296	0.8786
8.4		0.8664	0.7751	0.7555	0.7416	0.7778
9.3		0.7081	0.6845	0.5603	0.6942	0.6068
17.7		0.0000	0.0000	0.0000	0.0000	0.0000
Proportion Normal Detail						
Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9272	0.8913	0.8722	0.8611	0.8857
3.2		0.8458	0.8430	0.8507	0.8411	0.8806
4.8		0.7463	0.8348	0.8209	0.7971	0.8571
6.6		0.7446	0.8571	0.8082	0.8296	0.9005
8.4		0.8664	0.7751	0.7555	0.7416	0.7778
9.3		0.7081	0.6878	0.5603	0.7222	0.6477
17.7		0.0000	0.0000	0.0000	0.0000	0.0000
Survival Rate Detail						
Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	1.0000	0.8932	0.8738	1.0000	1.0000
3.2		1.0000	1.0000	0.9757	1.0000	0.9757
4.8		0.9951	1.0000	0.9757	1.0000	1.0000
6.6		0.8932	0.9515	1.0000	1.0000	0.9757
8.4		1.0000	1.0000	1.0000	1.0000	1.0000
9.3		1.0000	0.9951	1.0000	0.9612	0.9369
17.7		1.0000	1.0000	0.9757	1.0000	1.0000

CETIS Summary Report

Report Date: 12 Dec-18 10:52 (p 3 of 3)

Test Code: 180802mgrd | 15-4398-7435

Bivalve Larval Survival and Development Test						Amec Foster Wheeler - San Diego
Combined Proportion Normal Binomials						
Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	191/206	164/206	157/206	186/216	186/210
3.2		181/214	188/223	171/206	180/214	177/206
4.8		153/206	187/224	165/206	165/207	180/210
6.6		137/206	168/206	177/219	185/223	181/206
8.4		188/217	162/209	173/229	155/209	161/207
9.3		148/209	141/206	130/232	143/206	125/206
17.7		0/217	0/207	0/206	0/236	0/212
Proportion Normal Binomials						
Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	191/206	164/184	157/180	186/216	186/210
3.2		181/214	188/223	171/201	180/214	177/201
4.8		153/205	187/224	165/201	165/207	180/210
6.6		137/184	168/196	177/219	185/223	181/201
8.4		188/217	162/209	173/229	155/209	161/207
9.3		148/209	141/205	130/232	143/198	125/193
17.7		0/217	0/207	0/201	0/236	0/212
Survival Rate Binomials						
Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	206/206	184/206	180/206	206/206	206/206
3.2		206/206	206/206	201/206	206/206	201/206
4.8		205/206	206/206	201/206	206/206	206/206
6.6		184/206	196/206	206/206	206/206	201/206
8.4		206/206	206/206	206/206	206/206	206/206
9.3		206/206	205/206	206/206	198/206	193/206
17.7		206/206	206/206	201/206	206/206	206/206

CETIS Analytical Report

Report Date: 27 Nov-18 17:06 (p 1 of 6)
Test Code: 180802mgrd | 15-4398-7435

Bivalve Larval Survival and Development Test								Amec Foster Wheeler - San Diego					
Analysis ID: 10-6474-4821		Endpoint: Combined Proportion Normal				CETIS Version: CETISv1.9.3							
Analyzed: 27 Nov-18 17:02		Analysis: Parametric-Control vs Treatments				Official Results: Yes							
Data Transform		Alt Hyp		NOEL		LOEL		TOEL		TU		PMSD	
Angular (Corrected)		C > T		8.4		9.3		8.839				9.11%	
Dunnett Multiple Comparison Test													
Control		vs	Conc-mg/L	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)			
Lab Control		3.2	0.235	2.362	0.105	8	CDF	0.7547	Non-Significant Effect				
		4.8	1.299	2.362	0.105	8	CDF	0.2951	Non-Significant Effect				
		6.6	1.425	2.362	0.105	8	CDF	0.2493	Non-Significant Effect				
		8.4	1.935	2.362	0.105	8	CDF	0.1114	Non-Significant Effect				
		9.3*	5.28	2.362	0.105	8	CDF	4.9E-05	Significant Effect				
ANOVA Table													
Source		Sum Squares		Mean Square		DF		F Stat		P-Value		Decision(α:5%)	
Between		0.180607		0.0361214		5		7.257		2.9E-04		Significant Effect	
Error		0.119455		0.0049773		24							
Total		0.300062				29							
Distributional Tests													
Attribute		Test				Test Stat		Critical		P-Value		Decision(α:1%)	
Variances		Bartlett Equality of Variance Test				10.24		15.09		0.0687		Equal Variances	
Distribution		Shapiro-Wilk W Normality Test				0.9802		0.9031		0.8308		Normal Distribution	
Combined Proportion Normal Summary													
Conc-mg/L		Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect	
0		LC	5	0.8465	0.7634	0.9296	0.8611	0.7621	0.9272	0.0299	7.91%	0.00%	
3.2			5	0.8439	0.8309	0.8568	0.8430	0.8301	0.8592	0.0047	1.24%	0.31%	
4.8			5	0.8066	0.7526	0.8605	0.8010	0.7427	0.8571	0.0194	5.39%	4.71%	
6.6			5	0.7994	0.7001	0.8987	0.8155	0.6650	0.8786	0.0358	10.00%	5.56%	
8.4			5	0.7833	0.7227	0.8438	0.7751	0.7416	0.8664	0.0218	6.22%	7.46%	
9.3			5	0.6508	0.5712	0.7303	0.6845	0.5603	0.7081	0.0287	9.85%	23.12%	
17.7			5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%	
Angular (Corrected) Transformed Summary													
Conc-mg/L		Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect	
0		LC	5	1.175	1.057	1.293	1.189	1.061	1.298	0.04244	8.07%	0.00%	
3.2			5	1.165	1.147	1.183	1.163	1.146	1.186	0.006468	1.24%	0.89%	
4.8			5	1.117	1.049	1.185	1.108	1.039	1.183	0.02449	4.90%	4.93%	
6.6			5	1.112	0.9921	1.231	1.127	0.9536	1.215	0.04304	8.66%	5.41%	
8.4			5	1.089	1.011	1.167	1.077	1.038	1.197	0.02802	5.75%	7.35%	
9.3			5	0.9396	0.8567	1.023	0.9743	0.8459	1	0.02988	7.11%	20.05%	
17.7			5	0.03409	0.03293	0.03525	0.03435	0.03255	0.03484	0.0004162	2.73%	97.10%	

CETIS Analytical Report

Report Date: 27 Nov-18 17:06 (p 2 of 6)
Test Code: 180802mgrd | 15-4398-7435

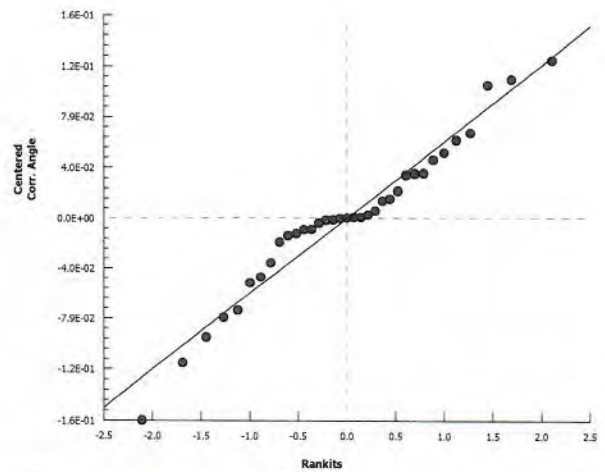
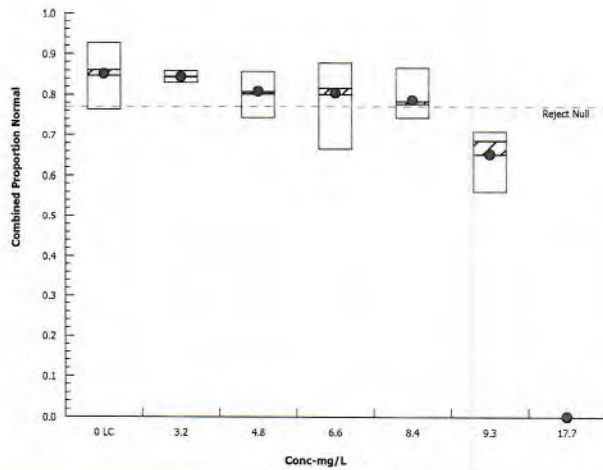
Bivalve Larval Survival and Development Test

Amec Foster Wheeler - San Diego

Analysis ID: 10-6474-4821
Analyzed: 27 Nov-18 17:02
Endpoint: Combined Proportion Normal
Analysis: Parametric-Control vs Treatments

CETIS Version: CETISv1.9.3
Official Results: Yes

Graphics



CETIS Analytical Report

Report Date: 27 Nov-18 17:06 (p 3 of 6)

Test Code: 180802mgrd | 15-4398-7435

Bivalve Larval Survival and Development Test								Amec Foster Wheeler - San Diego															
Analysis ID: 03-3396-3955		Endpoint: Proportion Normal		CETIS Version: CETISv1.9.3																			
Analyzed: 27 Nov-18 17:06		Analysis: Parametric-Control vs Treatments		Official Results: Yes																			
Data Transform		Alt Hyp		NOEL		LOEL		TOEL		TU		PMSD											
Angular (Corrected)		C > T		6.6		8.4		7.446				6.55%											
Dunnett Multiple Comparison Test																							
Control		vs		Conc-mg/L		Test Stat		Critical		MSD		DF P-Type		P-Value		Decision(α:5%)							
Lab Control		3.2		1.484		2.362		0.086		8		CDF		0.2292		Non-Significant Effect							
		4.8*		2.963		2.362		0.086		8		CDF		0.0139		Significant Effect							
		6.6		2.295		2.362		0.086		8		CDF		0.0571		Non-Significant Effect							
		8.4*		3.909		2.362		0.086		8		CDF		0.0015		Significant Effect							
		9.3*		7.605		2.362		0.086		8		CDF		9.5E-07		Significant Effect							
ANOVA Table																							
Source		Sum Squares		Mean Square		DF		F Stat		P-Value		Decision(α:5%)											
Between		0.221946		0.0443891		5		13.53		2.5E-06		Significant Effect											
Error		0.0787593		0.0032816		24																	
Total		0.300705				29																	
Distributional Tests																							
Attribute		Test		Test Stat		Critical		P-Value		Decision(α:1%)													
Variances		Bartlett Equality of Variance Test		5.217		15.09		0.3900		Equal Variances													
Distribution		Shapiro-Wilk W Normality Test		0.9704		0.9031		0.5512		Normal Distribution													
Proportion Normal Summary																							
Conc-mg/L		Code		Count		Mean		95% LCL		95% UCL		Median		Min		Max		Std Err		CV%		%Effect	
0		LC		5		0.8875		0.8563		0.9187		0.8857		0.8611		0.9272		0.0112		2.83%		0.00%	
3.2				5		0.8523		0.8321		0.8724		0.8458		0.8411		0.8806		0.0073		1.91%		3.97%	
4.8				5		0.8113		0.7587		0.8638		0.8209		0.7463		0.8571		0.0189		5.22%		8.59%	
6.6				5		0.8280		0.7560		0.9000		0.8296		0.7446		0.9005		0.0259		7.01%		6.70%	
8.4				5		0.7833		0.7227		0.8438		0.7751		0.7416		0.8664		0.0218		6.22%		11.75%	
9.3				5		0.6652		0.5845		0.7460		0.6878		0.5603		0.7222		0.0291		9.77%		25.04%	
17.7				5		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000				100.00%	
Angular (Corrected) Transformed Summary																							
Conc-mg/L		Code		Count		Mean		95% LCL		95% UCL		Median		Min		Max		Std Err		CV%		%Effect	
0		LC		5		1.23		1.179		1.282		1.226		1.189		1.298		0.01858		3.38%		0.00%	
3.2				5		1.177		1.147		1.206		1.167		1.161		1.218		0.01055		2.01%		4.37%	
4.8				5		1.123		1.057		1.189		1.134		1.043		1.183		0.02385		4.75%		8.72%	
6.6				5		1.147		1.051		1.244		1.145		1.041		1.25		0.03465		6.75%		6.76%	
8.4				5		1.089		1.011		1.167		1.077		1.038		1.197		0.02802		5.75%		11.51%	
9.3				5		0.955		0.8705		1.039		0.9779		0.8459		1.016		0.03044		7.13%		22.39%	
17.7				5		0.03418		0.03289		0.03546		0.03435		0.03255		0.03527		0.0004616		3.02%		97.22%	

CETIS Analytical Report

Report Date: 27 Nov-18 17:06 (p 4 of 6)
Test Code: 180802mgrd | 15-4398-7435

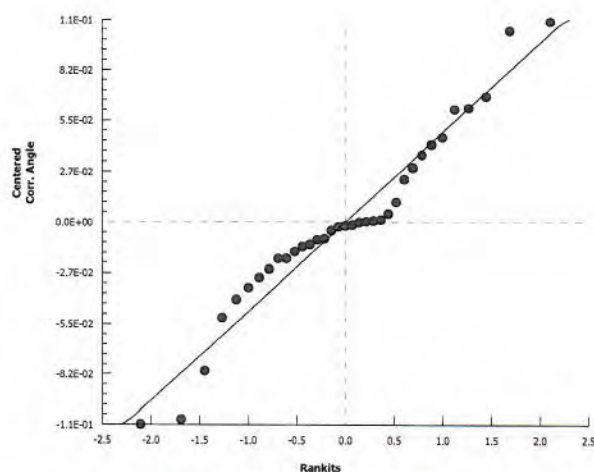
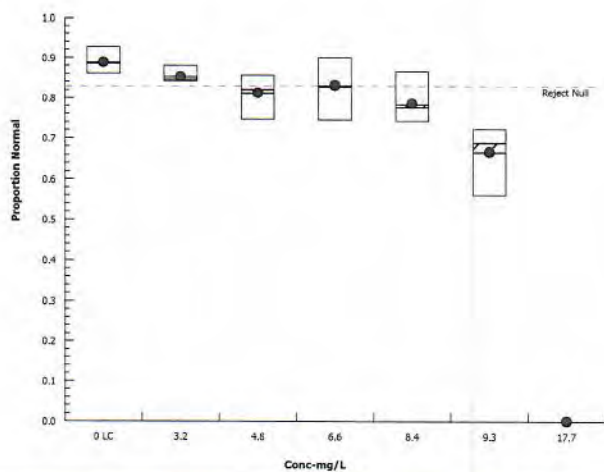
Bivalve Larval Survival and Development Test

Amec Foster Wheeler - San Diego

Analysis ID: 03-3396-3955 Endpoint: Proportion Normal
Analyzed: 27 Nov-18 17:06 Analysis: Parametric-Control vs Treatments

CETIS Version: CETISv1.9.3
Official Results: Yes

Graphics



CETIS Analytical Report

Report Date: 27 Nov-18 17:06 (p 5 of 6)
Test Code: 180802mgrd | 15-4398-7435

Bivalve Larval Survival and Development Test								Amec Foster Wheeler - San Diego															
Analysis ID: 06-3256-2903		Endpoint: Survival Rate		CETIS Version: CETISv1.9.3																			
Analyzed: 27 Nov-18 17:02		Analysis: Nonparametric-Control vs Treatments		Official Results: Yes																			
Data Transform		Alt Hyp		NOEL		LOEL		TOEL		TU		PMSD											
Angular (Corrected)		C > T		17.7		> 17.7		n/a				4.77%											
Steel Many-One Rank Sum Test																							
Control		vs		Conc-mg/L		Test Stat		Critical		Ties		DF P-Type		P-Value		Decision(α:5%)							
Lab Control		3.2		29.5		16		1		8		Asymp		0.9424		Non-Significant Effect							
		4.8		29.5		16		1		8		Asymp		0.9424		Non-Significant Effect							
		6.6		27.5		16		2		8		Asymp		0.8571		Non-Significant Effect							
		8.4		32.5		16		1		8		Asymp		0.9904		Non-Significant Effect							
		9.3		28		16		1		8		Asymp		0.8838		Non-Significant Effect							
		17.7		31		16		1		8		Asymp		0.9749		Non-Significant Effect							
ANOVA Table																							
Source		Sum Squares		Mean Square		DF		F Stat		P-Value		Decision(α:5%)											
Between		0.0718998		0.0119833		6		1.266		0.3043		Non-Significant Effect											
Error		0.264977		0.0094635		28																	
Total		0.336877				34																	
Distributional Tests																							
Attribute		Test		Test Stat		Critical		P-Value		Decision(α:1%)													
Variances		Bartlett Equality of Variance Test		119		16.81		<1.0E-37		Unequal Variances													
Distribution		Shapiro-Wilk W Normality Test		0.9314		0.9146		0.0308		Normal Distribution													
Survival Rate Summary																							
Conc-mg/L		Code		Count		Mean		95% LCL		95% UCL		Median		Min		Max		Std Err		CV%		%Effect	
0		LC		5		0.9534		0.8737		1.0000		1.0000		0.8738		1.0000		0.0287		6.73%		0.00%	
3.2				5		0.9903		0.9738		1.0000		1.0000		0.9757		1.0000		0.0059		1.34%		-3.87%	
4.8				5		0.9942		0.9811		1.0000		1.0000		0.9757		1.0000		0.0047		1.06%		-4.28%	
6.6				5		0.9641		0.9089		1.0000		0.9757		0.8932		1.0000		0.0199		4.61%		-1.12%	
8.4				5		1.0000		1.0000		1.0000		1.0000		1.0000		1.0000		0.0000		0.00%		-4.89%	
9.3				5		0.9786		0.9433		1.0000		0.9951		0.9369		1.0000		0.0127		2.91%		-2.65%	
17.7				5		0.9951		0.9817		1.0000		1.0000		0.9757		1.0000		0.0049		1.09%		-4.38%	
Angular (Corrected) Transformed Summary																							
Conc-mg/L		Code		Count		Mean		95% LCL		95% UCL		Median		Min		Max		Std Err		CV%		%Effect	
0		LC		5		1.411		1.197		1.624		1.536		1.208		1.536		0.07687		12.18%		0.00%	
3.2				5		1.487		1.405		1.57		1.536		1.414		1.536		0.02978		4.48%		-5.43%	
4.8				5		1.505		1.439		1.57		1.536		1.414		1.536		0.02356		3.50%		-6.66%	
6.6				5		1.415		1.256		1.573		1.414		1.238		1.536		0.05702		9.01%		-0.28%	
8.4				5		1.536		1.535		1.536		1.536		1.536		1.536		0		0.00%		-8.88%	
9.3				5		1.452		1.327		1.578		1.501		1.317		1.536		0.04533		6.98%		-2.96%	
17.7				5		1.512		1.444		1.579		1.536		1.414		1.536		0.02432		3.60%		-7.16%	

CETIS Test Data Worksheet

Report Date: 02 Aug-18 08:31 (p 1 of 1)
 Test Code/ID: 15-4398-7435/180802mgrd

Bivalve Larval Survival and Development Test								Amec Foster Wheeler - San Diego
Start Date: 02 Aug-18		Species: Mytilus galloprovincialis		Sample Code: 180802mgrd				
End Date: 04 Aug-18		Protocol: EPA/600/R-95/136 (1995)		Sample Source: Reference Toxicant				
Sample Date: 02 Aug-18		Material: Total Ammonia		Sample Station:				
Conc-mg/L	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
			1			216	186	on
			2			223	185	
			3			209	148	
			4			193	125	
			5			207	0	
			6			232	130	
			7			209	155	
			8			217	0	
			9			209	162	
			10			207	161	
			11			180	157	
			12			201	181	
			13			205	141	
			14			207	165	
			15			229	173	
			16			212	0	
			17			205	153	
			18			184	137	
			19			201	168	
			20			198	143	
			21			201	0	
			22			206	191	
			23			214	180	
			24			224	187	
			25			210	186	
			26			196	168	
			27			236	0	
			28			219	177	
			29			210	180	
			30			201	171	
			31			214	181	
			32			217	188	
			33			201	177	
			34			184	164	
			35			223	188	

[illegible]

Ammonia Subsample Analysis

Client: Internal
Project ID: NH₃ Reference Toxicant
Test No.: 180802 mard

Test Species: *M. galloprovincialis*
Start Date: 8/2/2018
End Date: 8/4/2018

DI Blank: 0.0

10 mg/L Ammonia Stock: 8.1 mg/L as NH_3

[illegible]

QC Check: AD 11/16/18

Final Review: 2w 12/12/18

Ammonia Subsample Analysis

Client: Internal

Project ID: NH₃ Reference Toxicant

Test No.: 180802 mgyd

Test Species: M. galloprovincialis

Start Date: 8/2/2018

End Date: 8/4/2018

DI Blank: 0,0

10 mg/L Ammonia Stock: 8.2 mg/L as NH_3

[illegible]

QC Check: AD 11/16/18

Final Review: 2w 12/12/18

Water Quality for Bivalve Development

Client: Internal
Project ID: NH₃ Reftox
Test No. 180802 mayrd

Test Species: *M. galloprovincialis*
Start Date/Time: 8/2/2018 1415
End Date/Time: 8/4/2018 1330

Concentration (mg/L)	Water Quality Measurements			
	Parameter	0hr	24hr ⁽⁸⁾	48hr
Lab Control	Temp. (°C)	15.6	16.7	14.7
	Salinity (ppt)	32.0	32.3	32.3
	pH (units)	7.93	7.65	7.69
	DO (mg/L)	8.1	7.9	7.9
AD 23.2	Temp. (°C)	15.6	16.8	14.8
	Salinity (ppt)	32.2	32.3	32.2
	pH (units)	7.94	7.66	7.70
	DO (mg/L)	8.1	7.8	8.2
AD 44.8	Temp. (°C)	15.7	16.8	14.8
	Salinity (ppt)	32.2	32.3	32.2
	pH (units)	7.91	7.65	7.70
	DO (mg/L)	8.1	8.0	8.1
AD 66.6	Temp. (°C)	15.7	16.9	14.6
	Salinity (ppt)	32.1	32.1	32.3
	pH (units)	7.90	7.65	7.69
	DO (mg/L)	8.1	7.8	8.2
AD 88.4	Temp. (°C)	15.7	16.9	14.6
	Salinity (ppt)	32.0	32.1	32.2
	pH (units)	7.88	7.65	7.70
	DO (mg/L)	8.1	7.8	8.2
AD 9.3	Temp. (°C)	15.7	16.9	14.6
	Salinity (ppt)	32.0	32.1	32.1
	pH (units)	7.85	7.65	7.71
	DO (mg/L)	8.1	7.8	8.1
AD 17.7	Temp. (°C)	15.8	17.0	14.6
	Salinity (ppt)	31.8	31.9	31.9
	pH (units)	7.82	7.63	7.69
	DO (mg/L)	8.1	7.7	8.1
Tech Initials:		AG	AG	AD

Source of Animals: Mission Bay / AG

Date Received: 6/6/18

Comments: ① Test moved to new location in chamber

QC Check: AD 8/30/18

Final Review: JW 12/12/18

Embryo-Larval Development Test

Stock Preparation Worksheet

Test Species: M. galloprovincialis
 Batch ID: Mission Bay
 Test Type: Embryo Development

Test Date: 8/2/18
 Analyst: BGS/jw

Task	
Spawning Induction	0830
Spawning Begins	1000
# Males/# Females	2 / 2
Spawn Condition	Good
Fertilization Initiated	stock #1 1030 1045
Fertilization End/Eggs Rinsed	1100 1115
Embryo Counts	1330 1340
Test Initiation	1415

stock #2

Embryo Density Counts

per 100 µL

Stock #	Stock Volume (mL)	Rep 1	Rep 2	Rep 3	Rep 4	Mean #/100 µL	Mean #/mL (x10)
Stock 1	300	44	61	67	42	53.5	535
Stock 2	300	89	NL				
Stock 3							

Cell Division:

	% Divided
Stock 1	99
Stock 2	96
Stock 3	

Selected Stock:	#1
-----------------	----

Adjust selected embryo stock to 500 embryos/mL.
 Dilution Factor = Stock Density/mL/500

Stock Density
535
 500

Dil Factor
1.07

In 10 mL sample volume add 500 µL of 500 embryo/mL stock to obtain 25 embryos/mL in test vials.

Notes:

QC = 193/255
 TD counts = 218, 195, 197, 220, 200, 181, 214, 228, 198, 210
 TD Average = 206 embryos/vial NL = not counted

QA Review:

AD 8/30/18

Final Review: jw 12/12/18

Bivalve Reference Toxicant
48-hr Survival & Development
8/14/18

CETIS Summary Report

Report Date: 09 Jan-19 11:15 (p 1 of 3)
Test Code: 180814mgrd | 06-7156-7887

Bivalve Larval Survival and Development Test						Wood Environment & Infrastructure Solutions					
Batch ID:	03-1035-2138		Test Type: Development-Survival			Analyst:					
Start Date:	14 Aug-18 14:15		Protocol: EPA/600/R-95/136 (1995)			Diluent: Diluted Natural Seawater					
Ending Date:	16 Aug-18 14:30		Species: Mytilis galloprovincialis			Brine: Not Applicable					
Duration:	48h		Source: Field Collected			Age:					
Sample ID:	16-2824-5555		Code: 180814mgrd			Client: Internal					
Sample Date:	14 Aug-18		Material: Total Ammonia			Project:					
Receipt Date:	16 Aug-18		Source: Reference Toxicant								
Sample Age:	14h		Station:								
Multiple Comparison Summary											
Analysis ID	Endpoint	Comparison Method				NOEL	LOEL	TOEL	TU	PMSD ✓	
02-4246-2540	Combined Proportion Normal	Bonferroni Adj t Test				3.9	5.7	4.715		14.2% ✓	
11-3005-2595	Proportion Normal	Bonferroni Adj t Test				5.7	7.9	6.71		6.8%	
21-0390-9797	Survival Rate	Bonferroni Adj t Test				18.1	> 18.1	n/a		15.6%	
Point Estimate Summary											
Analysis ID	Endpoint	Point Estimate Method				Level	mg/L	95% LCL	95% UCL	TU	✓
14-6273-7305	Combined Proportion Normal	Trimmed Spearman-Kärber				EC50	10.09	9.868	10.31		
Test Acceptability											
Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits		Lower	Upper	Overlap	Decision		
11-3005-2595	Proportion Normal	Control Resp	0.8482	0.9	>>			Yes	Below Criteria		
21-0390-9797	Survival Rate	Control Resp	0.9609	0.5	>>			Yes	Passes Criteria		
02-4246-2540	Combined Proportion Normal	PMSD	0.1424	<<		0.25		No	Passes Criteria		
Combined Proportion Normal Summary											
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	4	0.8159	0.7192	0.9126	0.7411	0.8841	0.0304	0.0608	7.45%	0.00%
2		5	0.7600	0.6492	0.8709	0.6071	0.8313	0.0399	0.0893	11.75%	6.85%
3.9		5	0.7051	0.5903	0.8199	0.5625	0.7890	0.0414	0.0925	13.11%	13.58%
5.7		5	0.6786	0.5940	0.7632	0.6116	0.7723	0.0305	0.0681	10.04%	16.83%
7.9		5	0.6375	0.5075	0.7675	0.4732	0.7321	0.0468	0.1047	16.42%	21.87%
9.3		5	0.5830	0.5281	0.6380	0.5134	0.6339	0.0198	0.0443	7.59%	28.54%
18.1		5	0.0054	0.0000	0.0126	0.0000	0.0134	0.0026	0.0058	108.65%	99.34%
Proportion Normal Summary											
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	4	0.8482	0.7984	0.8979	0.8098	0.8841	0.0156	0.0313	3.69%	0.00%
2		5	0.8178	0.8007	0.8348	0.8000	0.8313	0.0061	0.0137	1.68%	3.58%
3.9		5	0.8068	0.7859	0.8276	0.7884	0.8235	0.0075	0.0168	2.08%	4.88%
5.7		5	0.8036	0.7308	0.8764	0.7409	0.8827	0.0262	0.0587	7.30%	5.26%
7.9		5	0.7269	0.6718	0.7821	0.6667	0.7861	0.0199	0.0445	6.11%	14.29%
9.3		5	0.6984	0.6589	0.7380	0.6618	0.7435	0.0143	0.0319	4.56%	17.66%
18.1		5	0.0065	0.0000	0.0156	0.0000	0.0172	0.0033	0.0074	114.20%	99.24%
Survival Rate Summary											
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	4	0.9609	0.9028	1.0000	0.9152	1.0000	0.0183	0.0365	3.80%	0.00%
2		5	0.9286	0.8036	1.0000	0.7589	1.0000	0.0450	0.1007	10.84%	3.37%
3.9		5	0.8750	0.7243	1.0000	0.6830	1.0000	0.0543	0.1214	13.87%	8.94%
5.7		5	0.8446	0.7712	0.9181	0.7411	0.8884	0.0265	0.0592	7.01%	12.10%
7.9		5	0.8741	0.7323	1.0000	0.7098	0.9911	0.0511	0.1142	13.07%	9.04%
9.3		5	0.8357	0.7526	0.9188	0.7321	0.9107	0.0299	0.0669	8.01%	13.03%
18.1		5	0.9098	0.7980	1.0000	0.7768	1.0000	0.0403	0.0901	9.90%	5.32%

CETIS Summary Report

Report Date: 09 Jan-19 11:15 (p 2 of 3)
 Test Code: 180814mgrd | 06-7156-7887

Bivalve Larval Survival and Development Test				Wood Environment & Infrastructure Solutions		
Combined Proportion Normal Detail						
Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.7411	0.7991		0.8393	0.8841
2		0.7991	0.8313	0.8036	0.7589	0.6071
3.9		0.5625	0.7411	0.7890	0.6652	0.7679
5.7		0.7723	0.6116	0.6384	0.6429	0.7277
7.9		0.4732	0.6071	0.6562	0.7321	0.7188
9.3		0.5804	0.6339	0.5134	0.5848	0.6027
18.1		0.0000	0.0000	0.0089	0.0134	0.0045
Proportion Normal Detail						
Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.8098	0.8404		0.8584	0.8841
2		0.8211	0.8313	0.8072	0.8293	0.8000
3.9		0.8235	0.8177	0.7890	0.7884	0.8152
5.7		0.8827	0.8253	0.7409	0.7500	0.8191
7.9		0.6667	0.7047	0.7861	0.7387	0.7385
9.3		0.7104	0.7435	0.7012	0.6753	0.6618
18.1		0.0000	0.0000	0.0104	0.0172	0.0047
Survival Rate Detail						
Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9152	0.9509		0.9777	1.0000
2		0.9732	1.0000	0.9955	0.9152	0.7589
3.9		0.6830	0.9062	1.0000	0.8438	0.9420
5.7		0.8750	0.7411	0.8616	0.8571	0.8884
7.9		0.7098	0.8616	0.8348	0.9911	0.9732
9.3		0.8170	0.8527	0.7321	0.8661	0.9107
18.1		0.9643	1.0000	0.8616	0.7768	0.9464

CETIS Summary Report

Report Date: 09 Jan-19 11:15 (p 3 of 3)
 Test Code: 180814mgrd | 06-7156-7887

Bivalve Larval Survival and Development Test				Wood Environment & Infrastructure Solutions		
Combined Proportion Normal Binomials						
Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	166/224	179/224		188/224	206/233
2		179/224	207/249	180/224	170/224	136/224
3.9		126/224	166/224	187/237	149/224	172/224
5.7		173/224	137/224	143/224	144/224	163/224
7.9		106/224	136/224	147/224	164/224	161/224
9.3		130/224	142/224	115/224	131/224	135/224
18.1		0/224	0/226	2/224	3/224	1/224
Proportion Normal Binomials						
Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	166/205	179/213		188/219	206/233
2		179/218	207/249	180/223	170/205	136/170
3.9		126/153	166/203	187/237	149/189	172/211
5.7		173/196	137/166	143/193	144/192	163/199
7.9		106/159	136/193	147/187	164/222	161/218
9.3		130/183	142/191	115/164	131/194	135/204
18.1		0/216	0/226	2/193	3/174	1/212
Survival Rate Binomials						
Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	205/224	213/224		219/224	224/224
2		218/224	224/224	223/224	205/224	170/224
3.9		153/224	203/224	224/224	189/224	211/224
5.7		196/224	166/224	193/224	192/224	199/224
7.9		159/224	193/224	187/224	222/224	218/224
9.3		183/224	191/224	164/224	194/224	204/224
18.1		216/224	224/224	193/224	174/224	212/224

CETIS Analytical Report

Report Date: 09 Jan-19 11:15 (p 1 of 6)

Test Code: 180814mgrd | 06-7156-7887

Bivalve Larval Survival and Development Test								Nood Environment & Infrastructure Solutions			
Analysis ID: 02-4246-2540		Endpoint: Combined Proportion Normal				CETIS Version: CETISv1.9.3					
Analyzed: 09 Jan-19 11:15		Analysis: Parametric-Multiple Comparison				Official Results: Yes					
Data Transform		Alt Hyp				NOEL	LOEL	TOEL	TU	PMSD	
Angular (Corrected)		C > T				3.9	5.7	4.715		14.24%	
Bonferroni Adj t Test											
Control	vs	Conc-mg/L	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)		
Lab Control		2	1.236	2.552	0.140	7	CDF	0.6817	Non-Significant Effect		
		3.9	2.384	2.552	0.140	7	CDF	0.0732	Non-Significant Effect		
		5.7*	2.935	2.552	0.140	7	CDF	0.0202	Significant Effect		
		7.9*	3.714	2.552	0.140	7	CDF	0.0028	Significant Effect		
		9.3*	4.767	2.552	0.140	7	CDF	1.7E-04	Significant Effect		
		18.1*	19.32	2.552	0.140	7	CDF	<1.0E-37	Significant Effect		
ANOVA Table											
Source	Sum Squares		Mean Square		DF		F Stat	P-Value	Decision(α:5%)		
Between	3.81016		0.635026		6		94.51	<1.0E-37	Significant Effect		
Error	0.181408		0.0067188		27						
Total	3.99157				33						
Distributional Tests											
Attribute	Test				Test Stat	Critical	P-Value	Decision(α:1%)			
Variances	Bartlett Equality of Variance Test				6.191	16.81	0.4021	Equal Variances			
Distribution	Shapiro-Wilk W Normality Test				0.9371	0.9125	0.0507	Normal Distribution			
Combined Proportion Normal Summary											
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	4	0.8159	0.7192	0.9126	0.8192	0.7411	0.8841	0.0304	7.45%	0.00%
2		5	0.7600	0.6492	0.8709	0.7991	0.6071	0.8313	0.0399	11.75%	6.85%
3.9		5	0.7051	0.5903	0.8199	0.7411	0.5625	0.7890	0.0414	13.11%	13.58%
5.7		5	0.6786	0.5940	0.7632	0.6429	0.6116	0.7723	0.0305	10.04%	16.83%
7.9		5	0.6375	0.5075	0.7675	0.6562	0.4732	0.7321	0.0468	16.42%	21.87%
9.3		5	0.5830	0.5281	0.6380	0.5848	0.5134	0.6339	0.0198	7.59%	28.54%
18.1		5	0.0054	0.0000	0.0126	0.0045	0.0000	0.0134	0.0026	108.65%	99.34%
Angular (Corrected) Transformed Summary											
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	4	1.131	1.005	1.257	1.132	1.037	1.223	0.03954	6.99%	0.00%
2		5	1.063	0.9388	1.188	1.106	0.8934	1.148	0.04482	9.43%	6.01%
3.9		5	1	0.8759	1.124	1.037	0.8481	1.094	0.04471	10.00%	11.59%
5.7		5	0.9698	0.8775	1.062	0.9303	0.898	1.073	0.03325	7.67%	14.27%
7.9		5	0.927	0.7925	1.061	0.9443	0.7586	1.027	0.04845	11.69%	18.05%
9.3		5	0.8691	0.8134	0.9247	0.8706	0.7988	0.921	0.02004	5.16%	23.17%
18.1		5	0.06883	0.02316	0.1145	0.06687	0.03327	0.116	0.01645	53.44%	93.91%

CETIS Analytical Report

Report Date: 09 Jan-19 11:15 (p 2 of 6)
Test Code: 180814mgrd | 06-7156-7887

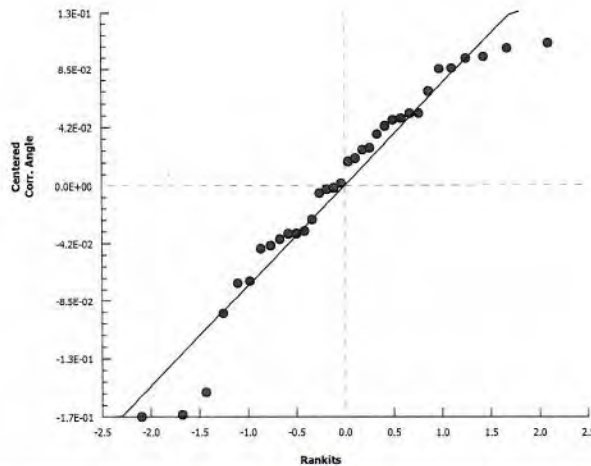
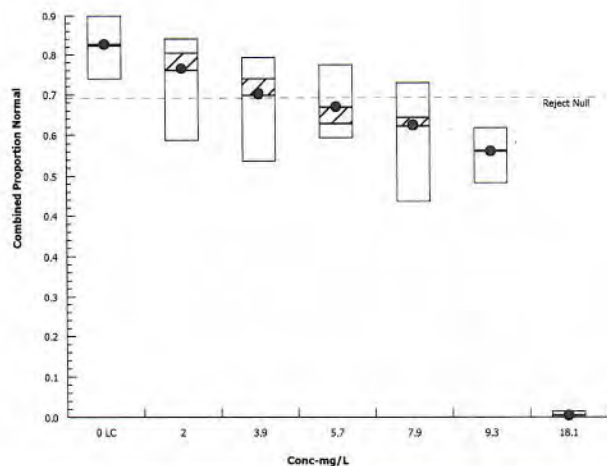
Bivalve Larval Survival and Development Test

Nood Environment & Infrastructure Solutions

Analysis ID: 02-4246-2540 Endpoint: Combined Proportion Normal
Analyzed: 09 Jan-19 11:15 Analysis: Parametric-Multiple Comparison

CETIS Version: CETISv1.9.3
Official Results: Yes

Graphics



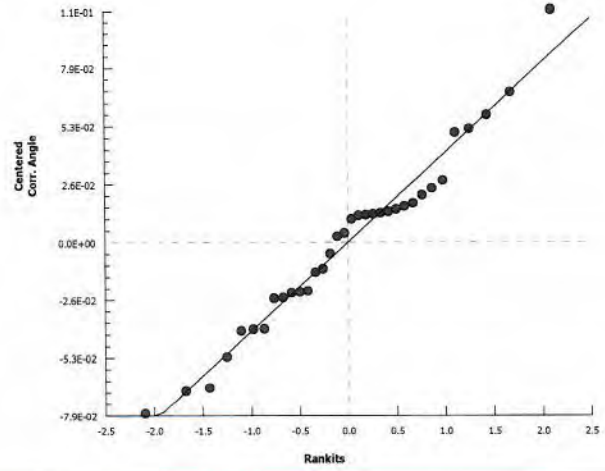
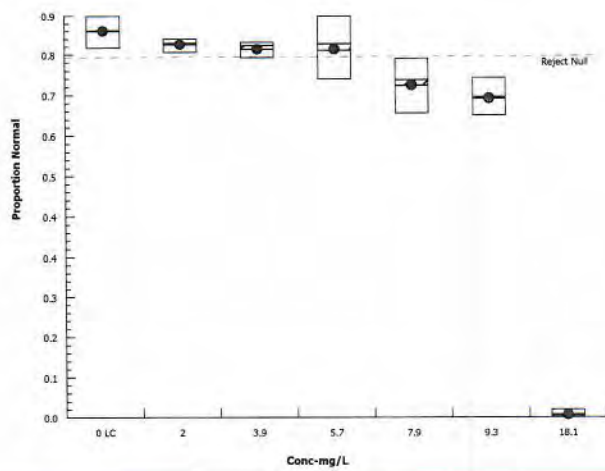
CETIS Analytical Report

Report Date: 09 Jan-19 11:15 (p 3 of 6)
Test Code: 180814mgrd | 06-7156-7887

Bivalve Larval Survival and Development Test							Nood Environment & Infrastructure Solutions				
Analysis ID: 11-3005-2595		Endpoint: Proportion Normal		CETIS Version: CETISv1.9.3							
Analyzed: 09 Jan-19 11:15		Analysis: Parametric-Multiple Comparison		Official Results: Yes							
Data Transform		Alt Hyp		NOEL	LOEL	TOEL	TU	PMSD			
Angular (Corrected)		C > T		5.7	7.9	6.71		6.80%			
Bonferroni Adj t Test											
Control	vs	Conc-mg/L	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)		
Lab Control		2	1.4	2.552	0.077	7	CDF	0.5186	Non-Significant Effect		
		3.9	1.868	2.552	0.077	7	CDF	0.2179	Non-Significant Effect		
		5.7	1.891	2.552	0.077	7	CDF	0.2081	Non-Significant Effect		
		7.9*	5.002	2.552	0.077	7	CDF	9.1E-05	Significant Effect		
		9.3*	6.073	2.552	0.077	7	CDF	5.2E-06	Significant Effect		
		18.1*	36.62	2.552	0.077	7	CDF	<1.0E-37	Significant Effect		
ANOVA Table											
Source	Sum Squares		Mean Square		DF	F Stat	P-Value	Decision(α:5%)			
Between	4.50024		0.75004		6	375.5	<1.0E-37	Significant Effect			
Error	0.0539315		0.0019975		27						
Total	4.55417				33						
Distributional Tests											
Attribute	Test				Test Stat	Critical	P-Value	Decision(α:1%)			
Variances	Bartlett Equality of Variance Test				9.714	16.81	0.1372	Equal Variances			
Distribution	Shapiro-Wilk W Normality Test				0.975	0.9125	0.6124	Normal Distribution			
Proportion Normal Summary											
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	4	0.8482	0.7984	0.8979	0.8494	0.8098	0.8841	0.0156	3.69%	0.00%
2		5	0.8178	0.8007	0.8348	0.8211	0.8000	0.8313	0.0061	1.68%	3.58%
3.9		5	0.8068	0.7859	0.8276	0.8152	0.7884	0.8235	0.0075	2.08%	4.88%
5.7		5	0.8036	0.7308	0.8764	0.8191	0.7409	0.8827	0.0262	7.30%	5.26%
7.9		5	0.7269	0.6718	0.7821	0.7385	0.6667	0.7861	0.0199	6.11%	14.29%
9.3		5	0.6984	0.6589	0.7380	0.7012	0.6618	0.7435	0.0143	4.56%	17.66%
18.1		5	0.0065	0.0000	0.0156	0.0047	0.0000	0.0172	0.0033	114.20%	99.24%
Angular (Corrected) Transformed Summary											
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	4	1.172	1.102	1.241	1.172	1.119	1.223	0.02185	3.73%	0.00%
2		5	1.13	1.108	1.152	1.134	1.107	1.148	0.007933	1.57%	3.58%
3.9		5	1.116	1.09	1.142	1.126	1.093	1.137	0.009463	1.90%	4.78%
5.7		5	1.115	1.021	1.209	1.131	1.037	1.221	0.03381	6.78%	4.84%
7.9		5	1.022	0.9598	1.084	1.034	0.9553	1.09	0.02239	4.90%	12.80%
9.3		5	0.9899	0.9465	1.033	0.9925	0.9501	1.04	0.01561	3.53%	15.54%
18.1		5	0.07394	0.02055	0.1273	0.06873	0.03327	0.1317	0.01923	58.15%	93.69%

Bivalve Larval Survival and Development Test		Nood Environment & Infrastructure Solutions	
Analysis ID: 11-3005-2595	Endpoint: Proportion Normal	CETIS Version: CETISv1.9.3	
Analyzed: 09 Jan-19 11:15	Analysis: Parametric-Multiple Comparison	Official Results: Yes	

Graphics



CETIS Analytical Report

Report Date: 09 Jan-19 11:15 (p 5 of 6)
Test Code: 180814mgrd | 06-7156-7887

Bivalve Larval Survival and Development Test								Wood Environment & Infrastructure Solutions			
Analysis ID: 21-0390-9797		Endpoint: Survival Rate		CETIS Version: CETISv1.9.3							
Analyzed: 09 Jan-19 11:15		Analysis: Parametric-Multiple Comparison		Official Results: Yes							
Data Transform		Alt Hyp		NOEL	LOEL	TOEL	TU	PMSD			
Angular (Corrected)		C > T		18.1	> 18.1	n/a		15.63%			
Bonferroni Adj t Test											
Control	vs	Conc-mg/L	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)		
Lab Control		2	0.3635	2.552	0.275	7	CDF	1.0000	Non-Significant Effect		
		3.9	1.328	2.552	0.275	7	CDF	0.5856	Non-Significant Effect		
		5.7	2.095	2.552	0.275	7	CDF	0.1370	Non-Significant Effect		
		7.9	1.394	2.552	0.275	7	CDF	0.5240	Non-Significant Effect		
		9.3	2.195	2.552	0.275	7	CDF	0.1109	Non-Significant Effect		
		18.1	0.8413	2.552	0.275	7	CDF	1.0000	Non-Significant Effect		
ANOVA Table											
Source	Sum Squares		Mean Square		DF	F Stat	P-Value	Decision(α:5%)			
Between	0.221197		0.0368661		6	1.434	0.2383	Non-Significant Effect			
Error	0.694059		0.0257059		27						
Total	0.915255				33						
Distributional Tests											
Attribute	Test				Test Stat	Critical	P-Value	Decision(α:1%)			
Variances	Bartlett Equality of Variance Test				6.177	16.81	0.4037	Equal Variances			
Distribution	Shapiro-Wilk W Normality Test				0.9798	0.9125	0.7664	Normal Distribution			
Survival Rate Summary											
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	4	0.9609	0.9028	1.0000	0.9643	0.9152	1.0000	0.0183	3.80%	0.00%
2		5	0.9286	0.8036	1.0000	0.9732	0.7589	1.0000	0.0450	10.84%	3.37%
3.9		5	0.8750	0.7243	1.0000	0.9062	0.6830	1.0000	0.0543	13.87%	8.94%
5.7		5	0.8446	0.7712	0.9181	0.8616	0.7411	0.8884	0.0265	7.01%	12.10%
7.9		5	0.8741	0.7323	1.0000	0.8616	0.7098	0.9911	0.0511	13.07%	9.04%
9.3		5	0.8357	0.7526	0.9188	0.8527	0.7321	0.9107	0.0299	8.01%	13.03%
18.1		5	0.9098	0.7980	1.0000	0.9464	0.7768	1.0000	0.0403	9.90%	5.32%
Angular (Corrected) Transformed Summary											
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	4	1.395	1.217	1.573	1.384	1.275	1.537	0.05594	8.02%	0.00%
2		5	1.356	1.113	1.599	1.406	1.058	1.537	0.08744	14.42%	2.80%
3.9		5	1.252	0.9942	1.51	1.26	0.9728	1.537	0.09296	16.60%	10.24%
5.7		5	1.17	1.075	1.265	1.19	1.037	1.23	0.03423	6.54%	16.15%
7.9		5	1.245	1.005	1.486	1.19	1.002	1.476	0.08667	15.56%	10.75%
9.3		5	1.159	1.048	1.27	1.177	1.027	1.267	0.03989	7.70%	16.92%
18.1		5	1.305	1.085	1.524	1.337	1.079	1.537	0.07915	13.56%	6.49%

CETIS Analytical Report

Report Date: 09 Jan-19 11:15 (p 6 of 6)
Test Code: 180814mgrd | 06-7156-7887

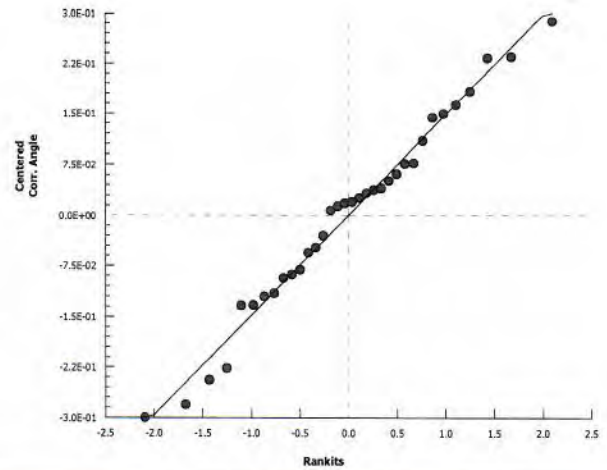
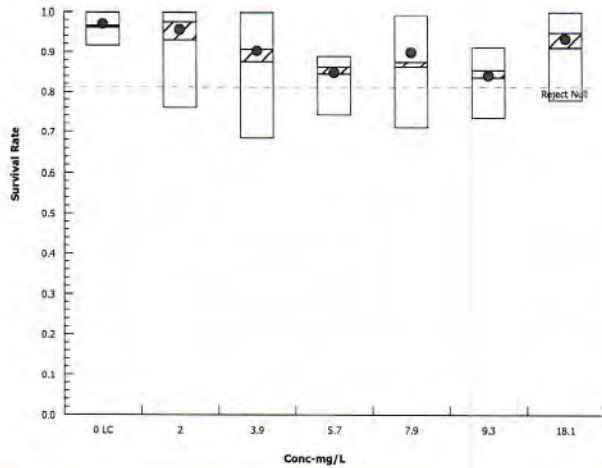
Bivalve Larval Survival and Development Test

Woods Environment & Infrastructure Solutions

Analysis ID: 21-0390-9797 Endpoint: Survival Rate
Analyzed: 09 Jan-19 11:15 Analysis: Parametric-Multiple Comparison

CETIS Version: CETISv1.9.3
Official Results: Yes

Graphics

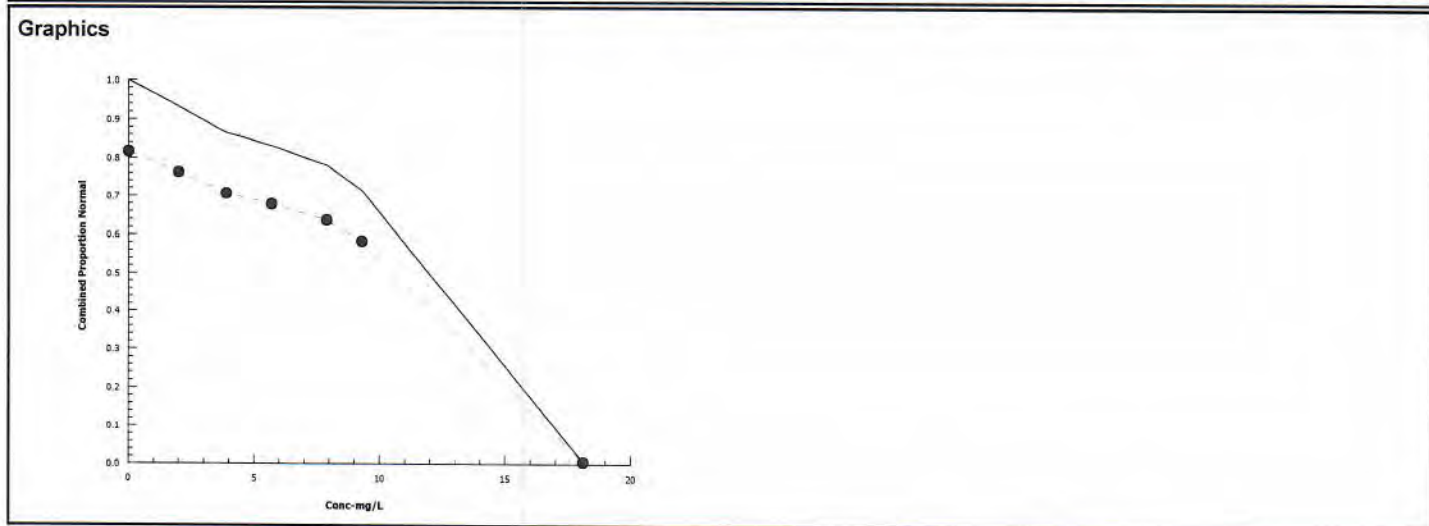


CETIS Analytical Report

Report Date: 09 Jan-19 11:15 (p 1 of 1)
Test Code: 180814mgrd | 06-7156-7887

Bivalve Larval Survival and Development Test					Mood Environment & Infrastructure Solutions		
Analysis ID:	14-6273-7305	Endpoint:	Combined Proportion Normal		CETIS Version:	CETISv1.9.3	
Analyzed:	09 Jan-19 11:15	Analysis:	Trimmed Spearman-Kärber		Official Results:	Yes	
Trimmed Spearman-Kärber Estimates							
Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0.1834	6.74%	1.004	0.004778	10.09	9.868	10.31

Combined Proportion Normal Summary					Calculated Variate(A/B)				Isotonic Variate		
Conc-mg/L	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	LC	4	0.8159	0.7411	0.8841	0.0608	7.45%	0.0%	739/905	0.8159	0.0%
2		5	0.7600	0.6071	0.8313	0.0893	11.75%	6.85%	872/1145	0.76	6.85%
3.9		5	0.7051	0.5625	0.7890	0.0925	13.11%	13.58%	800/1133	0.7051	13.58%
5.7		5	0.6786	0.6116	0.7723	0.0681	10.04%	16.83%	760/1120	0.6786	16.83%
7.9		5	0.6375	0.4732	0.7321	0.1047	16.42%	21.87%	714/1120	0.6375	21.87%
9.3		5	0.5830	0.5134	0.6339	0.0443	7.59%	28.54%	653/1120	0.583	28.54%
18.1		5	0.0054	0.0000	0.0134	0.0058	108.70%	99.34%	6/1122	0.005357	99.34%



Bivalve Larval Survival and Development Test

Wood Environment & Infrastructure Solutions

Test Type: Development-Survival

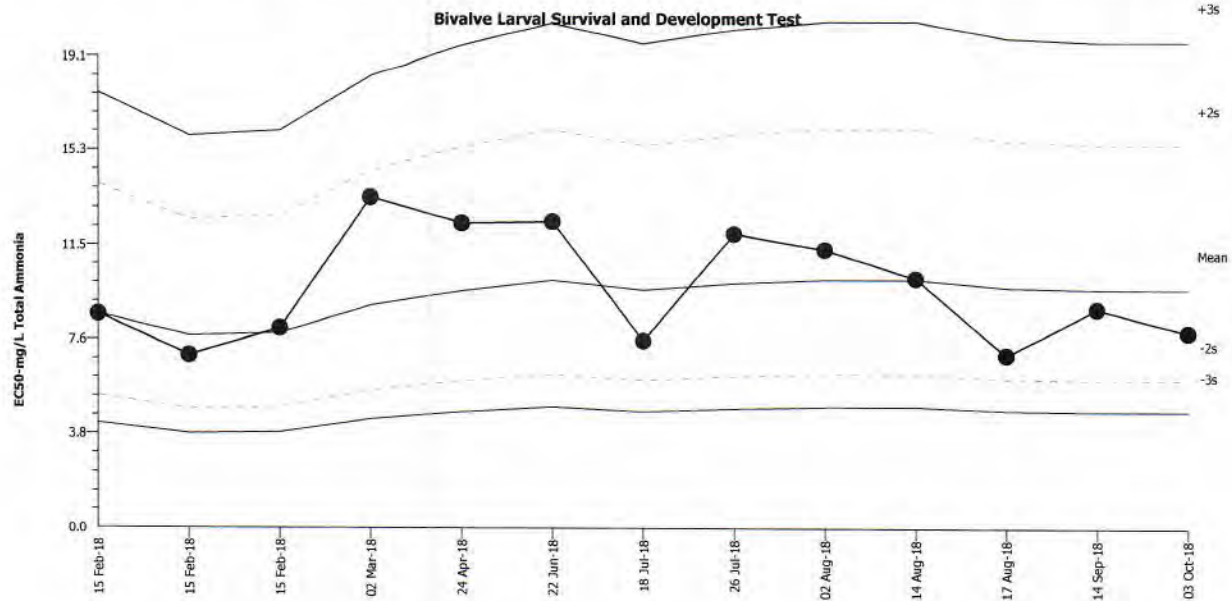
Organism: Mytilus galloprovincialis (Bay Mussel)

Material: Total Ammonia

Protocol: EPA/600/R-95/136 (1995)

Endpoint: Combined Proportion Normal

Source: Reference Toxicant-REF



Mean: 9.631

Count: 12

-2s Warning Limit: 5.996

-3s Action Limit: 4.73

Sigma: n/a

CV: 24.00%

+2s Warning Limit: 15.48

+3s Action Limit: 19.62

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2018	Feb	15	15:05	8.664	-0.9675	-0.4465			16-0331-5698	20-5403-3529
2			15	15:05	7	-2.631	-1.346			14-0965-7275	10-9849-1324
3			15	15:05	8.087	-1.544	-0.737			09-2789-8921	00-6375-0145
4		Mar	2	14:22	13.4	3.765	1.392			03-7955-5640	21-0844-6141
5		Apr	24	13:50	12.35	2.723	1.05			07-6862-1383	14-0887-3900
6		Jun	22	18:15	12.41	2.784	1.071			14-3626-7506	07-2831-7429
7		Jul	18	13:10	7.574	-2.057	-1.013			14-1933-2999	09-8220-2485
8			26	15:30	11.91	2.283	0.8971			04-4750-3360	07-2492-6358
9		Aug	2	14:15	11.26	1.632	0.6602			15-4398-7435	08-1276-4615
10			14	14:15	10.09	0.4561	0.1952			06-7156-7887	14-6273-7305
11			17	17:15	6.994	-2.638	-1.35			03-5411-9632	11-7669-9942
12		Sep	14	15:00	8.843	-0.7877	-0.3599			17-8327-4430	07-0472-1529
13		Oct	3	15:20	7.902	-1.729	-0.8345			17-8768-6287	19-9418-2380

CETIS Test Data Worksheet

Report Date: 13 Aug-18 16:46 (p 1 of 1)
Test Code/ID: 06-7156-7887/1808014mgrd

Bivalve Larval Survival and Development Test								Amec Foster Wheeler - San Diego	
Start Date: 14 Aug-18		Species: Mytilis galloprovincialis		Sample Code: 180814mgrd					
End Date: 16 Aug-18		Protocol: EPA/600/R-95/136 (1995)		Sample Source: Reference Toxicant					
Sample Date: 14 Aug-18		Material: Total Ammonia		Sample Station:					
Conc-mg/L	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes	
			1			211	172		
			2			187	147		
			3			213	179		
			4			191	142		
			5			182	13	Replicate double checked 11/192 ~sw	
			6			204	135	↳ likely contaminated; exclude from analysis	
			7			170	136		
			8			199	163		
			9			222	164		
			10			196	173		
			11			205	166		
			12			183	130		
			13			193	143		
			14			216	0		
			15			205	170		
			16			153	126		
			17			203	166		
			18			233	206		
			19			189	149		
			20			193	136		
			21			219	188		
			22			237	187		
			23			193	2		
			24			159	106		
			25			164	115		
			26			166	137		
			27			212	1		
			28			218	179		
			29			249	207		
			30			194	131		
			31			226	0		
			32			223	180		
			33			218	161		
			34			174	3		
			35			192	144		

CETIS Test Data Worksheet

Report Date: 27 Nov-18 15:01 (p 1 of 1)
 Test Code/ID: 06-7156-7887/180814mgrd

Bivalve Larval Survival and Development Test								Amec Foster Wheeler - San Diego
Start Date: 14 Aug-18 14:15		Species: Mytilis galloprovincialis		Sample Code: 180814mgrd				
End Date: 16 Aug-18 14:30		Protocol: EPA/600/R-95/136 (1995)		Sample Source: Reference Toxicant				
Sample Date: 14 Aug-18		Material: Total Ammonia		Sample Station:				
Conc-mg/L	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
0	LC	1	11					
0	LC	2	3					
0	LC	3	5					
0	LC	4	21					
0	LC	5	18					
2		1	28					
2		2	29					
2		3	32					
2		4	15					
2		5	7					
3.9		1	16					
3.9		2	17					
3.9		3	22					
3.9		4	19					
3.9		5	1					
5.7		1	10					
5.7		2	26					
5.7		3	13					
5.7		4	35					
5.7		5	8					
7.9		1	24					
7.9		2	20					
7.9		3	2					
7.9		4	9					
7.9		5	33					
9.3		1	12					
9.3		2	4					
9.3		3	25					
9.3		4	30					
9.3		5	6					
18.1		1	14					
18.1		2	31					
18.1		3	23					
18.1		4	34					
18.1		5	27					

Ammonia Subsample Analysis

Client: Internal

Project ID: Ammonia Reference Toxicant

Test No.: 180814mgrd

Test Species: *M. galloprovincialis*

Start Date: 8/14/2018

End Date: 8/16/2018

DI Blank: 0.0

10 mg/L Ammonia Stock: 8.1 mg/L as NH_3

[illegible]

QC Check: AD 11/27/18

Final Review: JW 1/19/19

Unionized Ammonia Calculation for Pressure of 1 atm													
Input 'Shaded' data													
Log Number	Beaker	Day	Dilution	Total Ammonia		Salinity		pH	Temp (K)	I		Beaker Num.	Station
				Ammonia (mg/L)	Temp (C)	(ppt)				Rounded	pK		
180814mگرد			0	0	0.5	15.8	31.9	7.84	288.96	7.07	7	9.33	0
180814mگرد			0	2	2	15.8	31.9	7.87	288.96	7.07	7	9.33	0
180814mگرد			0	4	3.9	15.7	31.9	7.87	288.86	7.07	7	9.33	0
180814mگرد			0	6	5.7	15.7	31.8	7.89	288.86	7.05	7	9.33	0
180814mگرد			0	8	7.9	15.6	31.8	7.91	288.76	7.05	7	9.33	0
180814mگرد			0	10	9.3	15.6	31.8	7.90	288.76	7.05	7	9.33	0
180814mگرد			0	20	18.1	15.6	31.6	7.90	288.76	7.00	7	9.33	0
180814mگرد			2	0	0.5	14.7	31.8	7.68	287.86	7.05	7	9.33	0
180814mگرد			2	2	2.2	14.7	31.9	7.68	287.86	7.07	7	9.33	0
180814mگرد			2	4	4.1	14.8	31.8	7.68	287.96	7.05	7	9.33	0
180814mگرد			2	6	5.9	14.7	31.7	7.69	287.86	7.02	7	9.33	0
180814mگرد			2	8	7.4	14.7	31.8	7.68	287.86	7.05	7	9.33	0
180814mگرد			2	10	9.30	14.8	31.6	7.68	287.96	7.00	7	9.33	0
180814mگرد			2	20	18.30	14.5	31.4	7.68	287.66	6.96	7	9.33	0

Water Quality for Bivalve Development

Client: Internal
Project ID: NH₃ Reftox
Test No. 180814mgvd

Test Species: *M. galloprovincialis*
Start Date/Time: 8/14/2018 1415
End Date/Time: 8/16/2018 1430

Concentration (mg/L)	Water Quality Measurements			
	Parameter	0hr	24hr	48hr
Lab Control	Temp. (°C)	15.8	14.1	14.7
	Salinity (ppt)	31.9	31.9	31.8
	pH (units)	7.84	7.68	7.68
	DO (mg/L)	7.5	8.3	8.3
2	Temp. (°C)	15.8	14.2	14.7
	Salinity (ppt)	31.9	31.8	31.9
	pH (units)	7.81	7.67	7.68
	DO (mg/L)	7.6	8.4	8.3
AP 43.9	Temp. (°C)	15.7	14.4	14.8
	Salinity (ppt)	31.9	31.8	31.8
	pH (units)	7.81	7.69	7.68
	DO (mg/L)	7.6	8.3	8.4
AP 45.7	Temp. (°C)	15.7	14.3	14.7
	Salinity (ppt)	31.8	31.7	31.7
	pH (units)	7.89	7.70	7.69
	DO (mg/L)	7.6	8.3	8.4
AP 47.9	Temp. (°C)	15.6	14.5	14.7
	Salinity (ppt)	31.8	31.8	31.8
	pH (units)	7.91	7.69	7.68
	DO (mg/L)	7.7	8.3	8.4
AP 49.3	Temp. (°C)	15.6	14.6	14.8
	Salinity (ppt)	31.8	31.6	31.6
	pH (units)	7.90	7.70	7.68
	DO (mg/L)	7.7	8.3	8.3
AP 2018.1	Temp. (°C)	15.6	14.6	14.5
	Salinity (ppt)	31.6	31.4	31.4
	pH (units)	7.90	7.68	7.68
	DO (mg/L)	7.7	8.3	8.3
Tech Initials:		AG	AD	AD

Source of Animals: Mission Bay

Date Received: 6/6/18 - 8/14/18

Comments:

QC Check: AD 11/14/18

Final Review: ~ 11/19/19

Embryo-Larval Development Test

Stock Preparation Worksheet

Test Species: M. galloprovincialis
 Batch ID: 8/14/18
 Test Type: mg-d

Test Date: 8/14/18
 Analyst: ju/AG

Task	
Spawning Induction	0940
Spawning Begins	1030
# Males/# Females	5♂ / 4
Spawn Condition	Good
Fertilization Initiated	1220
Fertilization End/Eggs Rinsed	1240
Embryo Counts	1415
Test Initiation	1455

Embryo Density Counts

per 100 µL

Stock #	Stock Volume (mL)	Rep 1	Rep 2	Rep 3	Rep 4	Mean #/100 µL	Mean #/mL (x10)
Stock 1	300	NC					
Stock 2	300	97	85	79	95	89	890
Stock 3	300	47	54	56	48	51	510

Cell Division:

	% Divided
Stock 1	86
Stock 2	100
Stock 3	97

Stock #2: $\frac{890}{500} = 1.78$ Dilution factor

Stock #3: No Dilution

Selected Stock:	2 + 3
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Stock Density

Dil Factor

Adjust selected embryo stock to 500 embryos/mL.

Dilution Factor = Stock Density/mL/500

500

In 10 mL sample volume add 500 µl of 500 embryo/mL stock to obtain 25 embryos/mL in test vials.

Notes:

QC #1: ~~184, 224, 181~~ 182/224 Normal
 TD Counts: 289, 207, 217, 212, 197, 233, 256, 188, 234, 204
 TD Average = 224 embryos/vial NC = not counted

QA Review:

AD 11/14/18

Final Review: ju 1/19/19
 ju

Bivalve Reference Toxicant
48-hr Survival & Development
8/17/18

CETIS Summary Report

Report Date: 09 Jan-19 10:48 (p 1 of 3)
Test Code: 180817mgrdNH3 | 03-5411-9632

Bivalve Larval Survival and Development Test						Wood Environment & Infrastructure Solutions					
Batch ID:	12-5385-4697		Test Type:	Development-Survival			Analyst:				
Start Date:	17 Aug-18 17:15		Protocol:	EPA/600/R-95/136 (1995)			Diluent:	Diluted Natural Seawater			
Ending Date:	19 Aug-18 16:00		Species:	Mytilis galloprovincialis			Brine:	Not Applicable			
Duration:	47h		Source:	Field Collected			Age:				
Sample ID:	15-5911-7289		Code:	180817mgrdNH3			Client:	Internal			
Sample Date:	17 Aug-18		Material:	Total Ammonia			Project:				
Receipt Date:	17 Aug-18		Source:	Reference Toxicant							
Sample Age:	17h		Station:								
Multiple Comparison Summary											
Analysis ID	Endpoint	Comparison Method				NOEL	LOEL	TOEL	TU	PMSD	✓
17-6095-8566	Combined Proportion Normal	Bonferroni Adj t Test				3.7	5.9	4.672		15.2%	✓
01-5841-9980	Proportion Normal	Bonferroni Adj t Test				3.7	5.9	4.672		8.24%	✓
19-0381-5094	Survival Rate	Bonferroni Adj t Test				18.2	> 18.2	n/a		26.0%	
Point Estimate Summary											
Analysis ID	Endpoint	Point Estimate Method				Level	mg/L	95% LCL	95% UCL	TU	✓
11-7669-9942	Combined Proportion Normal	Trimmed Spearman-Kärber				EC50	6.994	6.894	7.095		
Test Acceptability											
Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits		Lower	Upper	Overlap	Decision		
01-5841-9980	Proportion Normal	Control Resp	0.9009	0.9	>>			Yes	Passes Criteria		
19-0381-5094	Survival Rate	Control Resp	0.8645	0.5	>>			Yes	Passes Criteria		
17-6095-8566	Combined Proportion Normal	PMSD	0.1523	<<	0.25			No	Passes Criteria		
Combined Proportion Normal Summary											
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	4	0.8411	0.7871	0.8952	0.7980	0.8768	0.0170	0.0340	4.04%	0.00%
2.1		5	0.7925	0.6851	0.8998	0.7044	0.8910	0.0387	0.0865	10.91%	5.79%
3.7		5	0.8067	0.7024	0.9109	0.6798	0.8899	0.0376	0.0840	10.41%	4.10%
5.9		5	0.6082	0.4921	0.7242	0.4926	0.7206	0.0418	0.0935	15.37%	27.70%
7.8		5	0.4700	0.3312	0.6087	0.2906	0.5764	0.0500	0.1117	23.77%	44.13%
9.3		5	0.0059	0.0000	0.0192	0.0000	0.0246	0.0048	0.0107	180.66%	99.30%
18.2		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%
Proportion Normal Summary											
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	4	0.9009	0.8592	0.9426	0.8757	0.9368	0.0131	0.0262	2.91%	0.00%
2.1		5	0.8875	0.8676	0.9073	0.8644	0.9051	0.0072	0.0160	1.80%	1.49%
3.7		5	0.8743	0.8321	0.9164	0.8263	0.9186	0.0152	0.0340	3.89%	2.96%
5.9		5	0.6539	0.5639	0.7438	0.5747	0.7225	0.0324	0.0724	11.08%	27.42%
7.8		5	0.5586	0.4275	0.6898	0.4069	0.6763	0.0472	0.1056	18.91%	37.99%
9.3		5	0.0064	0.0000	0.0211	0.0000	0.0272	0.0053	0.0118	183.44%	99.29%
18.2		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%
Survival Rate Summary											
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	4	0.8645	0.8544	0.8747	0.8571	0.8719	0.0032	0.0064	0.74%	0.00%
2.1		5	0.8256	0.6707	0.9805	0.6601	1.0000	0.0558	0.1247	15.11%	4.50%
3.7		5	0.9222	0.8183	1.0000	0.8227	1.0000	0.0374	0.0836	9.07%	-6.67%
5.9		5	0.9438	0.8747	1.0000	0.8818	1.0000	0.0249	0.0557	5.90%	-9.17%
7.8		5	0.8493	0.7350	0.9635	0.7044	0.9310	0.0411	0.0920	10.83%	1.77%
9.3		5	0.9478	0.8908	1.0000	0.9015	1.0000	0.0205	0.0459	4.84%	-9.63%
18.2		5	0.9261	0.8359	1.0000	0.8079	1.0000	0.0325	0.0727	7.84%	-7.12%

CETIS Summary Report

Report Date: 09 Jan-19 10:48 (p 2 of 3)
 Test Code: 180817mgrdNH3 | 03-5411-9632

Bivalve Larval Survival and Development Test				Wood Environment & Infrastructure Solutions		
Combined Proportion Normal Detail						
Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.8325	0.7980	0.8571	0.8571	0.8768
2.1		0.7340	0.8910	0.8792	0.7044	0.7537
3.7		0.8725	0.7783	0.8899	0.8128	0.6798
5.9		0.4926	0.5468	0.7206	0.6010	0.6798
7.8		0.2906	0.5764	0.5222	0.4384	0.5222
9.3		0.0246	0.0000	0.0000	0.0049	0.0000
18.2		0.0000	0.0000	0.0000	0.0000	0.0000
Proportion Normal Detail						
Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.8895	0.8757	0.9016	0.9016	0.9368
2.1		0.8976	0.8910	0.8792	0.9051	0.8644
3.7		0.8725	0.9186	0.8899	0.8639	0.8263
5.9		0.5747	0.5812	0.7206	0.6703	0.7225
7.8		0.4069	0.6763	0.6347	0.5145	0.5608
9.3		0.0272	0.0000	0.0000	0.0050	0.0000
18.2		0.0000	0.0000	0.0000	0.0000	0.0000
Survival Rate Detail						
Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.8571	0.8621	0.8719	0.8719	0.8670
2.1		0.8177	0.6601	1.0000	0.7783	0.8719
3.7		1.0000	0.8473	1.0000	0.9409	0.8227
5.9		0.8818	0.9409	1.0000	0.8966	1.0000
7.8		0.7044	0.8670	0.8227	0.9212	0.9310
9.3		0.9064	0.9015	0.9409	0.9901	1.0000
18.2		1.0000	0.9163	0.9606	0.8079	0.9458

④ Replicate excluded due to contamination

CETIS Summary Report

Report Date: 09 Jan-19 10:48 (p 3 of 3)

Test Code: 180817mgrdNH3 | 03-5411-9632

Bivalve Larval Survival and Development Test				Wood Environment & Infrastructure Solutions		
Combined Proportion Normal Binomials						
Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	169/203	162/203	Ⓐ	174/203	178/203
2.1		149/203	188/211	182/207	143/203	153/203
3.7		178/204	158/203	194/218	165/203	138/203
5.9		100/203	111/203	147/204	122/203	138/203
7.8		59/203	117/203	106/203	89/203	106/203
9.3		5/203	0/203	0/203	1/203	0/219
18.2		0/203	0/203	0/203	0/203	0/203
Proportion Normal Binomials						
Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	169/190	162/185	Ⓐ	174/193	178/190
2.1		149/166	188/211	182/207	143/158	153/177
3.7		178/204	158/172	194/218	165/191	138/167
5.9		100/174	111/191	147/204	122/182	138/191
7.8		59/145	117/173	106/167	89/173	106/189
9.3		5/184	0/183	0/191	1/201	0/219
18.2		0/203	0/186	0/195	0/164	0/192
Survival Rate Binomials						
Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	174/203	175/203	Ⓐ	177/203	176/203
2.1		166/203	134/203	203/203	158/203	177/203
3.7		203/203	172/203	203/203	191/203	167/203
5.9		179/203	191/203	203/203	182/203	203/203
7.8		143/203	176/203	167/203	187/203	189/203
9.3		184/203	183/203	191/203	201/203	203/203
18.2		203/203	186/203	195/203	164/203	192/203

Ⓐ Replicate excluded due to contamination.

CETIS Analytical Report

Report Date: 09 Jan-19 10:48 (p 1 of 6)
 Test Code: 180817mgrdNH3 | 03-5411-9632

Bivalve Larval Survival and Development Test								Nood Environment & Infrastructure Solutions					
Analysis ID: 17-6095-8566		Endpoint: Combined Proportion Normal		CETIS Version: CETISv1.9.3									
Analyzed: 09 Jan-19 10:45		Analysis: Parametric-Multiple Comparison		Official Results: Yes									
Data Transform		Alt Hyp		NOEL		LOEL		TOEL		TU		PMSD	
Angular (Corrected)		C > T		3.7		5.9		4.672		TU		15.23%	
Bonferroni Adj t Test													
Control	vs	Conc-mg/L	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)				
Lab Control		2.1	0.9083	2.5	0.157	7	CDF	0.9329	Non-Significant Effect				
		3.7	0.6374	2.5	0.157	7	CDF	1.0000	Non-Significant Effect				
		5.9*	4.241	2.5	0.157	7	CDF	7.7E-04	Significant Effect				
		7.8*	6.505	2.5	0.157	7	CDF	3.1E-06	Significant Effect				
		9.3*	17.46	2.5	0.157	7	CDF	<1.0E-37	Significant Effect				
ANOVA Table													
Source	Sum Squares		Mean Square		DF		F Stat	P-Value	Decision(α:5%)				
Between	4.21125		0.84225		5		96.21	<1.0E-37	Significant Effect				
Error	0.201345		0.0087542		23								
Total	4.4126				28								
Distributional Tests													
Attribute	Test				Test Stat	Critical	P-Value	Decision(α:1%)					
Variances	Bartlett Equality of Variance Test				4.112	15.09	0.5334	Equal Variances					
Distribution	Shapiro-Wilk W Normality Test				0.9614	0.9004	0.3549	Normal Distribution					
Combined Proportion Normal Summary													
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect		
0	LC	4	0.8411	0.7871	0.8952	0.8448	0.7980	0.8768	0.0170	4.04%	0.00%		
2.1		5	0.7925	0.6851	0.8998	0.7537	0.7044	0.8910	0.0387	10.91%	5.79%		
3.7		5	0.8067	0.7024	0.9109	0.8128	0.6798	0.8899	0.0376	10.41%	4.10%		
5.9		5	0.6082	0.4921	0.7242	0.6010	0.4926	0.7206	0.0418	15.37%	27.70%		
7.8		5	0.4700	0.3312	0.6087	0.5222	0.2906	0.5764	0.0500	23.77%	44.13%		
9.3		5	0.0059	0.0000	0.0192	0.0000	0.0000	0.0246	0.0048	180.66%	99.30%		
18.2		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%		
Angular (Corrected) Transformed Summary													
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect		
0	LC	4	1.162	1.089	1.236	1.166	1.105	1.212	0.02313	3.98%	0.00%		
2.1		5	1.105	0.9671	1.244	1.051	0.996	1.234	0.04978	10.07%	4.90%		
3.7		5	1.122	0.9917	1.253	1.123	0.9693	1.233	0.04705	9.37%	3.44%		
5.9		5	0.8961	0.7762	1.016	0.8871	0.778	1.014	0.0432	10.78%	22.90%		
7.8		5	0.754	0.6119	0.8962	0.8076	0.5694	0.8621	0.0512	15.18%	35.13%		
9.3		5	0.06637	0.000215	0.1325	0.0351	0.03379	0.1576	0.02383	80.28%	94.29%		
18.2		5	0.0351	0.03509	0.03511	0.0351	0.0351	0.0351	0	0.00%	96.98%		

CETIS Analytical Report

Report Date: 09 Jan-19 10:48 (p 2 of 6)
 Test Code: 180817mgrdNH3 | 03-5411-9632

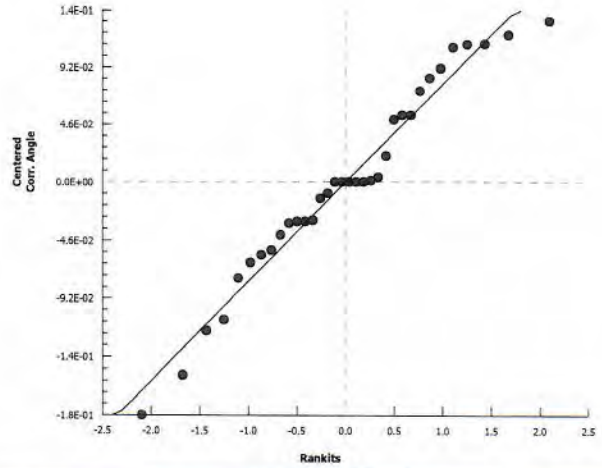
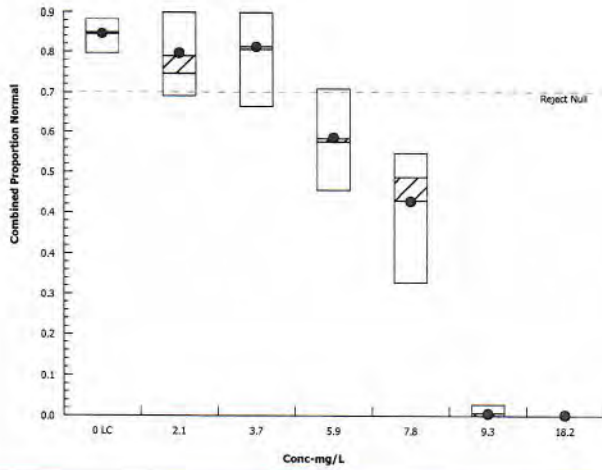
Bivalve Larval Survival and Development Test

Wood Environment & Infrastructure Solutions

Analysis ID: 17-6095-8566 Endpoint: Combined Proportion Normal
 Analyzed: 09 Jan-19 10:45 Analysis: Parametric-Multiple Comparison

CETIS Version: CETISv1.9.3
 Official Results: Yes

Graphics



CETIS Analytical Report

Report Date: 09 Jan-19 10:48 (p 3 of 6)

Test Code: 180817mgrdNH3 | 03-5411-9632

Bivalve Larval Survival and Development Test								Wood Environment & Infrastructure Solutions			
Analysis ID: 01-5841-9980		Endpoint: Proportion Normal		CETIS Version: CETISv1.9.3							
Analyzed: 09 Jan-19 10:47		Analysis: Parametric-Multiple Comparison		Official Results: Yes							
Data Transform		Alt Hyp		NOEL	LOEL	TOEL	TU	PMSD			
Angular (Corrected)		C > T		3.7	5.9	4.672		8.24%			
Bonferroni Adj t Test											
Control	vs	Conc-mg/L	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)		
Lab Control		2.1	0.525	2.5	0.111	7	CDF	1.0000	Non-Significant Effect		
		3.7	0.9418	2.5	0.111	7	CDF	0.8902	Non-Significant Effect		
		5.9*	6.947	2.5	0.111	7	CDF	1.1E-06	Significant Effect		
		7.8*	9.151	2.5	0.111	7	CDF	<1.0E-37	Significant Effect		
		9.3*	26.58	2.5	0.111	7	CDF	<1.0E-37	Significant Effect		
ANOVA Table											
Source	Sum Squares		Mean Square		DF	F Stat	P-Value	Decision(α:5%)			
Between	4.99748		0.999495		5	226.7	<1.0E-37	Significant Effect			
Error	0.101402		0.0044088		23						
Total	5.09888				28						
Distributional Tests											
Attribute	Test				Test Stat	Critical	P-Value	Decision(α:1%)			
Variances	Bartlett Equality of Variance Test				7.603	15.09	0.1795	Equal Variances			
Distribution	Shapiro-Wilk W Normality Test				0.9746	0.9004	0.6880	Normal Distribution			
Proportion Normal Summary											
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	4	0.9009	0.8592	0.9426	0.8955	0.8757	0.9368	0.0131	2.91%	0.00%
2.1		5	0.8875	0.8676	0.9073	0.8910	0.8644	0.9051	0.0072	1.80%	1.49%
3.7		5	0.8743	0.8321	0.9164	0.8725	0.8263	0.9186	0.0152	3.89%	2.96%
5.9		5	0.6539	0.5639	0.7438	0.6703	0.5747	0.7225	0.0324	11.08%	27.42%
7.8		5	0.5586	0.4275	0.6898	0.5608	0.4069	0.6763	0.0472	18.91%	37.99%
9.3		5	0.0064	0.0000	0.0211	0.0000	0.0000	0.0272	0.0053	183.44%	99.29%
18.2		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%
Angular (Corrected) Transformed Summary											
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	4	1.253	1.18	1.326	1.242	1.21	1.317	0.02295	3.66%	0.00%
2.1		5	1.229	1.198	1.26	1.234	1.194	1.258	0.01123	2.04%	1.87%
3.7		5	1.211	1.147	1.275	1.206	1.141	1.281	0.02312	4.27%	3.35%
5.9		5	0.9433	0.8487	1.038	0.9592	0.8604	1.016	0.03408	8.08%	24.70%
7.8		5	0.8451	0.712	0.9782	0.8464	0.6917	0.9656	0.04794	12.68%	32.54%
9.3		5	0.06863	-0.001269	0.1385	0.03697	0.03379	0.1656	0.02518	82.03%	94.52%
18.2		5	0.03655	0.03467	0.03842	0.03609	0.0351	0.03905	0.0006758	4.14%	97.08%

CETIS Analytical Report

Report Date: 09 Jan-19 10:48 (p 4 of 6)

Test Code: 180817mgrdNH3 | 03-5411-9632

Bivalve Larval Survival and Development Test

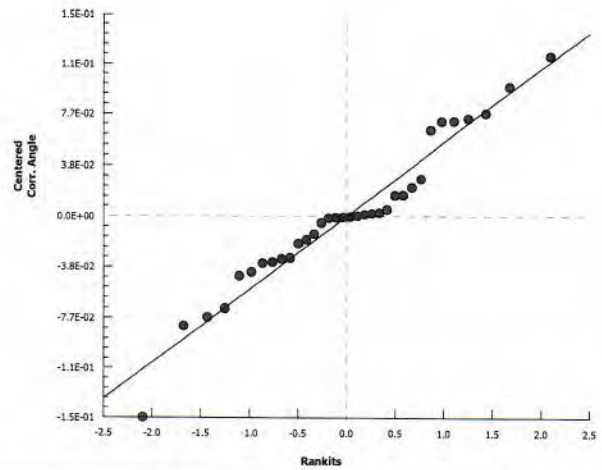
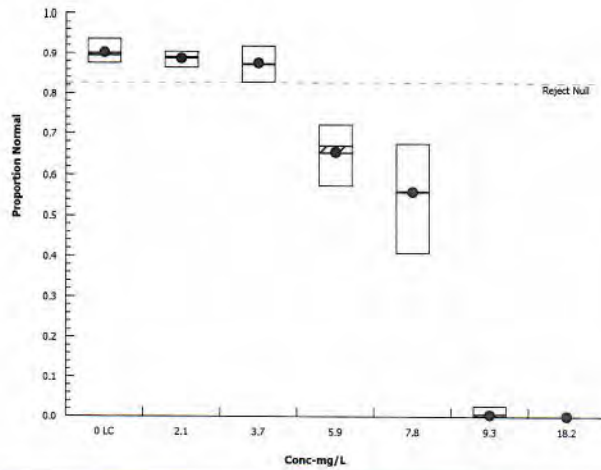
Wood Environment & Infrastructure Solutions

Analysis ID: 01-5841-9980
Analyzed: 09 Jan-19 10:47

Endpoint: Proportion Normal
Analysis: Parametric-Multiple Comparison

CETIS Version: CETISv1.9.3
Official Results: Yes

Graphics



CETIS Analytical Report

Report Date: 09 Jan-19 10:48 (p 5 of 6)

Test Code: 180817mgrdNH3 | 03-5411-9632

Bivalve Larval Survival and Development Test								Mood Environment & Infrastructure Solutions					
Analysis ID: 19-0381-5094		Endpoint: Survival Rate		CETIS Version: CETISv1.9.3									
Analyzed: 09 Jan-19 10:45		Analysis: Parametric-Multiple Comparison		Official Results: Yes									
Data Transform		Alt Hyp		NOEL		LOEL		TOEL		TU		PMSD	
Angular (Corrected)		C > T		18.2		> 18.2		n/a				26.03%	
Bonferroni Adj t Test													
Control	vs	Conc-mg/L	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)				
Lab Control		2.1	0.1349	2.552	0.267	7	CDF	1.0000	Non-Significant Effect				
		3.7	-1.399	2.552	0.267	7	CDF	1.0000	Non-Significant Effect				
		5.9	-1.701	2.552	0.267	7	CDF	1.0000	Non-Significant Effect				
		7.8	0.09327	2.552	0.267	7	CDF	1.0000	Non-Significant Effect				
		9.3	-1.67	2.552	0.267	7	CDF	1.0000	Non-Significant Effect				
		18.2	-1.275	2.552	0.267	7	CDF	1.0000	Non-Significant Effect				
ANOVA Table													
Source	Sum Squares		Mean Square		DF		F Stat	P-Value	Decision(α:5%)				
Between	0.236389		0.0393981		6		1.618	0.1805	Non-Significant Effect				
Error	0.657409		0.0243485		27								
Total	0.893797				33								
Distributional Tests													
Attribute	Test			Test Stat	Critical	P-Value	Decision(α:1%)						
Variances	Bartlett Equality of Variance Test			14.67	16.81	0.0230	Equal Variances						
Distribution	Shapiro-Wilk W Normality Test			0.9678	0.9125	0.4036	Normal Distribution						
Survival Rate Summary													
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect		
0	LC	4	0.8645	0.8544	0.8747	0.8645	0.8571	0.8719	0.0032	0.74%	0.00%		
2.1		5	0.8256	0.6707	0.9805	0.8177	0.6601	1.0000	0.0558	15.11%	4.50%		
3.7		5	0.9222	0.8183	1.0000	0.9409	0.8227	1.0000	0.0374	9.07%	-6.67%		
5.9		5	0.9438	0.8747	1.0000	0.9409	0.8818	1.0000	0.0249	5.90%	-9.17%		
7.8		5	0.8493	0.7350	0.9635	0.8670	0.7044	0.9310	0.0411	10.83%	1.77%		
9.3		5	0.9478	0.8908	1.0000	0.9409	0.9015	1.0000	0.0205	4.84%	-9.63%		
18.2		5	0.9261	0.8359	1.0000	0.9458	0.8079	1.0000	0.0325	7.84%	-7.12%		
Angular (Corrected) Transformed Summary													
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect		
0	LC	4	1.194	1.179	1.209	1.194	1.183	1.205	0.004647	0.78%	0.00%		
2.1		5	1.18	0.9069	1.453	1.13	0.9484	1.536	0.09829	18.63%	1.18%		
3.7		5	1.34	1.102	1.579	1.325	1.136	1.536	0.08588	14.33%	-12.27%		
5.9		5	1.372	1.18	1.564	1.325	1.22	1.536	0.0691	11.26%	-14.91%		
7.8		5	1.184	1.028	1.34	1.197	0.996	1.305	0.05609	10.59%	0.82%		
9.3		5	1.369	1.209	1.528	1.325	1.252	1.536	0.0574	9.38%	-14.64%		
18.2		5	1.327	1.139	1.516	1.336	1.117	1.536	0.06786	11.43%	-11.17%		

Bivalve Larval Survival and Development Test

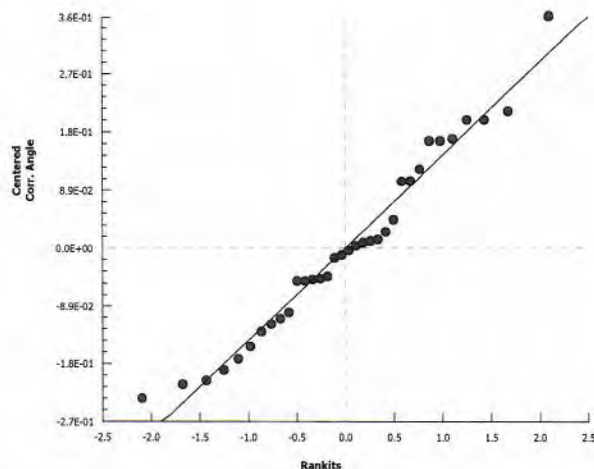
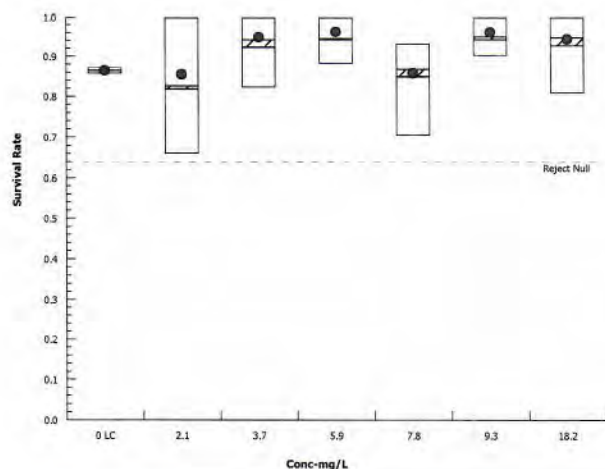
Nood Environment & Infrastructure Solutions

Analysis ID: 19-0381-5094
Analyzed: 09 Jan-19 10:45

Endpoint: Survival Rate
Analysis: Parametric-Multiple Comparison

CETIS Version: CETISv1.9.3
Official Results: Yes

Graphics



CETIS Analytical Report

Report Date: 09 Jan-19 10:48 (p 1 of 1)
 Test Code: 180817mgrdNH3 | 03-5411-9632

Bivalve Larval Survival and Development Test Wood Environment & Infrastructure Solutions

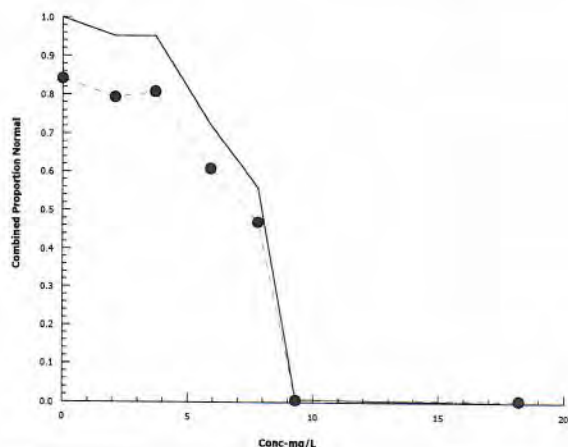
Analysis ID: 11-7669-9942	Endpoint: Combined Proportion Normal	CETIS Version: CETISv1.9.3
Analyzed: 09 Jan-19 10:45	Analysis: Trimmed Spearman-Kärber	Official Results: Yes

Trimmed Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0.1589	4.80%	0.8447	0.003127	6.994	6.894	7.095

Combined Proportion Normal Summary			Calculated Variate(A/B)							Isotonic Variate	
Conc-mg/L	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	LC	4	0.8411	0.7980	0.8768	0.0340	4.04%	0.0%	683/812	0.8411	0.0%
2.1		5	0.7925	0.7044	0.8910	0.0865	10.91%	5.79%	815/1027	0.7996	4.94%
3.7		5	0.8067	0.6798	0.8899	0.0840	10.41%	4.1%	833/1031	0.7996	4.94%
5.9		5	0.6082	0.4926	0.7206	0.0935	15.37%	27.7%	618/1016	0.6082	27.7%
7.8		5	0.4700	0.2906	0.5764	0.1117	23.77%	44.13%	477/1015	0.47	44.13%
9.3		5	0.0059	0.0000	0.0246	0.0107	180.70%	99.3%	6/1031	0.005911	99.3%
18.2		5	0.0000	0.0000	0.0000	0.0000		100.0%	0/1015	0	100.0%

Graphics



Bivalve Larval Survival and Development Test

Wood Environment & Infrastructure Solutions

Test Type: Development-Survival

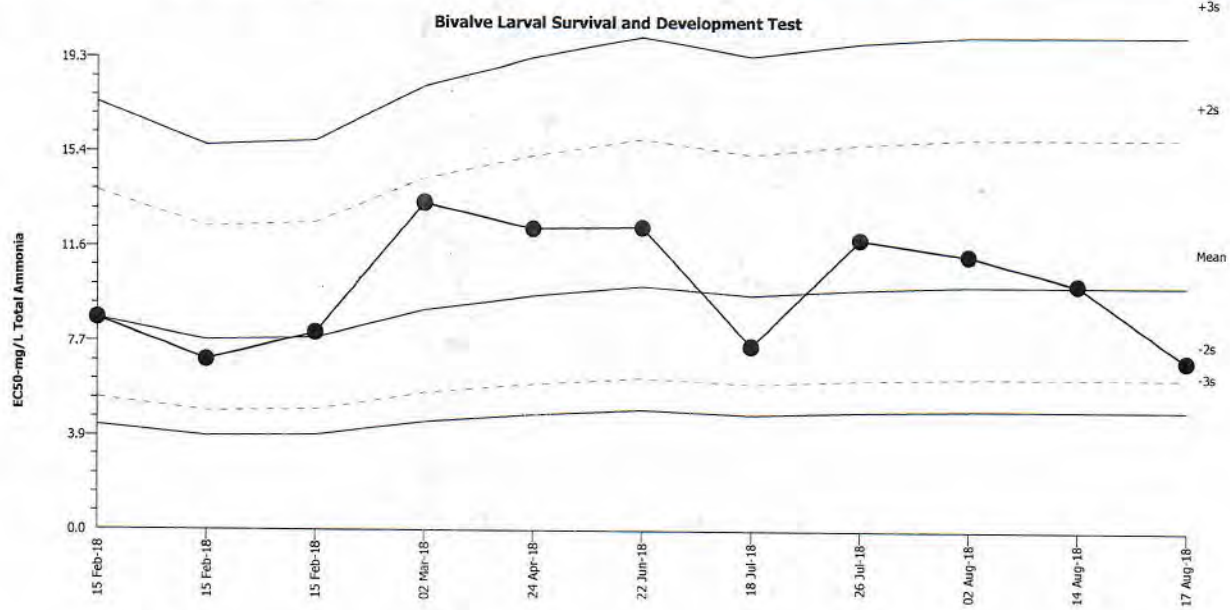
Organism: Mytilus galloprovincialis (Bay Mussel)

Material: Total Ammonia

Protocol: EPA/600/R-95/136 (1995)

Endpoint: Combined Proportion Normal

Source: Reference Toxicant-REF



Mean: 10.03

Count: 10

-2s Warning Limit: 6.285

-3s Action Limit: 4.975

Sigma: n/a

CV: 23.70%

+2s Warning Limit: 16.01

+3s Action Limit: 20.23

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2018	Feb	15	15:05	8.664	-1.371	-0.6281			16-0331-5698	20-5403-3529
2			15	15:05	7	-3.034	-1.54			14-0965-7275	10-9849-1324
3			15	15:05	8.087	-1.947	-0.9228			09-2789-8921	00-6375-0145
4		Mar	2	14:22	13.4	3.362	1.236			03-7955-5640	21-0844-6141
5		Apr	24	13:50	12.35	2.32	0.8897			07-6862-1383	14-0887-3900
6		Jun	22	18:15	12.41	2.381	0.9105			14-3626-7506	07-2831-7429
7		Jul	18	13:10	7.574	-2.46	-1.203			14-1933-2999	09-8220-2485
8			26	15:30	11.91	1.88	0.7344			04-4750-3360	07-2492-6358
9		Aug	2	14:15	11.26	1.229	0.4942			15-4398-7435	08-1276-4615
10			14	14:15	10.09	0.05304	0.02255			06-7156-7887	14-6273-7305
11			17	17:15	6.994	-3.041	-1.544			03-5411-9632	11-7669-9942

CETIS Test Data Worksheet

Report Date: 15 Aug-18 14:26 (p 1 of 1)
Test Code/ID: 03-5411-9632/180817mgrd

Bivalve Larval Survival and Development Test								Amec Foster Wheeler - San Diego	
Start Date: 17 Aug-18 1715		Species: Mytilus galloprovincialis		Sample Code: 180817mgrd 1143					
End Date: 19 Aug-18 1600		Protocol: EPA/600/R-95/136 (1995)		Sample Source: Reference Toxicant					
Sample Date: 17 Aug-18		Material: Total Ammonia		Sample Station:					
Conc-mg/L	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes	
			1			192	0		
			2			167	138		
			3			158	143		
			4			164	0		
			5			207	182		
			6			172	158		
			7			204	178		
			8			218	194		
			9			182 175	87 162		
			10			193 177	148 174		
			11			166	149		
			12			145 143	8 59		
			13			201	1		
			14			190 176	157 178		
			15			182	122		
			16			183	0		
			17			219	0		
			18			191 206	75 138		
			19			173 187	81 89		
			20			203	0		
			21			191 195	4 111		
			22			191	165		
			23			211 184	46 188		
			24			168	0	* Replicate excluded from analysis due to contamination	
			25			190 174	98 169		
			26			177	153		
			27			186	0		
			28			174 179	40 100		
			29			195	0		
			30			191	0		
			31			204	147		
			32			184	5		
			33			173 176	58 117		
			34			189	106		
			35			167	106		

CETIS Test Data Worksheet

Report Date: 15 Aug-18 14:42 (p 1 of 1)
 Test Code/ID: 03-5411-9632/180817mgrd

Bivalve Larval Survival and Development Test

Amec Foster Wheeler - San Diego

Start Date: 17 Aug-18 Species: Mytilis galloprovincialis Sample Code: 180817mgrd
 End Date: 19 Aug-18 Protocol: EPA/600/R-95/136 (1995) Sample Source: Reference Toxicant
 Sample Date: 17 Aug-18 Material: Total Ammonia Sample Station:

Conc-mg/L	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
0	LC	1	25					
0	LC	2	9					
0	LC	3	24					
0	LC	4	10					
0	LC	5	14					
2.1	2	1	11					
2		2	23					
2		3	5					
2		4	3					
2		5	26					
3.7	4	1	7					
4		2	6					
4		3	8					
4		4	22					
4		5	2					
5.9	6	1	28					
6		2	21					
6		3	31					
6		4	15					
6		5	18					
7.8	8	1	12					
8		2	33					
8		3	35					
8		4	19					
8		5	34					
9.3	10	1	32					
10		2	16					
10		3	30					
10		4	13					
10		5	17					
18.2	20	1	20					
20		2	27					
20		3	29					
20		4	4					
20		5	1					

QC: AL

Water Quality for Bivalve Development

Client: Internal
Project ID: NH₃ Reftox
Test No. 180817mgd NH₃

Test Species: *M. galloprovincialis*
Start Date/Time: 8/17/2018 1715
End Date/Time: 8/19/2018 1600

Concentration (mg/L)	Water Quality Measurements			
	Parameter	0hr	24hr	48hr
Lab Control	Temp. (°C)	15.7	15.6	15.1
	Salinity (ppt)	31.6	32.3	32.2
	pH (units)	7.86	7.69	7.82
	DO (mg/L)	7.8	8.2	8.3
2	Temp. (°C)	15.5	15.5	15.0
	Salinity (ppt)	31.8	32.3	32.3
	pH (units)	7.92	7.71	7.83
	DO (mg/L)	7.9	8.1	8.2
4	Temp. (°C)	15.4	15.6	15.0
	Salinity (ppt)	31.7	32.3	32.3
	pH (units)	7.92	7.73	7.83
	DO (mg/L)	7.9	7.9	8.3
6	Temp. (°C)	15.5	15.6	15.0
	Salinity (ppt)	31.7	32.3	32.4
	pH (units)	7.92	7.70	7.82
	DO (mg/L)	7.9	8.1	8.3
8	Temp. (°C)	15.5	15.6	15.0
	Salinity (ppt)	AD 32.31.6	32.2	32.2
	pH (units)	7.92	7.70	7.82
	DO (mg/L)	7.9	8.1	8.3
10	Temp. (°C)	15.7	15.6	15.0
	Salinity (ppt)	31.5	32.1	32.1
	pH (units)	7.92	7.70	7.81
	DO (mg/L)	7.9	8.2	8.3
20	Temp. (°C)	15.7	15.6	14.8
	Salinity (ppt)	31.3	31.9	31.9
	pH (units)	7.90	7.69	7.81
	DO (mg/L)	7.9	8.2	8.3
Tech Initials:		AD	AD	AD

Source of Animals: Mission Bay 8/1/18
Comments:

Date Received: 8/1/18

QC Check: AD 11/14/18

Final Review: JW 1/16/19

[illegible]

Ammonia Subsample Analysis

Client: Internal

Project ID: Reference Toxicant

Test No.: 180817moxd rd NH3

Test Species: *M. galloprovincialis*

Start Date: 8/17/2018

End Date: 8/19/2018

DI Blank: 0.0

10 mg/L Ammonia Stock: 8.4 mg/L as NH_3

[illegible]

QC Check: AD 11/14/18

Final Review: SW 1/16/19

Embryo-Larval Development Test

Stock Preparation Worksheet

Test Species: M. galloprovincialis
 Batch ID: N/A
 Test Type: Mussel Development

Test Date: 8/17/18
 Analyst: SW

Task	
Spawning Induction	1000
Spawning Begins	1200 - 1400
# Males/# Females	3 / 2
Spawn Condition	Moderate
Fertilization Initiated	1500
Fertilization End/Eggs Rinsed	1520
Embryo Counts	1630
Test Initiation	1715

Embryo Density Counts

per 100 μ L

Stock #	Stock Volume (mL)	Rep 1	Rep 2	Rep 3	Rep 4	Mean #/100 μ L	Mean #/mL (x10)
Stock 1	250	42	57	63	65	57	570
Stock 2							
Stock 3							

Cell Division:

	% Divided
Stock 1	96%
Stock 2	82%
Stock 3	

Selected Stock:	#1
-----------------	----

Adjust selected embryo stock to 500 embryos/mL.
 Dilution Factor = Stock Density/mL/500

Stock Density
570
 500

Dil Factor
1.14

In 10 mL sample volume add 500 μ L of 500 embryo/mL stock to obtain 25 embryos/mL in test vials.

Notes:

191
 $TO_1A = 184/187$, $TO_1B = 228$, $TO_1C = 184$, $TO_1D = 206$, $TO_1E = 202$ $x = 202$
 $TO_2A = 200$, $TO_2B = 194$, $TO_2C = 199$, $TO_2D = 222$, $TO_2E = 201$ $x = 203$
 $QC_1C = 180/196$ Overall TO $x = 203$

QA Review:

A6 10/8/18

Final Review: SW 10/10/18

Bivalve Reference Toxicant
48-hr Survival & Development
8/26/18

CETIS Summary Report

Report Date: 12 Dec-18 10:50 (p 1 of 3)
Test Code: 180726mgrd | 04-4750-3360

Bivalve Larval Survival and Development Test						Amec Foster Wheeler - San Diego					
Batch ID:	18-6392-3940	Test Type:	Development-Survival	Analyst:		Diluent:	Diluted Natural Seawater	Brine:	Not Applicable	Age:	
Start Date:	26 Jul-18 15:30	Protocol:	EPA/600/R-95/136 (1995)								
Ending Date:	28 Jul-18 14:00	Species:	Mytilus galloprovincialis								
Duration:	46h	Source:	Field Collected								
Sample ID:	17-4856-1258	Code:	180726mgrd	Client:	Internal	Project:					
Sample Date:	25 Jul-18	Material:	Total Ammonia								
Receipt Date:	25 Jul-18	Source:	Reference Toxicant								
Sample Age:	40h	Station:									
Multiple Comparison Summary											
Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	TU	PMSD	✓			
14-8934-8776	Combined Proportion Normal	Dunnett Multiple Comparison Test	5.9	7.9	6.827		11.6%	✓			
00-7148-1327	Proportion Normal	Steel Many-One Rank Sum Test	5.9	7.9	6.827		8.54%	✓			
04-4174-8834	Survival Rate	Dunnett Multiple Comparison Test	19.6	> 19.6	n/a		14.0%				
Point Estimate Summary											
Analysis ID	Endpoint	Point Estimate Method	Level	mg/L	95% LCL	95% UCL	TU	✓			
07-2492-6358	Combined Proportion Normal	Trimmed Spearman-Kärber	EC50	11.91	11.75	12.08					
Test Acceptability											
Analysis ID	Endpoint	Attribute	Test Stat	Lower	Upper	Overlap	Decision				
00-7148-1327	Proportion Normal	Control Resp	0.8087	0.9	>>	Yes	Below Criteria				
04-4174-8834	Survival Rate	Control Resp	0.8968	0.5	>>	Yes	Passes Criteria				
14-8934-8776	Combined Proportion Normal	PMSD	0.1161	<<	0.25	No	Passes Criteria				
Combined Proportion Normal Summary											
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.7252	0.6386	0.8118	0.6089	0.7953	0.0312	0.0697	9.62%	0.00%
1.8		5	0.7524	0.7044	0.8004	0.7177	0.8105	0.0173	0.0386	5.13%	-3.76%
4		5	0.7089	0.6099	0.8078	0.5766	0.7903	0.0356	0.0797	11.24%	2.25%
5.9		5	0.7621	0.7255	0.7987	0.7177	0.7944	0.0132	0.0295	3.87%	-5.09%
7.9		5	0.5847	0.4922	0.6772	0.4879	0.6653	0.0333	0.0745	12.74%	19.38%
10.6		5	0.5282	0.4600	0.5964	0.4758	0.6169	0.0246	0.0549	10.40%	27.16%
19.6		5	0.0024	0.0000	0.0069	0.0000	0.0081	0.0016	0.0036	149.07%	99.67%
Proportion Normal Summary											
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.8087	0.7797	0.8377	0.7947	0.8500	0.0104	0.0233	2.89%	0.00%
1.8		5	0.9089	0.8677	0.9501	0.8553	0.9418	0.0148	0.0332	3.65%	-12.39%
4		5	0.8830	0.8170	0.9490	0.7904	0.9196	0.0238	0.0531	6.02%	-9.18%
5.9		5	0.8570	0.8003	0.9137	0.7842	0.8990	0.0204	0.0457	5.33%	-5.97%
7.9		5	0.6866	0.6263	0.7449	0.6037	0.7149	0.0210	0.0469	6.84%	15.10%
10.6		5	0.6223	0.5470	0.6975	0.5279	0.6830	0.0271	0.0606	9.74%	23.06%
19.6		5	0.0031	0.0000	0.0083	0.0000	0.0085	0.0019	0.0042	138.48%	99.62%
Survival Rate Summary											
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.8968	0.7919	1.0000	0.7661	1.0000	0.0378	0.0845	9.42%	0.00%
1.8		5	0.8298	0.7405	0.9192	0.7621	0.9476	0.0322	0.0720	8.67%	7.46%
4		5	0.8065	0.6656	0.9474	0.6331	0.9234	0.0508	0.1135	14.07%	10.07%
5.9		5	0.8919	0.8060	0.9779	0.7984	0.9718	0.0310	0.0692	7.76%	0.54%
7.9		5	0.8516	0.7400	0.9633	0.7016	0.9395	0.0402	0.0899	10.56%	5.04%
10.6		5	0.8508	0.7683	0.9333	0.7903	0.9395	0.0297	0.0664	7.81%	5.13%
19.6		5	0.7919	0.6341	0.9498	0.5968	0.9435	0.0569	0.1271	16.06%	11.69%

CETIS Summary Report

Report Date: 12 Dec-18 10:50 (p 2 of 3)
 Test Code: 180726mgrd | 04-4750-3360

Bivalve Larval Survival and Development Test					Amec Foster Wheeler - San Diego	
Combined Proportion Normal Detail						
Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.6089	0.7379	0.7540	0.7953	0.7298
1.8		0.7661	0.7177	0.8105	0.7500	0.7177
4		0.7097	0.5766	0.7379	0.7298	0.7903
5.9		0.7177	0.7823	0.7540	0.7944	0.7621
7.9		0.4879	0.6653	0.6371	0.6048	0.5282
10.6		0.5403	0.5121	0.4960	0.6169	0.4758
19.6		0.0000	0.0000	0.0000	0.0081	0.0040
Proportion Normal Detail						
Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.7947	0.8026	0.8500	0.7953	0.8009
1.8		0.9091	0.9082	0.8553	0.9300	0.9418
4		0.9072	0.9108	0.9196	0.7904	0.8869
5.9		0.8990	0.8778	0.8821	0.8419	0.7842
7.9		0.6954	0.7082	0.7149	0.7109	0.6037
10.6		0.6601	0.6382	0.5279	0.6830	0.6020
19.6		0.0000	0.0000	0.0000	0.0085	0.0068
Survival Rate Detail						
Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.7661	0.9194	0.8871	1.0000	0.9113
1.8		0.8427	0.7903	0.9476	0.8065	0.7621
4		0.7823	0.6331	0.8024	0.9234	0.8911
5.9		0.7984	0.8911	0.8548	0.9435	0.9718
7.9		0.7016	0.9395	0.8911	0.8508	0.8750
10.6		0.8185	0.8024	0.9395	0.9032	0.7903
19.6		0.8266	0.7621	0.8306	0.9435	0.5968

CETIS Summary Report

Report Date: 12 Dec-18 10:50 (p 3 of 3)
 Test Code: 180726mgrd | 04-4750-3360

Bivalve Larval Survival and Development Test							Amec Foster Wheeler - San Diego
Combined Proportion Normal Binomials							
Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	
0	LC	151/248	183/248	187/248	202/254	181/248	
1.8		190/248	178/248	201/248	186/248	178/248	
4		176/248	143/248	183/248	181/248	196/248	
5.9		178/248	194/248	187/248	197/248	189/248	
7.9		121/248	165/248	158/248	150/248	131/248	
10.6		134/248	127/248	123/248	153/248	118/248	
19.6		0/248	0/248	0/248	2/248	1/248	
Proportion Normal Binomials							
Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	
0	LC	151/190	183/228	187/220	202/254	181/226	
1.8		190/209	178/196	201/235	186/200	178/189	
4		176/194	143/157	183/199	181/229	196/221	
5.9		178/198	194/221	187/212	197/234	189/241	
7.9		121/174	165/233	158/221	150/211	131/217	
10.6		134/203	127/199	123/233	153/224	118/196	
19.6		0/205	0/189	0/206	2/234	1/148	
Survival Rate Binomials							
Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	
0	LC	190/248	228/248	220/248	248/248	226/248	
1.8		209/248	196/248	235/248	200/248	189/248	
4		194/248	157/248	199/248	229/248	221/248	
5.9		198/248	221/248	212/248	234/248	241/248	
7.9		174/248	233/248	221/248	211/248	217/248	
10.6		203/248	199/248	233/248	224/248	196/248	
19.6		205/248	189/248	206/248	234/248	148/248	

CETIS Analytical Report

Report Date: 27 Nov-18 14:32 (p 1 of 6)

Test Code: 180726mgrd | 04-4750-3360

Bivalve Larval Survival and Development Test										Amec Foster Wheeler - San Diego			
Analysis ID: 14-8934-8776		Endpoint: Combined Proportion Normal		CETIS Version: CETISv1.9.3									
Analyzed: 27 Nov-18 14:28		Analysis: Parametric-Control vs Treatments		Official Results: Yes									
Data Transform		Alt Hyp		NOEL		LOEL		TOEL		TU		PMSD	
Angular (Corrected)		C > T		5.9		7.9		6.827				11.61%	
Dunnett Multiple Comparison Test													
Control	vs	Conc-mg/L	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)				
Lab Control		1.8	-0.7736	2.407	0.093	8	CDF	0.9765	Non-Significant Effect				
		4	0.4619	2.407	0.093	8	CDF	0.6964	Non-Significant Effect				
		5.9	-1.055	2.407	0.093	8	CDF	0.9896	Non-Significant Effect				
		7.9*	3.889	2.407	0.093	8	CDF	0.0015	Significant Effect				
		10.6*	5.377	2.407	0.093	8	CDF	2.7E-05	Significant Effect				
		19.6*	25.19	2.407	0.093	8	CDF	<1.0E-37	Significant Effect				
ANOVA Table													
Source	Sum Squares		Mean Square		DF		F Stat	P-Value	Decision(α:5%)				
Between	3.89699		0.649499		6		174.7	<1.0E-37	Significant Effect				
Error	0.104075		0.003717		28								
Total	4.00107				34								
Distributional Tests													
Attribute	Test				Test Stat	Critical	P-Value	Decision(α:1%)					
Variances	Bartlett Equality of Variance Test				7.378	16.81	0.2873	Equal Variances					
Distribution	Shapiro-Wilk W Normality Test				0.9597	0.9146	0.2235	Normal Distribution					
Combined Proportion Normal Summary													
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect		
0	LC	5	0.7252	0.6386	0.8118	0.7379	0.6089	0.7953	0.0312	9.62%	0.00%		
1.8		5	0.7524	0.7044	0.8004	0.7500	0.7177	0.8105	0.0173	5.13%	-3.76%		
4		5	0.7089	0.6099	0.8078	0.7298	0.5766	0.7903	0.0356	11.24%	2.25%		
5.9		5	0.7621	0.7255	0.7987	0.7621	0.7177	0.7944	0.0132	3.87%	-5.09%		
7.9		5	0.5847	0.4922	0.6772	0.6048	0.4879	0.6653	0.0333	12.74%	19.38%		
10.6		5	0.5282	0.4600	0.5964	0.5121	0.4758	0.6169	0.0246	10.40%	27.16%		
19.6		5	0.0024	0.0000	0.0069	0.0000	0.0000	0.0081	0.0016	149.07%	99.67%		
Angular (Corrected) Transformed Summary													
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect		
0	LC	5	1.021	0.9262	1.116	1.033	0.8951	1.101	0.0342	7.49%	0.00%		
1.8		5	1.051	0.9944	1.108	1.047	1.011	1.12	0.02038	4.34%	-2.92%		
4		5	1.003	0.8964	1.11	1.024	0.8623	1.095	0.03851	8.58%	1.74%		
5.9		5	1.062	1.019	1.105	1.061	1.011	1.1	0.01538	3.24%	-3.98%		
7.9		5	0.8712	0.7772	0.9653	0.891	0.7733	0.9539	0.03387	8.69%	14.68%		
10.6		5	0.8138	0.7451	0.8826	0.7975	0.7612	0.9034	0.02476	6.80%	20.30%		
19.6		5	0.04975	0.01704	0.08245	0.03176	0.03176	0.08992	0.01178	52.95%	95.13%		

Bivalve Larval Survival and Development Test

Amec Foster Wheeler - San Diego

Analysis ID: 14-8934-8776

Endpoint: Combined Proportion Normal

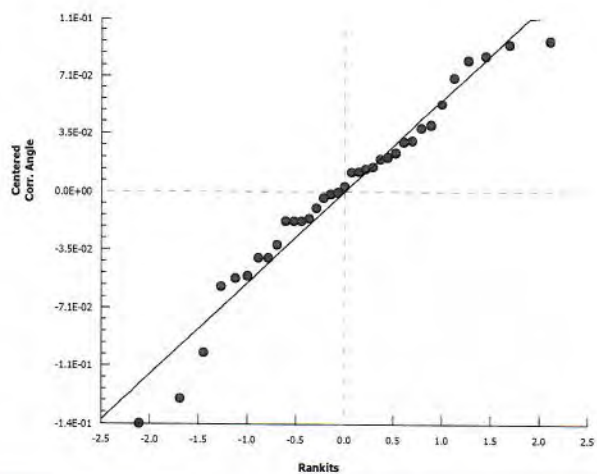
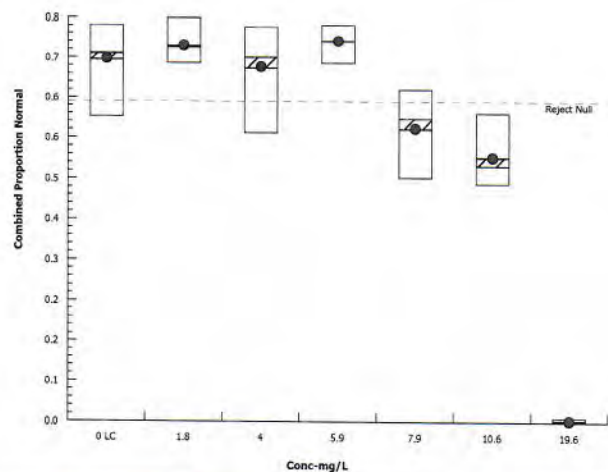
CETIS Version: CETISv1.9.3

Analyzed: 27 Nov-18 14:28

Analysis: Parametric-Control vs Treatments

Official Results: Yes

Graphics



CETIS Analytical Report

Report Date: 27 Nov-18 14:32 (p 3 of 6)
 Test Code: 180726mgrd | 04-4750-3360

Bivalve Larval Survival and Development Test							Amec Foster Wheeler - San Diego				
Analysis ID: 00-7148-1327		Endpoint: Proportion Normal		CETIS Version: CETISv1.9.3							
Analyzed: 27 Nov-18 14:31		Analysis: Nonparametric-Control vs Treatments		Official Results: Yes							
Data Transform		Alt Hyp		NOEL	LOEL	TOEL	TU	PMSD			
Angular (Corrected)		C > T		5.9	7.9	6.827		8.54%			
Steel Many-One Rank Sum Test											
Control	vs	Conc-mg/L	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)		
Lab Control		1.8	40	16	0	8	Asymp	1.0000	Non-Significant Effect		
		4	35	16	0	8	Asymp	0.9986	Non-Significant Effect		
		5.9	34	16	0	8	Asymp	0.9968	Non-Significant Effect		
		7.9*	15	16	0	8	Asymp	0.0222	Significant Effect		
		10.6*	15	16	0	8	Asymp	0.0222	Significant Effect		
		19.6*	15	16	0	8	Asymp	0.0222	Significant Effect		
ANOVA Table											
Source	Sum Squares		Mean Square		DF	F Stat	P-Value	Decision(α:5%)			
Between	5.30958		0.884929		6	294.7	<1.0E-37	Significant Effect			
Error	0.0840809		0.0030029		28						
Total	5.39366				34						
Distributional Tests											
Attribute	Test				Test Stat	Critical	P-Value	Decision(α:1%)			
Variances	Bartlett Equality of Variance Test				5.173	16.81	0.5219	Equal Variances			
Distribution	Shapiro-Wilk W Normality Test				0.8931	0.9146	0.0026	Non-Normal Distribution			
Proportion Normal Summary											
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.8087	0.7797	0.8377	0.8009	0.7947	0.8500	0.0104	2.89%	0.00%
1.8		5	0.9089	0.8677	0.9501	0.9091	0.8553	0.9418	0.0148	3.65%	-12.39%
4		5	0.8830	0.8170	0.9490	0.9072	0.7904	0.9196	0.0238	6.02%	-9.18%
5.9		5	0.8570	0.8003	0.9137	0.8778	0.7842	0.8990	0.0204	5.33%	-5.97%
7.9		5	0.6866	0.6283	0.7449	0.7082	0.6037	0.7149	0.0210	6.84%	15.10%
10.6		5	0.6223	0.5470	0.6975	0.6382	0.5279	0.6830	0.0271	9.74%	23.06%
19.6		5	0.0031	0.0000	0.0083	0.0000	0.0000	0.0085	0.0019	138.48%	99.62%
Angular (Corrected) Transformed Summary											
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.119	1.081	1.157	1.108	1.101	1.173	0.01373	2.74%	0.00%
1.8		5	1.268	1.199	1.337	1.265	1.181	1.327	0.0249	4.39%	-13.31%
4		5	1.227	1.132	1.322	1.261	1.095	1.283	0.03417	6.23%	-9.68%
5.9		5	1.186	1.108	1.265	1.214	1.088	1.247	0.02824	5.32%	-6.03%
7.9		5	0.9774	0.9158	1.039	1	0.8898	1.008	0.02217	5.07%	12.64%
10.6		5	0.9096	0.8324	0.9868	0.9254	0.8133	0.9728	0.02782	6.84%	18.69%
19.6		5	0.0562	0.02051	0.0919	0.03638	0.03484	0.09258	0.01286	51.15%	94.98%

CETIS Analytical Report

Report Date: 27 Nov-18 14:32 (p 4 of 6)
Test Code: 180726mgrd | 04-4750-3360

Bivalve Larval Survival and Development Test

Amec Foster Wheeler - San Diego

Analysis ID: 00-7148-1327

Endpoint: Proportion Normal

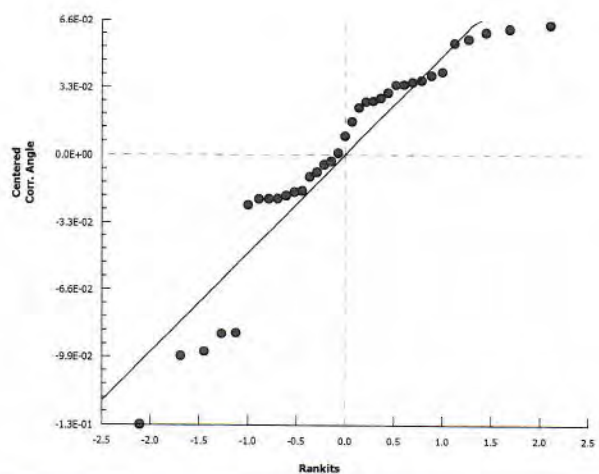
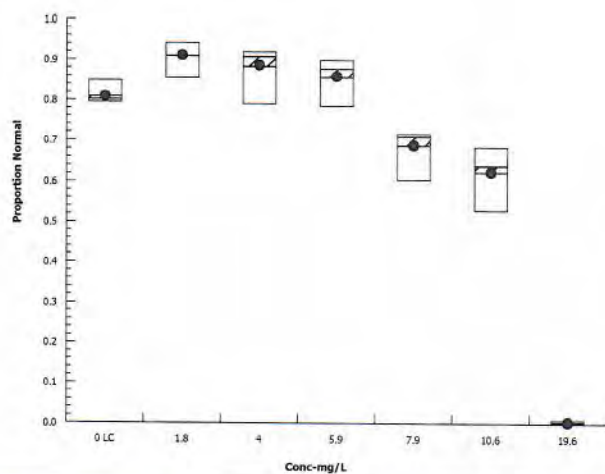
CETIS Version: CETISv1.9.3

Analyzed: 27 Nov-18 14:31

Analysis: Nonparametric-Control vs Treatments

Official Results: Yes

Graphics



CETIS Analytical Report

Report Date: 27 Nov-18 14:32 (p 5 of 6)
Test Code: 180726mgrp | 04-4750-3360

Bivalve Larval Survival and Development Test										Amec Foster Wheeler - San Diego													
Analysis ID: 04-4174-8834		Endpoint: Survival Rate		CETIS Version: CETISv1.9.3																			
Analyzed: 27 Nov-18 14:30		Analysis: Parametric-Control vs Treatments		Official Results: Yes																			
Data Transform		Alt Hyp			NOEL		LOEL		TOEL		TU		PMSD										
Angular (Corrected)		C > T			19.6		> 19.6		n/a				14.01%										
Dunnett Multiple Comparison Test																							
Control		vs		Conc-mg/L		Test Stat		Critical		MSD		DF		P-Type		P-Value		Decision(α:5%)					
Lab Control		1.8		1.433		2.407		0.205		8		CDF		0.2696		Non-Significant Effect							
		4		1.748		2.407		0.205		8		CDF		0.1684		Non-Significant Effect							
		5.9		0.31		2.407		0.205		8		CDF		0.7567		Non-Significant Effect							
		7.9		1.06		2.407		0.205		8		CDF		0.4249		Non-Significant Effect							
		10.6		1.108		2.407		0.205		8		CDF		0.4032		Non-Significant Effect							
		19.6		1.931		2.407		0.205		8		CDF		0.1240		Non-Significant Effect							
ANOVA Table																							
Source		Sum Squares		Mean Square		DF		F Stat		P-Value		Decision(α:5%)											
Between		0.110634		0.0184389		6		1.018		0.4337		Non-Significant Effect											
Error		0.506939		0.018105		28																	
Total		0.617572				34																	
Distributional Tests																							
Attribute		Test		Test Stat		Critical		P-Value		Decision(α:1%)													
Variances		Bartlett Equality of Variance Test		1.771		16.81		0.9395		Equal Variances													
Distribution		Shapiro-Wilk W Normality Test		0.9762		0.9146		0.6330		Normal Distribution													
Survival Rate Summary																							
Conc-mg/L		Code		Count		Mean		95% LCL		95% UCL		Median		Min		Max		Std Err		CV%		%Effect	
0		LC		5		0.8968		0.7919		1.0000		0.9113		0.7661		1.0000		0.0378		9.42%		0.00%	
1.8				5		0.8298		0.7405		0.9192		0.8065		0.7621		0.9476		0.0322		8.67%		7.46%	
4				5		0.8065		0.6656		0.9474		0.8024		0.6331		0.9234		0.0508		14.07%		10.07%	
5.9				5		0.8919		0.8060		0.9779		0.8911		0.7984		0.9718		0.0310		7.76%		0.54%	
7.9				5		0.8516		0.7400		0.9633		0.8750		0.7016		0.9395		0.0402		10.56%		5.04%	
10.6				5		0.8508		0.7683		0.9333		0.8185		0.7903		0.9395		0.0297		7.81%		5.13%	
19.6				5		0.7919		0.6341		0.9498		0.8266		0.5968		0.9435		0.0569		16.06%		11.69%	
Angular (Corrected) Transformed Summary																							
Conc-mg/L		Code		Count		Mean		95% LCL		95% UCL		Median		Min		Max		Std Err		CV%		%Effect	
0		LC		5		1.277		1.066		1.488		1.268		1.066		1.539		0.07605		13.32%		0.00%	
1.8				5		1.155		1.019		1.291		1.115		1.061		1.34		0.04907		9.50%		9.55%	
4				5		1.128		0.9492		1.307		1.11		0.9201		1.29		0.06445		12.77%		11.65%	
5.9				5		1.25		1.104		1.397		1.235		1.105		1.402		0.05281		9.44%		2.07%	
7.9				5		1.187		1.036		1.337		1.209		0.9929		1.322		0.05427		10.23%		7.06%	
10.6				5		1.183		1.058		1.307		1.131		1.095		1.322		0.04487		8.48%		7.39%	
19.6				5		1.113		0.9113		1.314		1.141		0.8828		1.331		0.07249		14.57%		12.87%	

Bivalve Larval Survival and Development Test

Amec Foster Wheeler - San Diego

Analysis ID: 04-4174-8834

Endpoint: Survival Rate

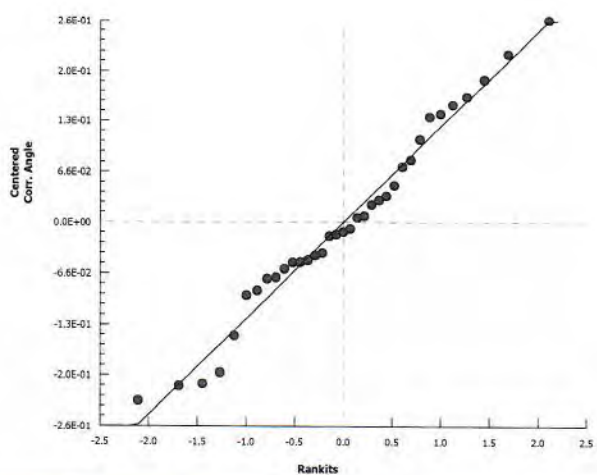
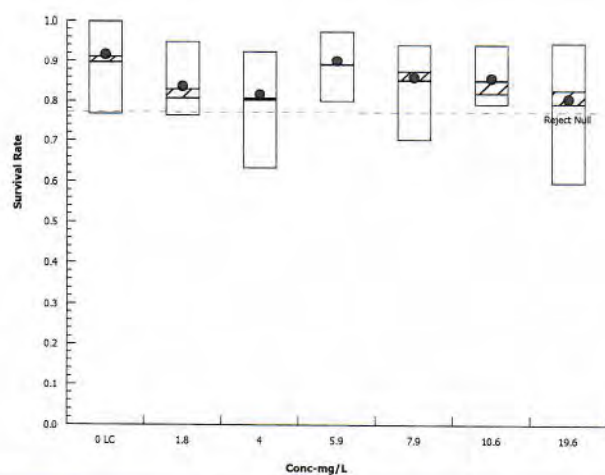
CETIS Version: CETISv1.9.3

Analyzed: 27 Nov-18 14:30

Analysis: Parametric-Control vs Treatments

Official Results: Yes

Graphics



CETIS Analytical Report

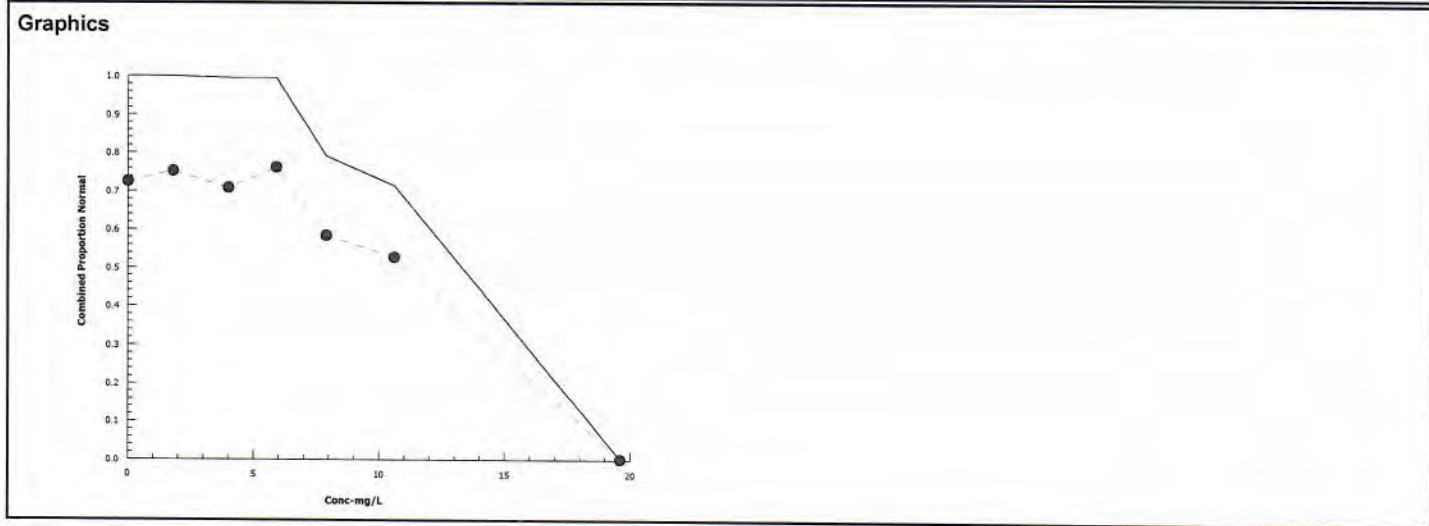
Report Date: 27 Nov-18 14:32 (p 1 of 1)
 Test Code: 180726mgrd | 04-4750-3360

Bivalve Larval Survival and Development Test Amec Foster Wheeler - San Diego

Analysis ID: 07-2492-6358	Endpoint: Combined Proportion Normal	CETIS Version: CETISv1.9.3
Analyzed: 27 Nov-18 14:28	Analysis: Trimmed Spearman-Kärber	Official Results: Yes

Trimmed Spearman-Kärber Estimates							
Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0.2745	0.33%	1.076	0.002986	11.91	11.75	12.08

Combined Proportion Normal Summary			Calculated Variate(A/B)							Isotonic Variate	
Conc-mg/L	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	LC	5	0.7252	0.6089	0.7953	0.0697	9.62%	0.0%	904/1246	0.7388	0.0%
1.8		5	0.7524	0.7177	0.8105	0.0386	5.14%	-3.76%	933/1240	0.7388	0.0%
4		5	0.7089	0.5766	0.7903	0.0797	11.24%	2.25%	879/1240	0.7355	0.45%
5.9		5	0.7621	0.7177	0.7944	0.0295	3.87%	-5.09%	945/1240	0.7355	0.45%
7.9		5	0.5847	0.4879	0.6653	0.0745	12.74%	19.38%	725/1240	0.5847	20.86%
10.6		5	0.5282	0.4758	0.6169	0.0549	10.40%	27.16%	655/1240	0.5282	28.5%
19.6		5	0.0024	0.0000	0.0081	0.0036	149.10%	99.67%	3/1240	0.002419	99.67%



Bivalve Larval Survival and Development Test

Amec Foster Wheeler - San Diego

Test Type: Development-Survival

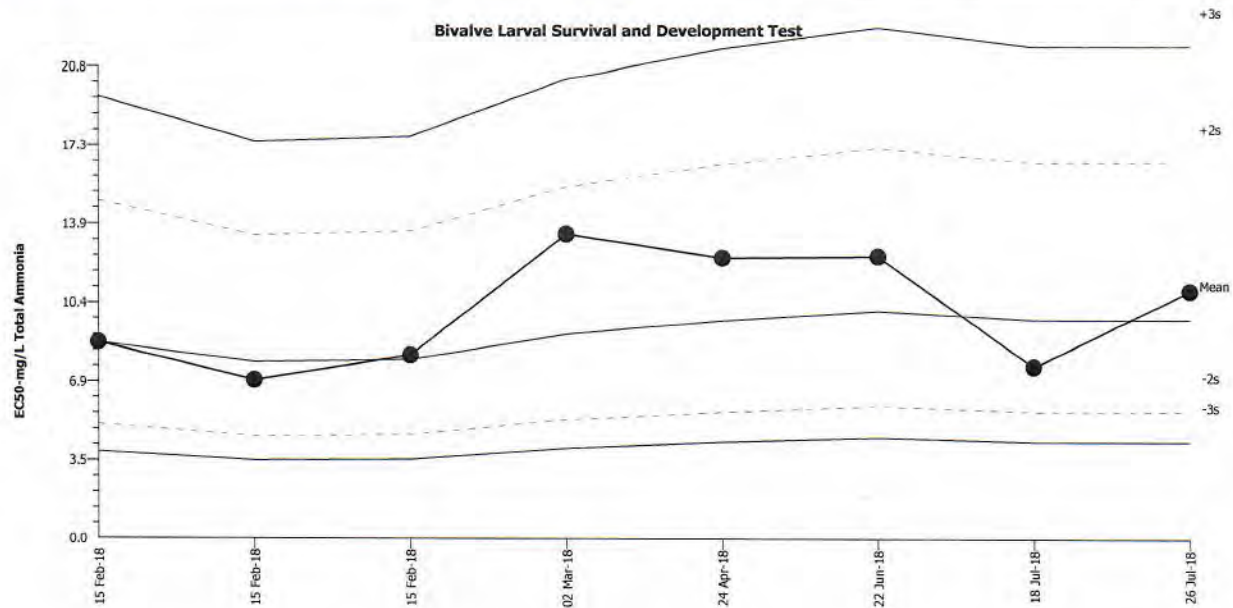
Organism: Mytilus galloprovincialis (Bay Mussel)

Material: Total Ammonia

Protocol: EPA/600/R-95/136 (1995)

Endpoint: Combined Proportion Normal

Source: Reference Toxicant-REF



Mean: 9.621

Count: 7

-2s Warning Limit: 5.609

-3s Action Limit: 4.283

Sigma: n/a

CV: 27.50%

+2s Warning Limit: 16.5

+3s Action Limit: 21.61

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2018	Feb	15	15:05	8.664	-0.9578	-0.3887			16-0331-5698	20-5403-3529
2			15	15:05	7	-2.622	-1.179			14-0965-7275	10-9849-1324
3			15	15:05	8.087	-1.535	-0.644			09-2789-8921	00-6375-0145
4		Mar	2	14:22	13.4	3.775	1.227			03-7955-5640	21-0844-6141
5		Apr	24	13:50	12.35	2.733	0.9266			07-6862-1383	14-0887-3900
6		Jun	22	18:15	12.41	2.793	0.9447			14-3626-7506	07-2831-7429
7		Jul	18	13:10	7.574	-2.047	-0.8868			14-1933-2999	09-8220-2485
8			26	15:30	10.88	1.257	0.4551			04-4750-3360	00-5177-6966

CETIS Test Data Worksheet

Report Date: 25 Sep-18 13:29 (p 1 of 1)
Test Code/ID: 04-4750-3360/180726mgrd

Bivalve Larval Survival and Development Test								Amec Foster Wheeler - San Diego	
Start Date: 26 Jul-18 15:30		Species: Mytilis galloprovincialis		Sample Code: 180726mgrd					
End Date: 28 Jul-18 14:00		Protocol: EPA/600/R-95/136 (1995)		Sample Source: Reference Toxicant					
Sample Date: 25 Jul-18		Material: Total Ammonia		Sample Station:					
Conc-mg/L	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes	
			1			254	202		
			2			234	197		
			3			203	134		
			4			196	118		
			5			189	0		
			6			233	123		
			7			211	150		
			8			205	0		
			9			233	165		
			10			217	131		
			11			220	187		
			12			241	189		
			13			199	127		
			14			229	181		
			15			221	158		
			16			198	1		
			17			194	176		
			18			198 198 ^{sw}	178		
			19			199	183		
			20			224 224 ^{sw}	153		
			21			206	0		
			22			190	151		
			23			200	186		
			24			157	143		
			25			226	181		
			26			221	194		
			27			234	2		
			28			212	187		
			29			221	196		
			30			235	201		
			31			209	190		
			32			174	121		
			33			189	178		
			34			228	183		
			35			196	178		

CETIS Test Data Worksheet

Report Date: 19 Oct-18 10:29 (p 1 of 1)
 Test Code/ID: 04-4750-3360/180726mgrd

Bivalve Larval Survival and Development Test

Amec Foster Wheeler - San Diego

Start Date: 26 Jul-18 15:30
 End Date: 28 Jul-18 14:00
 Sample Date: 25 Jul-18

Species: Mytilus galloprovincialis
 Protocol: EPA/600/R-95/136 (1995)
 Material: Total Ammonia

Sample Code: 180726mgrd
 Sample Source: Reference Toxicant
 Sample Station:

Conc-mg/L	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
0	LC	1	22					
0	LC	2	34					
0	LC	3	11					
0	LC	4	1					
0	LC	5	25					
2		1	31					
2		2	35					
1.8		3	30					
2		4	23					
2		5	33					
4		1	17					
4		2	24					
4		3	19					
4		4	14					
4		5	29					
6		1	18					
6		2	26					
5.9		3	28					
6		4	2					
6		5	12					
8		1	32					
8		2	9					
7.9		3	15					
8		4	7					
8		5	10					
10		1	3					
10		2	13					
10.6		3	6					
10		4	20					
10		5	4					
20		1	8					
20		2	5					
19.6		3	21					
20		4	27					
20		5	16					

QC: SW

Water Quality for Bivalve Development

Client: Internal
Project ID: NH₃ Reftox
Test No. 180726 ^{AP} ~~22~~ ^{AP}

Test Species: *M. galloprovincialis*
Start Date/Time: 4th 7/26/18 1530
End Date/Time: 7/28/18 1400

Concentration (mg/L)	Water Quality Measurements			
	Parameter	0hr	24hr	48hr
Lab Control	Temp. (°C)	15.2	15.3	15.5
	Salinity (ppt)	31.6	32.0	AP 31.6 32.0
	pH (units)	7.88	7.68	7.79 ^{AP} 7.3
	DO (mg/L)	7.0	7.4	8.2
1.8 2 -w	Temp. (°C)	15.2	15.1	15.4
	Salinity (ppt)	31.8	32.2	32.2
	pH (units)	7.88	7.72	7.75
	DO (mg/L)	7.1	7.5	8.2
4	Temp. (°C)	15.1	15.1	14.8
	Salinity (ppt)	31.9	32.2	32.4
	pH (units)	7.87	7.72	7.76
	DO (mg/L)	7.1	7.5	8.3
5.9 8 -w	Temp. (°C)	15.1	15.1	15.0
	Salinity (ppt)	7 31.8	32.0 32.1	32.3
	pH (units)	7.86	7.72	7.76
	DO (mg/L)	7.1	7.6	8.3
7.9 8 -w	Temp. (°C)	15.3	15.0	14.6
	Salinity (ppt)	31.7	32.1	32.2
	pH (units)	7.87	7.72	7.77
	DO (mg/L)	7.1	7.6	8.3
10.6	Temp. (°C)	15.2	15.0	14.5
	Salinity (ppt)	31.6	32.1	32.2
	pH (units)	7.90	7.72	7.76
	DO (mg/L)	7.2	7.7	8.3
14.6 20 -w	Temp. (°C)	15.2	15.1	14.4
	Salinity (ppt)	31.9	31.8	31.9
	pH (units)	7.88	7.72	7.76
	DO (mg/L)	7.2	7.7	8.3
Tech Initials:		JW	JW	AD

Source of Animals: Mission Bay

Date Received: 7/6/18 - 7/24/18

Comments: NH₃ collected @ 0hr AD
NH₃ collected @ 48hr AD

QC Check: AD 8/30/18

Final Review: JW 12/12/18

Embryo-Larval Development Test

Stock Preparation Worksheet

Test Species: M. galloprovincialis
 Batch ID: Mission Bay
 Test Type: Embryo Development

Test Date: 7-26-18
 Analyst: BCS/AR/JW

Task	Stock #1
Spawning Induction	0845
Spawning Begins	1000
# Males/# Females	2 / 1
Spawn Condition	Moderate
Fertilization Initiated	1205
Fertilization End/Eggs Rinsed	1235
Embryo Counts	1445
Test Initiation	1530

Stock 2

1253

1320

Embryo Density Counts

per 100 μ L

Stock #	Stock Volume (mL)	Rep 1	Rep 2	Rep 3	Rep 4	Mean #/100 μ L	Mean #/mL (x10)
Stock 1	200	51	46	45	38	45	450
Stock 2	↓	51	41	39	44	44	440
Stock 3	—	—	—	—	—	—	440

Cell Division:

	% Divided
Stock 1	75
Stock 2	
Stock 3	

Selected Stock:	1
-----------------	---

Stock Density

Dil Factor

Adjust selected embryo stock to 500 embryos/mL.

Dilution Factor = Stock Density/mL/500

440

500

0.88

In 10 mL sample volume add 500 μ L of 500 embryo/mL stock to obtain 25 embryos/mL in test vials.

Notes:

TD Counts: 246, 218, 276, 270, 248, 262, 281, 236, 233, 212, 245
 TD Average = 248 embryos/vial

QA Review:

AR 8/30/18

Final Review: JW 12/12/18

Ammonia Subsample Analysis

Client: Internal
Project ID: Reference Toxicant - *MMs*
Test No.: 180726mgrd

Test Species: M. galloprovincialis
Start Date: 7/26/2018
End Date: 7/28/2018

DI Blank: 0.0

10 mg/L Ammonia Stock: 9.76 mg/L as NH_3

[illegible]

QC Check: AD 11/14/18

Final Review: 2w 12/12/14

Mussel Reflex Unionized

Unionized Ammonia Calculation for Pressure of 1 atm											
Input 'Shaded' data											

Bivalve Reference Toxicant
48-hr Survival & Development
9/14/18

CETIS Summary Report

Report Date: 09 Jan-19 11:26 (p 1 of 3)
Test Code: 180914mgrd | 17-8327-4430

Bivalve Larval Survival and Development Test					Wood Environment & Infrastructure Solutions						
Batch ID: 08-0244-2539		Test Type: Development-Survival			Analyst:						
Start Date: 14 Sep-18 15:00		Protocol: EPA/600/R-95/136 (1995)			Diluent: Diluted Natural Seawater						
Ending Date: 16 Sep-18 16:00		Species: Mytilis galloprovincialis			Brine: Not Applicable						
Duration: 49h		Source: Field Collected			Age:						
Sample ID: 11-5419-1811		Code: 180914mgrd			Client: Internal						
Sample Date: 14 Sep-18		Material: Total Ammonia			Project:						
Receipt Date: 14 Sep-18		Source: Reference Toxicant									
Sample Age: 15h		Station:									
Multiple Comparison Summary											
Analysis ID	Endpoint	Comparison Method			NOEL	LOEL	TOEL	TU	PMSD ✓		
02-5571-3311	Combined Proportion Norma	Steel Many-One Rank Sum Test			5.5	7.1	6.249		15.6% ✓		
04-1427-2877	Proportion Normal	Steel Many-One Rank Sum Test			7.1	9.2	8.082		14.2%		
06-2036-9563	Survival Rate	Dunnett Multiple Comparison Test			20	> 20	n/a		12.6%		
Point Estimate Summary											
Analysis ID	Endpoint	Point Estimate Method			Level	mg/L	95% LCL	95% UCL	TU	✓	
05-1718-6773	Combined Proportion Norma	Trimmed Spearman-Kärber			EC50	9.017	8.87	9.167			
Test Acceptability											
Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits		Overlap	Decision				
04-1427-2877	Proportion Normal	Control Resp	0.875	0.9	>>	Yes	Below Criteria				
06-2036-9563	Survival Rate	Control Resp	0.9399	0.5	>>	Yes	Passes Criteria				
02-5571-3311	Combined Proportion Norma	PMSD	0.1564	<<	0.25	No	Passes Criteria				
Combined Proportion Normal Summary											
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.8218	0.7873	0.8563	0.7826	0.8552	0.0124	0.0278	3.38%	0.00%
2		5	0.8399	0.7812	0.8985	0.7754	0.8877	0.0211	0.0472	5.62%	-2.20%
4		5	0.8241	0.7592	0.8890	0.7536	0.8804	0.0234	0.0523	6.34%	-0.28%
5.5		5	0.7254	0.6256	0.8252	0.6087	0.8297	0.0360	0.0804	11.08%	11.73%
7.1		5	0.4813	0.2524	0.7101	0.2717	0.7645	0.0824	0.1843	38.31%	41.44%
9.2		5	0.4102	0.2688	0.5515	0.2717	0.5763	0.0509	0.1139	27.76%	50.09%
20		5	0.0014	0.0000	0.0055	0.0000	0.0072	0.0014	0.0032	223.61%	99.82%
Proportion Normal Summary											
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.8750	0.8501	0.8998	0.8552	0.8988	0.0090	0.0200	2.29%	0.00%
2		5	0.9118	0.9038	0.9198	0.9032	0.9209	0.0029	0.0065	0.71%	-4.21%
4		5	0.8522	0.7718	0.9327	0.8007	0.9567	0.0290	0.0648	7.60%	2.60%
5.5		5	0.8357	0.8084	0.8629	0.8048	0.8642	0.0098	0.0220	2.63%	4.49%
7.1		5	0.5471	0.2847	0.8094	0.3151	0.8683	0.0945	0.2113	38.62%	37.47%
9.2		5	0.4243	0.2875	0.5612	0.2953	0.5763	0.0493	0.1102	25.97%	51.50%
20		5	0.0017	0.0000	0.0062	0.0000	0.0083	0.0017	0.0037	223.61%	99.81%
Survival Rate Summary											
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9399	0.8830	0.9967	0.8768	1.0000	0.0205	0.0458	4.87%	0.00%
2		5	0.9210	0.8589	0.9831	0.8514	0.9710	0.0224	0.0500	5.43%	2.00%
4		5	0.9486	0.8556	1.0000	0.8225	1.0000	0.0335	0.0748	7.89%	-0.93%
5.5		5	0.8674	0.7616	0.9732	0.7355	0.9601	0.0381	0.0852	9.83%	7.71%
7.1		5	0.8949	0.8021	0.9878	0.8261	1.0000	0.0334	0.0748	8.36%	4.78%
9.2		5	0.9638	0.9098	1.0000	0.9130	1.0000	0.0194	0.0435	4.51%	-2.54%
20		5	0.9601	0.8933	1.0000	0.8768	1.0000	0.0241	0.0539	5.61%	-2.16%

20mg/L concentration subsample collected or analyzed incorrectly; nominal ammonia concentration used for analyses.

CETIS Summary Report

Report Date: 09 Jan-19 11:26 (p 2 of 3)
 Test Code: 180914mgrd | 17-8327-4430

Bivalve Larval Survival and Development Test				Wood Environment & Infrastructure Solutions		
Combined Proportion Normal Detail						
Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.8370	0.8080	0.8261	0.8552	0.7826
2		0.8116	0.7754	0.8804	0.8877	0.8442
4		0.8007	0.8152	0.8804	0.8705	0.7536
5.5		0.7536	0.7319	0.6087	0.7029	0.8297
7.1		0.7645	0.4534	0.3877	0.2717	0.5290
9.2		0.4312	0.5763	0.3441	0.4275	0.2717
20		0.0072	0.0000	0.0000	0.0000	0.0000
Proportion Normal Detail						
Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.8988	0.8711	0.8571	0.8552	0.8926
2		0.9032	0.9106	0.9101	0.9142	0.9209
4		0.8007	0.8303	0.9567	0.8705	0.8031
5.5		0.8455	0.8048	0.8276	0.8362	0.8642
7.1		0.8683	0.4534	0.4693	0.3151	0.6293
9.2		0.4722	0.5763	0.3441	0.4338	0.2953
20		0.0083	0.0000	0.0000	0.0000	0.0000
Survival Rate Detail						
Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9312	0.9275	0.9638	1.0000	0.8768
2		0.8986	0.8514	0.9674	0.9710	0.9167
4		1.0000	0.9819	0.8225	1.0000	0.9384
5.5		0.8913	0.9094	0.7355	0.8406	0.9601
7.1		0.9457	1.0000	0.8261	0.8623	0.8406
9.2		0.9130	1.0000	1.0000	0.9855	0.9203
20		0.8768	1.0000	0.9348	1.0000	0.9891

CETIS Summary Report

Report Date: 09 Jan-19 11:26 (p 3 of 3)
 Test Code: 180914mgrd | 17-8327-4430

Bivalve Larval Survival and Development Test				Wood Environment & Infrastructure Solutions		
Combined Proportion Normal Binomials						
Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	231/276	223/276	228/276	248/290	216/276
2		224/276	214/276	243/276	245/276	233/276
4		229/286	225/276	243/276	242/278	208/276
5.5		208/276	202/276	168/276	194/276	229/276
7.1		211/276	141/311	107/276	75/276	146/276
9.2		119/276	170/295	96/279	118/276	75/276
20		2/276	0/305	0/276	0/284	0/276
Proportion Normal Binomials						
Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	231/257	223/256	228/266	248/290	216/242
2		224/248	214/235	243/267	245/268	233/253
4		229/286	225/271	243/254	242/278	208/259
5.5		208/246	202/251	168/203	194/232	229/265
7.1		211/243	141/311	107/228	75/238	146/232
9.2		119/252	170/295	96/279	118/272	75/254
20		2/242	0/305	0/258	0/284	0/273
Survival Rate Binomials						
Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	257/276	256/276	266/276	276/276	242/276
2		248/276	235/276	267/276	268/276	253/276
4		276/276	271/276	227/276	276/276	259/276
5.5		246/276	251/276	203/276	232/276	265/276
7.1		261/276	276/276	228/276	238/276	232/276
9.2		252/276	276/276	276/276	272/276	254/276
20		242/276	276/276	258/276	276/276	273/276

CETIS Analytical Report

Report Date: 09 Jan-19 11:26 (p 1 of 6)

Test Code: 180914mgrd | 17-8327-4430

Bivalve Larval Survival and Development Test								Nood Environment & Infrastructure Solutions			
Analysis ID: 02-5571-3311		Endpoint: Combined Proportion Normal		CETIS Version: CETISv1.9.3							
Analyzed: 09 Jan-19 11:25		Analysis: Nonparametric-Control vs Treatments		Official Results: Yes							
Data Transform		Alt Hyp		NOEL	LOEL	TOEL	TU	PMSD			
Angular (Corrected)		C > T		5.5	7.1	6.249		15.64%			
Steel Many-One Rank Sum Test											
Control	vs	Conc-mg/L	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)		
Lab Control		2	31	16	0	8	Asymp	0.9749	Non-Significant Effect		
		4	28	16	0	8	Asymp	0.8838	Non-Significant Effect		
		5.5	18	16	0	8	Asymp	0.0987	Non-Significant Effect		
		7.1*	15	16	0	8	Asymp	0.0222	Significant Effect		
		9.2*	15	16	0	8	Asymp	0.0222	Significant Effect		
		20*	15	16	0	8	Asymp	0.0222	Significant Effect		
ANOVA Table											
Source	Sum Squares		Mean Square		DF	F Stat	P-Value	Decision(α:5%)			
Between	4.89974		0.816624		6	81.93	<1.0E-37	Significant Effect			
Error	0.279102		0.0099679		28						
Total	5.17885				34						
Distributional Tests											
Attribute	Test				Test Stat	Critical	P-Value	Decision(α:1%)			
Variances	Bartlett Equality of Variance Test				18.24	16.81	0.0057	Unequal Variances			
Distribution	Shapiro-Wilk W Normality Test				0.9399	0.9146	0.0554	Normal Distribution			
Combined Proportion Normal Summary											
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.8218	0.7873	0.8563	0.8261	0.7826	0.8552	0.0124	3.38%	0.00%
2		5	0.8399	0.7813	0.8985	0.8442	0.7754	0.8877	0.0211	5.62%	-2.20%
4		5	0.8241	0.7592	0.8890	0.8152	0.7536	0.8804	0.0234	6.34%	-0.28%
5.5		5	0.7254	0.6256	0.8252	0.7319	0.6087	0.8297	0.0360	11.08%	11.73%
7.1		5	0.4813	0.2524	0.7101	0.4534	0.2717	0.7645	0.0824	38.31%	41.44%
9.2		5	0.4102	0.2688	0.5515	0.4275	0.2717	0.5763	0.0509	27.76%	50.09%
20		5	0.0014	0.0000	0.0055	0.0000	0.0000	0.0072	0.0014	223.61%	99.82%
Angular (Corrected) Transformed Summary											
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.136	1.091	1.181	1.141	1.086	1.18	0.01618	3.19%	0.00%
2		5	1.162	1.083	1.242	1.165	1.077	1.229	0.02868	5.52%	-2.32%
4		5	1.141	1.056	1.227	1.126	1.051	1.218	0.03084	6.04%	-0.48%
5.5		5	1.023	0.9097	1.135	1.027	0.895	1.145	0.04063	8.89%	9.97%
7.1		5	0.7675	0.5286	1.006	0.7387	0.5484	1.064	0.08606	25.07%	32.42%
9.2		5	0.6932	0.5479	0.8385	0.7127	0.5484	0.862	0.05234	16.88%	38.97%
20		5	0.04075	0.009864	0.07163	0.0301	0.02863	0.08523	0.01112	61.04%	96.41%

CETIS Analytical Report

Report Date: 09 Jan-19 11:26 (p 2 of 6)

Test Code: 180914mgrd | 17-8327-4430

Bivalve Larval Survival and Development Test

Nood Environment & Infrastructure Solutions

Analysis ID: 02-5571-3311

Endpoint: Combined Proportion Normal

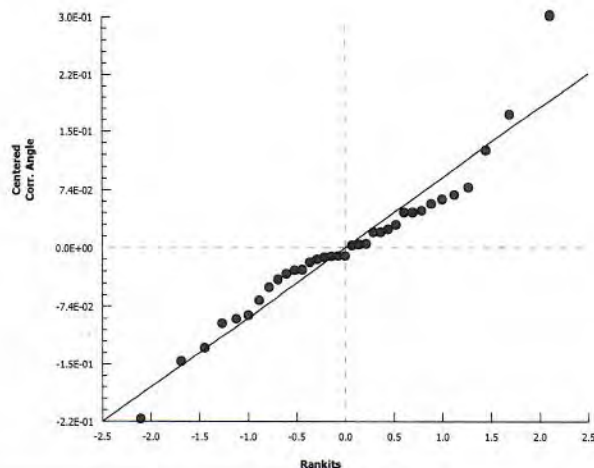
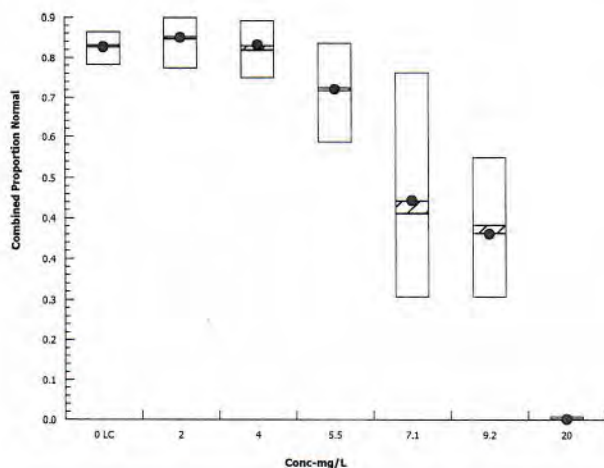
CETIS Version: CETISv1.9.3

Analyzed: 09 Jan-19 11:25

Analysis: Nonparametric-Control vs Treatments

Official Results: Yes

Graphics



CETIS Analytical Report

Report Date: 09 Jan-19 11:26 (p 3 of 6)

Test Code: 180914mgrd | 17-8327-4430

Bivalve Larval Survival and Development Test							Nood Environment & Infrastructure Solutions																
Analysis ID: 04-1427-2877		Endpoint: Proportion Normal		CETIS Version: CETISv1.9.3																			
Analyzed: 09 Jan-19 11:26		Analysis: Nonparametric-Control vs Treatments		Official Results: Yes																			
Data Transform		Alt Hyp		NOEL		LOEL		TOEL		TU		PMSD											
Angular (Corrected)		C > T		7.1		9.2		8.082				14.20%											
Steel Many-One Rank Sum Test																							
Control		vs		Conc-mg/L		Test Stat		Critical		Ties		DF P-Type		P-Value		Decision(α:5%)							
Lab Control		2		40		16		0		8		Asymp		1.0000		Non-Significant Effect							
		4		22		16		0		8		Asymp		0.3786		Non-Significant Effect							
		5.5		17		16		0		8		Asymp		0.0629		Non-Significant Effect							
		7.1		17		16		0		8		Asymp		0.0629		Non-Significant Effect							
		9.2*		15		16		0		8		Asymp		0.0222		Significant Effect							
		20*		15		16		0		8		Asymp		0.0222		Significant Effect							
ANOVA Table																							
Source		Sum Squares		Mean Square		DF		F Stat		P-Value		Decision(α:5%)											
Between		5.76727		0.961211		6		84.7		<1.0E-37		Significant Effect											
Error		0.317766		0.0113488		28																	
Total		6.08503				34																	
Distributional Tests																							
Attribute		Test		Test Stat		Critical		P-Value		Decision(α:1%)													
Variances		Bartlett Equality of Variance Test		38.77		16.81		8.3E-07		Unequal Variances													
Distribution		Shapiro-Wilk W Normality Test		0.8579		0.9146		3.5E-04		Non-Normal Distribution													
Proportion Normal Summary																							
Conc-mg/L		Code		Count		Mean		95% LCL		95% UCL		Median		Min		Max		Std Err		CV%		%Effect	
0		LC		5		0.8750		0.8501		0.8998		0.8711		0.8552		0.8988		0.0090		2.29%		0.00%	
2				5		0.9118		0.9038		0.9198		0.9106		0.9032		0.9209		0.0029		0.71%		-4.21%	
4				5		0.8522		0.7718		0.9327		0.8303		0.8007		0.9567		0.0290		7.60%		2.60%	
5.5				5		0.8357		0.8084		0.8629		0.8362		0.8048		0.8642		0.0098		2.63%		4.49%	
7.1				5		0.5471		0.2847		0.8094		0.4693		0.3151		0.8683		0.0945		38.62%		37.47%	
9.2				5		0.4243		0.2875		0.5612		0.4338		0.2953		0.5763		0.0493		25.97%		51.50%	
20				5		0.0017		0.0000		0.0062		0.0000		0.0000		0.0083		0.0017		223.61%		99.81%	
Angular (Corrected) Transformed Summary																							
Conc-mg/L		Code		Count		Mean		95% LCL		95% UCL		Median		Min		Max		Std Err		CV%		%Effect	
0		LC		5		1.21		1.172		1.248		1.204		1.18		1.247		0.01366		2.52%		0.00%	
2				5		1.269		1.255		1.284		1.267		1.254		1.286		0.005113		0.90%		-4.89%	
4				5		1.186		1.055		1.316		1.146		1.108		1.361		0.04704		8.87%		2.02%	
5.5				5		1.154		1.117		1.191		1.154		1.113		1.193		0.01325		2.57%		4.64%	
7.1				5		0.841		0.5551		1.127		0.7547		0.596		1.199		0.103		27.38%		30.51%	
9.2				5		0.708		0.5682		0.8478		0.719		0.5745		0.862		0.05035		15.90%		41.50%	
20				5		0.04215		0.008197		0.0761		0.03027		0.02863		0.09103		0.01223		64.87%		96.52%	

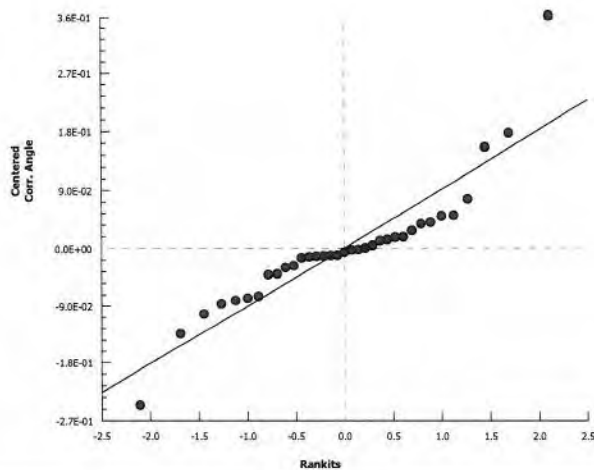
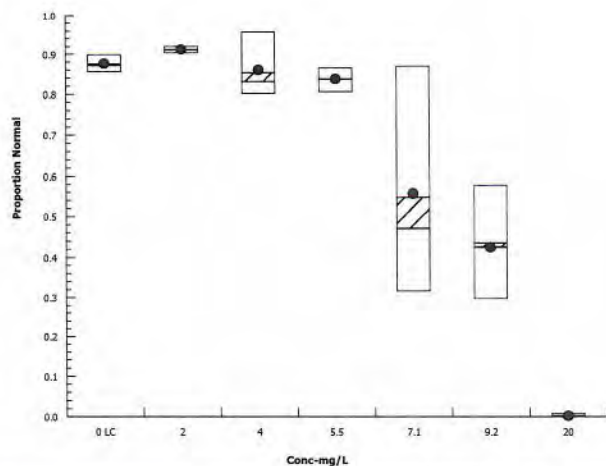
Bivalve Larval Survival and Development Test

Nood Environment & Infrastructure Solutions

Analysis ID: 04-1427-2877 Endpoint: Proportion Normal
 Analyzed: 09 Jan-19 11:26 Analysis: Nonparametric-Control vs Treatments

CETIS Version: CETISv1.9.3
 Official Results: Yes

Graphics



CETIS Analytical Report

Report Date: 09 Jan-19 11:26 (p 5 of 6)
 Test Code: 180914mgrd | 17-8327-4430

Bivalve Larval Survival and Development Test								Wood Environment & Infrastructure Solutions			
Analysis ID: 06-2036-9563		Endpoint: Survival Rate		CETIS Version: CETISv1.9.3							
Analyzed: 09 Jan-19 11:26		Analysis: Parametric-Control vs Treatments		Official Results: Yes							
Data Transform		Alt Hyp		NOEL	LOEL	TOEL	TU	PMSD			
Angular (Corrected)		C > T		20	> 20	n/a		12.62%			
Dunnett Multiple Comparison Test											
Control	vs	Conc-mg/L	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)		
Lab Control		2	0.5588	2.407	0.213	8	CDF	0.6549	Non-Significant Effect		
		4	-0.5368	2.407	0.213	8	CDF	0.9562	Non-Significant Effect		
		5.5	1.527	2.407	0.213	8	CDF	0.2362	Non-Significant Effect		
		7.1	0.8327	2.407	0.213	8	CDF	0.5299	Non-Significant Effect		
		9.2	-0.7958	2.407	0.213	8	CDF	0.9779	Non-Significant Effect		
		20	-0.7617	2.407	0.213	8	CDF	0.9757	Non-Significant Effect		
ANOVA Table											
Source	Sum Squares		Mean Square		DF	F Stat	P-Value	Decision(α:5%)			
Between	0.185429		0.0309048		6	1.581	0.1896	Non-Significant Effect			
Error	0.547294		0.0195462		28						
Total	0.732723				34						
Distributional Tests											
Attribute	Test				Test Stat	Critical	P-Value	Decision(α:1%)			
Variances	Bartlett Equality of Variance Test				1.646	16.81	0.9492	Equal Variances			
Distribution	Shapiro-Wilk W Normality Test				0.976	0.9146	0.6250	Normal Distribution			
Survival Rate Summary											
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9399	0.8830	0.9967	0.9312	0.8768	1.0000	0.0205	4.87%	0.00%
2		5	0.9210	0.8589	0.9831	0.9167	0.8514	0.9710	0.0224	5.43%	2.00%
4		5	0.9486	0.8556	1.0000	0.9819	0.8225	1.0000	0.0335	7.89%	-0.93%
5.5		5	0.8674	0.7616	0.9732	0.8913	0.7355	0.9601	0.0381	9.83%	7.71%
7.1		5	0.8949	0.8021	0.9878	0.8623	0.8261	1.0000	0.0334	8.36%	4.78%
9.2		5	0.9638	0.9098	1.0000	0.9855	0.9130	1.0000	0.0194	4.51%	-2.54%
20		5	0.9601	0.8933	1.0000	0.9891	0.8768	1.0000	0.0241	5.61%	-2.16%
Angular (Corrected) Transformed Summary											
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.347	1.194	1.5	1.305	1.212	1.541	0.05516	9.16%	0.00%
2		5	1.298	1.179	1.417	1.278	1.175	1.4	0.0429	7.39%	3.67%
4		5	1.395	1.182	1.607	1.436	1.136	1.541	0.07645	12.26%	-3.52%
5.5		5	1.212	1.055	1.369	1.235	1.031	1.37	0.0565	10.42%	10.03%
7.1		5	1.274	1.065	1.482	1.191	1.141	1.541	0.07504	13.18%	5.47%
9.2		5	1.418	1.253	1.582	1.45	1.271	1.541	0.05934	9.36%	-5.22%
20		5	1.414	1.233	1.596	1.466	1.212	1.541	0.06552	10.36%	-5.00%

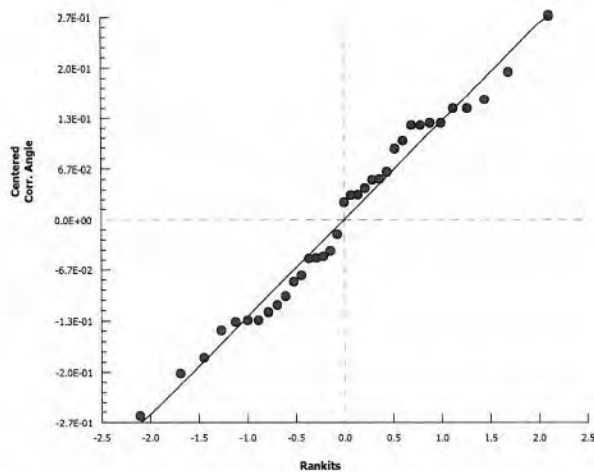
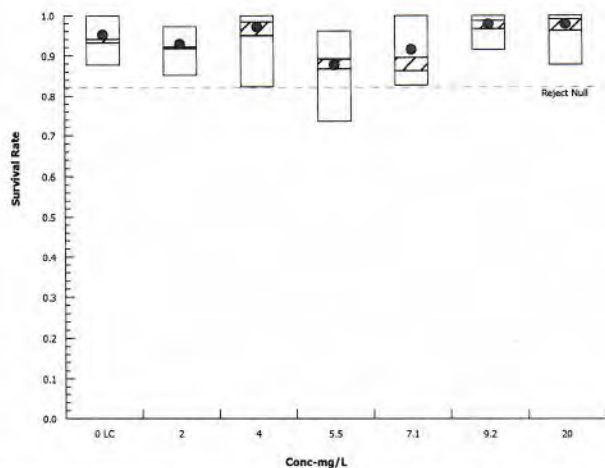
Bivalve Larval Survival and Development Test

Nood Environment & Infrastructure Solutions

Analysis ID: 06-2036-9563 Endpoint: Survival Rate
 Analyzed: 09 Jan-19 11:26 Analysis: Parametric-Control vs Treatments

CETIS Version: CETISv1.9.3
 Official Results: Yes

Graphics



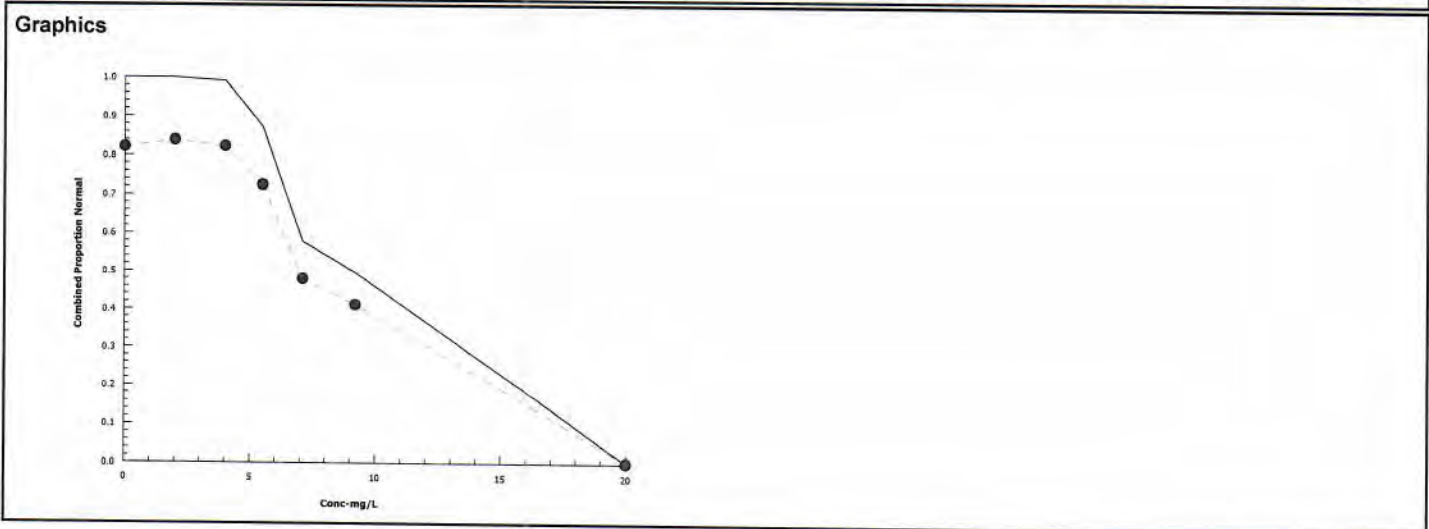
CETIS Analytical Report

Report Date: 09 Jan-19 11:26 (p 1 of 1)
 Test Code: 180914mgd | 17-8327-4430

Bivalve Larval Survival and Development Test				Nood Environment & Infrastructure Solutions			
Analysis ID: 05-1718-6773	Endpoint: Combined Proportion Normal			CETIS Version: CETISv1.9.3			
Analyzed: 09 Jan-19 11:26	Analysis: Trimmed Spearman-Kärber			Official Results: Yes			

Trimmed Spearman-Kärber Estimates							
Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0.1779	0.17%	0.9551	0.003579	9.017	8.87	9.167

Combined Proportion Normal Summary				Calculated Variate(A/B)						Isotonic Variate	
Conc-mg/L	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	LC	5	0.8218	0.7826	0.8552	0.0278	3.38%	0.0%	1146/1394	0.8308	0.0%
2		5	0.8399	0.7754	0.8877	0.0472	5.62%	-2.2%	1159/1380	0.8308	0.0%
4		5	0.8241	0.7536	0.8804	0.0523	6.34%	-0.28%	1147/1392	0.8241	0.81%
5.5		5	0.7254	0.6087	0.8297	0.0804	11.08%	11.73%	1001/1380	0.7254	12.69%
7.1		5	0.4813	0.2717	0.7645	0.1843	38.31%	41.44%	680/1415	0.4813	42.07%
9.2		5	0.4102	0.2717	0.5763	0.1139	27.76%	50.09%	578/1402	0.4102	50.63%
20		5	0.0014	0.0000	0.0072	0.0032	223.60%	99.82%	2/1417	0.001449	99.83%



Bivalve Larval Survival and Development Test

Amec Foster Wheeler - San Diego

Test Type: Development-Survival

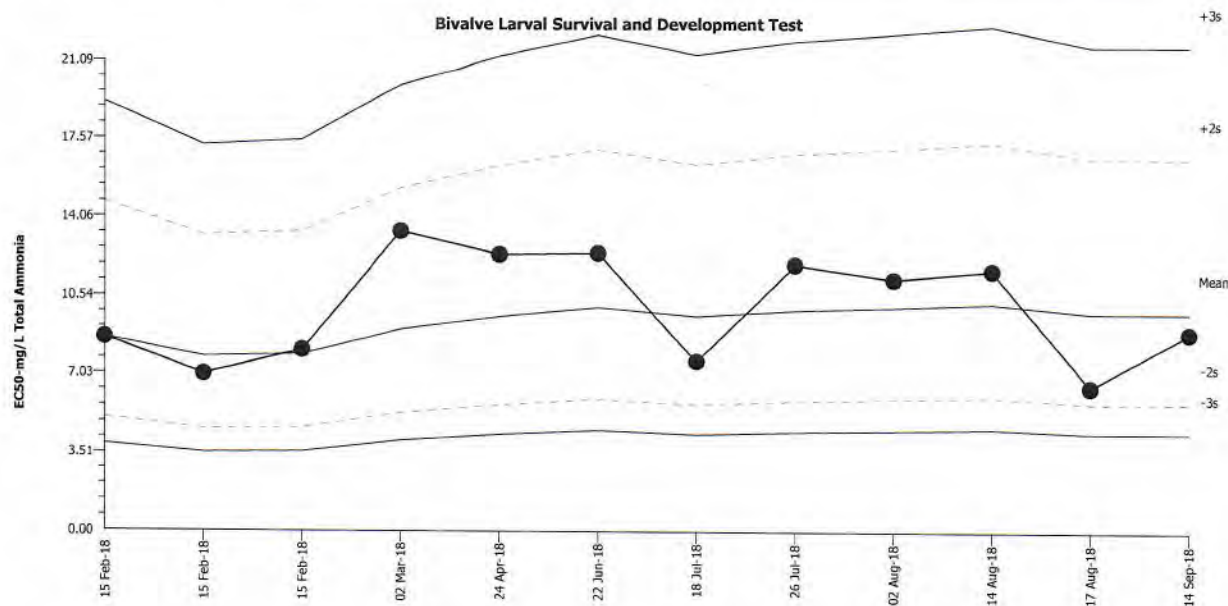
Organism: Mytilus galloprovincialis (Bay Mussel)

Material: Total Ammonia

Protocol: EPA/600/R-95/136 (1995)

Endpoint: Combined Proportion Normal

Source: Reference Toxicant-REF



Mean: 9.767

Count: 11

-2s Warning Limit: 5.744

-3s Action Limit: 4.406

Sigma: n/a

CV: 27.00%

+2s Warning Limit: 16.59

+3s Action Limit: 21.63

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2018	Feb	15	15:05	8.664	-1.103	-0.452			16-0331-5698	20-5403-3529
2			15	15:05	7	-2.767	-1.256			14-0965-7275	10-9849-1324
3			15	15:05	8.087	-1.68	-0.7117			09-2789-8921	00-6375-0145
4		Mar	2	14:22	13.4	3.629	1.191			03-7955-5640	21-0844-6141
5		Apr	24	13:50	12.35	2.587	0.8862			07-6862-1383	14-0887-3900
6		Jun	22	18:15	12.41	2.648	0.9045			14-3626-7506	07-2831-7429
7		Jul	18	13:10	7.574	-2.193	-0.9588			14-1933-2999	09-8220-2485
8			26	15:30	11.91	2.147	0.7493			04-4750-3360	07-2492-6358
9		Aug	2	14:15	11.26	1.496	0.5375			15-4398-7435	08-1276-4615
10			14	14:15	11.65	1.885	0.6655			06-7156-7887	15-8087-8364
11			17	17:15	6.434	-3.333	-1.574			03-5411-9632	10-2524-6142
12		Sep	14	15:00	8.843	-0.9235	-0.3745			17-8327-4430	07-0472-1529

Embryo-Larval Development Test Scoring Worksheet

Client: Internal
Project ID: Ammonia Reference Toxicant
Test No.: 180914 myrd #113 AD

Test Species: M. galloprovincialis
Start Date: 9/14/18
End Date: 9/16/18

Random #	# Counted	# Normal	Tech Initials	Notes
71	279	96	AD OBO	EN
72	203	168		
73	224 238	175 114		
74	254 243 227	185 243		
75	232	194		
76	265	229		
77	278	242		
78	273	0		
79	252	119		
80	295	170		
81	305	0		
82	284	0		
83	251	202		
84	266	228		
85	286	229		
86	311	141		
87	248	224		
88	235	214		
89	256	223		
90	258	0		
91	268	245		
92	271	225		
93	242	216		
94	259	208		
95	228	107		
96	242	2		
97	253	233		
98	267	243		
99	243 261	211 209		
100	246	208		
101	254	75		
102	232	146		
103	272	118		
104	290	248		
105	257	231		
T01	293			
T02	278			
T03	305			
T04	241			
T05	264			

QC Check: AD 11/26/18

Final Review: SW 1/20/19

**Internal
Ammonia Reference Toxicant Test**

Concentration (mg/L)	Rand#
Lab Control	105
	89
	84
	104
	93
2	87
	88
	98
	91
	97
4	85
	92
	74
	77
	94
AD 5.5	100
	83
	72
	75
	76
AD 7.1	99
	86
	95
	73
	102
AD 9.2	79
	80
	71
	103
	101
20	96
	81
	90
	82
	78

QC: AB

QC Check - Mussel: SW

Mussel Reflux Unionized

[illegible]

* Sample incorrectly collected, preserved, or analyzed due to technician error; nominal concentration

Final Review: 2w 1/20/19

Ammonia Subsample Analysis

Client: Internal
Project ID: Reference Toxicant
Test No.: 180914 maxed

Test Species: M. galloprovincialis
Start Date: 9/14/2018
End Date: 9/16/2018

DI Blank: 0.0

10 mg/L Ammonia Stock: 8.7 mg/L as NH_3

[illegible]

QC Check: AD 11/26/18

Final Review: du 1/20/15

④ subsample incorrectly collected, preserved, or analyzed; technician error

Water Quality for Bivalve Development

Client: Internal
Project ID: NH₃ Reftox
Test No. 180914 mard

Test Species: *M. galloprovincialis*
Start Date/Time: 9/14/18 1500
End Date/Time: 9/16/18 1600

Concentration (mg/L)	Water Quality Measurements			
	Parameter	0hr	24hr	48hr
Lab Control	Temp. (°C)	15.6	14.7	14.5
	Salinity (ppt)	31.9	32.1	31.1
	pH (units)	7.85	7.73	7.59
	DO (mg/L)	7.6	7.8	7.2
2	Temp. (°C)	15.9	14.7	14.4
	Salinity (ppt)	32.0	32.0	31.9
	pH (units)	7.81	7.73	7.56
	DO (mg/L)	7.7	7.5	6.4
4	Temp. (°C)	15.6	14.7	14.4
	Salinity (ppt)	31.9	32.0	32.0
	pH (units)	7.87	7.74	7.52
	DO (mg/L)	7.7	7.4	5.5
AD 8/5.5	Temp. (°C)	15.5	14.7	14.7
	Salinity (ppt)	31.9	31.9	31.9
	pH (units)	7.86	7.74	7.49
	DO (mg/L)	7.7	7.4	5.9
AD 8/7.1	Temp. (°C)	15.6	14.7	14.6
	Salinity (ppt)	31.9	31.9	31.9
	pH (units)	7.86	7.74	7.47
	DO (mg/L)	7.7	7.3	5.1
AD 10/9.2	Temp. (°C)	15.4	14.7	14.6
	Salinity (ppt)	31.8	31.9	31.9
	pH (units)	7.86	7.74	7.46
	DO (mg/L)	7.8	7.3	5.0
20	Temp. (°C)	15.4	14.7	14.4
	Salinity (ppt)	31.5	31.5	31.5
	pH (units)	7.84	7.72	7.46
	DO (mg/L)	7.8	7.3	5.3
Tech Initials:		AD	AB	AD

Source of Animals: Mission Bay

Date Received: 9/12/18

Comments:

QC Check: AD 11/26/18

Final Review: JV 1/20/19

Embryo-Larval Development Test Stock Preparation Worksheet

Test Species: M. galloprovincialis
Batch ID: 9/14/18
Test Type: mg-d

Test Date: 9/14/18
Analyst: AG

Task	
Spawning Induction	0950
Spawning Begins	1115
# Males/# Females	3/1
Spawn Condition	below average
Fertilization Initiated	1230
Fertilization End/Eggs Rinsed	1305
Embryo Counts	1415
Test Initiation	1500

Embryo Density Counts

per 100 μ L

Stock #	Stock Volume (mL)	Rep 1	Rep 2	Rep 3	Rep 4	Mean #/100 μ L	Mean #/mL (x10)
Stock 1	200	79	60	75	59	68.25	682.5
Stock 2						62.8	628
Stock 3							

Cell Division:

	% Divided
Stock 1	99%
Stock 2	
Stock 3	

Selected Stock: 1

Stock Density

Dil Factor

Adjust selected embryo stock to 500 embryos/mL.

Dilution Factor = Stock Density/mL/500

500

In 10 mL sample volume add 500 μ L of 500 embryo/mL stock to obtain 25 embryos/mL in test vials.

Notes:

TD Counts: 243, 278, 305, 241, 264
TD Average = 276 embryos / vial
* Embryo stock density greater than target density at initiation

QA Review:

AD 11/26/18

Final Review: sw 1/20/19