

Attachment 0

WET Testing Historical Record

Attachment N Loutre Creek UAA. Update Lion Oil Outfall 001 WET test results.
Outfall 001 Lion Facility Toxicity Summary (7-day chronic toxicity test) POR November 2003 through June 2011.

Ceriodaphnia dubia (Water Flea)							Pimephales promelas (Fathead Minnow)						Maximum										Min.	NOTES
Survival CNTL	Survival 96%	Survival NOEL	Repro. CNTL	Repro. 96%	Repro. NOEL	Survival CNTL	Survival 96%	Survival NOEL	Growth CNTL	Growth 96%	Growth NOEL	TRC	Hardness	Alkalinity	Conductivity	TDS	Se (ug/L)	pH	D.O.					
1/4/2000	100	100	96	18.4	19.7	96	87.5	85	96	0.355	0.293	96	0.01	79	110	2890	1879		8.1	3.9	PASSED ALL ENDPOINTS. NOTE depressed DO in FM tests chemistry. Passed despite Also contro reproduction less than 20			
6/20/2000	100	100	96	17	24.3	96	100	97.5	96	0.683	0.395	0	0.01	128	122	1963	1276		8.1	3.2	PASSED 3 or 4 ENDPOINTS. NOTE depressed DO in FM tests chemistry could have been cause for gwth failure DO swing from 10.1to 3.4 Also control CD only 17 barely enough for valid test.			
9/18/2000	100	90	96	18.4	14.7	0	97.5	97.5	96	0.663	0.44	41	0.01	104	72	3070	1996		7.8	4.3	Passed lethality, failed both sub-lethal endpoints. CD cntl repro was onlt 18.4, next highest 17.0 also sig dif??? Need to review stats. FM DO swings significant			
12/12/2000	100	100	96	17.4	15	96	100	100	96	0.617	0.538	72	0.01	72	132	2610	1697		8	5.5	PASSED 3 of 4. Growth fs lure was .005mg/larvae (see details of tests results.Check stats & reference performance). Note: Cd control only 17			
3/31/2001	100	100	96	19.9	19	96	90	87.5	96	0.446	0.292	72	0.01	84	80	2020	1313		8	5.1	PASSED 3 or 4 ENDPOINTS. Check the reference control performance of FM			
9/17/2001	90	100	96	22.8	12.5	54	97.5	100	96	0.658	0.489	41	0.01	92	132	2460	1599		8	7.1	PASSED LETHALITY, failed both sub-lethal endpoints. NEED DETAILS OF FATHEAD TESTS and control.			
12/4/2001	100	90	96	20.5	0	0	97.5	55	41	0.728	0.403	0	0.01	96	80	2100	1365		8	4.9	FAILED 3 or 4, including lethality for FM. NOTE at the 3rd LOWEST TDS recorded for the POR. NOT TDS RELATED. REVIEW THE DETAILS OF Reference.			
3/26/2002	90	100	96	19.8	18.4	96	100	62.5	72	0.632	0.36	72	0.01	120	72	2170	1411		8.3	4.3	ALL PASSED but FM sub-lethal, not appear to be TDS related. Check test details.NOTE DO swings ALL PASSED, NOTE THE RANGE BETWEEN CNTL REPO AND 96% repro. (10.5 but not statistically different). Conductivity & TDS lowest of those recorded , not appear to be TDS related. Check test details.NOTE DO swings			
6/25/2002	80	100	96	26.6	16.1	96	92.5	92.5	96	0.453	0.505	96	0.01	64	108	2570	1671		8	4.5	FATHEAD RETEST summary PAGES not report data in 96% dilution			
7/6/2002	na	na	na	na	na	na	100	90	96	0.783	0.5	41	0.1	68	72	????????			7.8	4	NASO4 spiked study ??????????			
9/23/2002	100	100	96	18	7.1	0	na	na	na	na	na	na				2170	1411		8.1	7.8	PASSED 3 of 4. CD repro see details of tests results.Check stats & reference performance).			
12/16/2002	100	100	96	22.1	11.4	30	87.5	100	96	0.81	0.848	96	0.01	52	72	2700	1755		8.1	4	PASSED ALL ENDPOINTS. Note the cntl repro compared to subsequent tests. The critical dilution repro doesn't really change with conductivity but is found to be significantly diff from controls.			
2/4/2003	100	90	96	17	22.9	72	100	60	96	0.633	0.328	96	< 0.1	156	76	3200	2080		8.1	7	PASSED ALL ENDPOINTS. Note the cntl repro compared to subsequent tests. The critical dilution reoro doesn't really change with conductivity but is found to be significantly diff reom controls.			
6/17/2003	100	100	96	23	22.9	72	82	96	96	0.932	1	96	< 0.01	112	56	2650	1723		7.9	7.2	PASSED ALL ENDPOINTS note CD cntl reduced. Conductivity greater than others that failed. Check daily reproduction			
9/9/2003	100	100	96	17.5	17.5	96	92.5	97.5	96	0.49	0.45	96	< 0.01	60	132	2100	1365		7.6	7.6	PASSED ALL ENDPOINTS note CD cntl reduced. Conductivity greater than others that failed. Check daily reproduction			
12/9/2003	80	80	96	16.4	17	72	100	90	96	0.405	0.415	72	< 0.01	156	100	2980	1937		8	4.7	PASSED ALL END POINTS but Cd reproduction 22 from 41-96% effluent, break point at 30 %. NOTE conductivity lowest of any subsequent even in those that passed. REVIEW DAILY INDIVIDUAL DETAILS			
1/20/2004	100	100	96	26.6	21.9	0	97.5	92.5	96	0.495	0.418	96	< 0.01	112	112	2370	1541		8.2	4.1	PASSED ALL END POINTS but Cd reproduction Note conductivity and cntl repro (28.9) 14.7 in critical dilution. Breakpointbetween 54 and 41%. Need to review daily records for individual repro characteristics.			
5/4/2004	100	100	96	28.9	14.7	30	92.5	97.5	96	0.44	0.585	96	< 0.01	80	124	3580	2327		7.2	5.9	Control failure FM. CD passed lethality but failed repro at critical dilution. Cntl repro lowest demonstrated over POR Note: low DO, conductivity & est TDS highest to date (CHECK TO CONTROL CHARTS)			
8/16/2004	100	90	96	24.6	14.9	54	na	na	na	na	na	na	< 0.01	84	40	4380	2847		7.8	7.4	test replaced previous failure note conductivity			
9/14/2004	0	0	0	0	0	0	97.5	100	96	0.588	0.793	96	< 0.1	76	48	4160	2704		5.3	8				
12/7/2004	100	100	96	25.2	24.1	96	97.5	97.5	96	0.845	0.853	96	< 0.1	92	52	3280	2132		7.6	7.4	PASSED ALL. NOTE: Repro in 100% 21.6. NOTE: Conductivity greater with no effect			
2/28/2005	90	100	96	33.6	25.3	0	100	100	96	0.555	0.53	96	< 0.01	72	48	3140	2041	13	7.9	5.1	Passed all but Cd reproduction. 25neonates in critical dilution. Controls tight. Stats. ALSO: the conductivity lsee than past or future yet diff in lowest diltion same a critical dilution.			
5/17/2005	100	70	96	26	17.7	0	87.5	90	96	0.46	0.41	96	< 0.01	156	56	3360	2184	15	8	3.8	Passed 3of 4, failed CD repo. Note Cd reproduction less than lowest dilution. Also, TDS lower than subsequent test with less response. NOTE DO 3.8			
9/12/2005	100	100	96	24.5	16.9	41	97.5	92.5	96	0.793	0.605	30	< 0.01	92	44	3470	2256	18	7.8	5.5	Failed FH groth in addition to CD repo. Note decreased DO, also the cond 350 less than 3rd qt 05 test			
11/7/2005	100	100	96	23.7	14.8	54	95	82.5	96	0.87	0.62	72	< 0.01	92	80	3820	2483	11	8.3	8.3	Passed 3 of 4 endpoints.CD dose response typical. Failed 1 of 4 endpoints.			
2/28/2006							100	100	96	0.678	0.697	96		80	48	4120	2678	15	7.9	5.8				
3/28/2006	90	60	96	21.6	18.8	96								110	104	4060	2639	15	8.3	7.7				
6/6/2006	100	100	96	27.6	10.8	30	100	100	96	0.52	0.574	96		116	64	3930	2555	39	8	6.8				
8/21/2006	100	40	72	20.7	19.9	72	100	100	96	0.85	0.93	96		168	40	4240	2756	29	7.7	6.1				
9/18/2006	100	80	96	20.6	12.4	54								116	48	3640	2366	34	7.8	7.2				
10/24/2006	100	100	96	19.2	20.2	96								104	56	3350	2178	28	8.1	7.4				
11/14/2006	100	100	96	20.5	17.3	72								104	76	3410	2217	21	8.2	7.1				
12/11/2006	100	80	96	18.9	18.3	96	100	97.5	96	0.58	0.708	96		88	72	3060	1989	22	8.1	7				
2/27/2007	100	0	41	24.3	0	0	100	100	96	0.65	0.85	96	< 0.01	108	44	2900	1885	33	7.9	6.2	Passed fathead minnow Failed Water flea			
3/27/2007	100	30	72	28	18.1	30							< 0.01	128	52	4610	2997	36	7.9	7.6	CD RETEST Passed water flea lethality, failed repo. Note TDS 1000 more than Feb 2008 but still passed lethality. Lethality not TDS (mineral) related.			
4/24/2007	90	60	96	23.8	11	41							< 0.01	144	32	3930	2555	28	7.8	7.4	CD RETEST Note TDS 1000 more than Feb 2008 but still passed lethality. Lethality not TDS (mineral) related.			
5/15/2007	100	100	96	22.2	19.3	96							< 0.01	140	76	3650	2373	28	7.4	7.4	PASSED BOTH ENDPOINTS Note TDS 1000 more than Feb 2008 but still passed lethality. Lethality not TDS (mineral) related			
6/12/2007	100	70	96	26.5	18.6	30	87.5	97.5	96	0.785	0.76	96	< 0.01	146	52	4030	2620	23	7.8	6.9	Passed 3 of 4 endpoints. Passed CD lethality and Fathead Lethality & growth. Note high conductivity. Reproduction 13.6 in 96%			
8/21/2007	100	80	96	19.5	17.4	96	100	100	96	0.66	0.69	96	< 0.01	112	72	3610	2347	13	8	7.3	PASSED ALL ENDPOINTS Note TDSmore than Feb 2008 but still passed lethality. Lethality not TDS (mineral) related			
11/6/2007	100	100	96	18.1	16.7	96	100	100	96	1.06	1.23	96	< 0.01	132	60	4030	2620	24	8	7.3	PASSED ALL ENDPOINTS including Cd repo in 96% effluent. Note TDS more than Feb 2008 but still passed lethality. Lethality not TDS (mineral) related			
2/19/2008	100	100	96	17.5	16.6	96	100	100	96	1.023	1.013	96	< 0.01	96	52	2600	1690	0	7.9	7.7	PASSED ALL ENDPOINTS including Cd repo in 96% effluent. NO EFFECTS EITHER END POINT			
4/22/2008	100	100	96	23.9	23	72	100	97.5	96	0.723	0.855	96	< 0.01	78	76	3030	1970	13	8.1	7.3	PASSED ALL ENDPOINTS including Cd repo in 96% effluent. NO EFFECTS EITHER END POINT			
7/15/2008	100	90	96	18	18.4	96	100	87.5	96	0.545	0.488	96	< 0.01	82	84	3280	2132	25	7.4	5.2	PASSED ALL ENDPOINTS including Cd repo in 96% effluent. NO EFFECTS EITHER END POINT			
11/20/2009	90	100	96	19.2	18.7	96	100	100	96	0.868	0.887	96	< 0.01	60	36	2460	1599	10	8.1	7.1	PASSED ALL ENDPOINTS including Cd repo in 96% effluent. NO EFFECTS EITHER END POINT			
2/23/2010	100	100	96	20.3	6	30	95	100	96	1.02	0.978	96		64	100	2845	1849	81	8.2	7.4	Passed 3 of 4 endpoints. Passed CD lethality and Fathead Lethality & growth. Note high conductivity.			
4/20/2010	90	80	96	18.6	14.3	96	100	92.5	96	0.82	0.73	96		92	84	3240	2106	34	8.1	7.5	PASSED ALL ENDPOINTS including Cd repo in 96% effluent. NO EFFECTS EITHER END POINT			
5/25/2010	90	70	96	16.4	10.8	41	45	100	96	NA	NA	NA		208	80	3290	2220	18	7.7	7.2	Passed CD survival at 96 %, failed sub-lethal Fathead minnow control failure but 96% passed with 97.5 survival.			

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	Ceriodaphnia dubia (Water Flea)						Pimephales promelas (Fathead Minnow)						Maximum										Min.	
Date Test initiated	Survival CNTL	Survival 96%	Survival NOEL	Repro. CNTL	Repro. 96%	Repro. NOEL	Survival CNTL	Survival 96%	Survival NOEL	Growth CNTL	Growth 96%	Growth NOEL	TRC	Hardness	Alkalinity	Conductivity	TDS	Se (ug/L)	pH	D.O.	NOTES			
6/22/2010	90	100	96	20.5	16.5	96	92.5	92.5	96	0.6	0.62	96		64	80	2980	1937	35	8.2	5.7	PASSED ALL ENDPOINTS including Cd repo in 96% effluent. NO EFFECTS EITHER END POINT			
7/20/2010	100	90	96	25.6	16.9	72	87.5	97.5	96	0.499	0.443	96		92	76	2370	2130	21	7.71	7.9	PASSED ALL ENDPOINTS except Cd repo in 96% effluent.Cd repor NOEC 72% PASSED ALL OTHERS.			
9/21-28/2010	100	100	96	15	14.9	96	N/A	N/A	N/A	N/A	N/A	N/A		56	64	3310	2152	16	8	7.7	PASSED ALL ENDPOINTS in 96% cd only			
10/12-19/2010	100	100	96	21.5	16.2	96	100	82.5	96	0.688	0.578	96		72	84	3430	2230	21	8.4	8.1	PASSED ALL ENDPOINTS including Cd repo in 96% effluent. NO EFFECTS EITHER END POINT			
11/15-22/2010	100	100	96	20.9	10.9	76	N/A	N/A	N/A	N/A	N/A	N/A		64	112	2980	1937	16	8.1	7.7	PASSED ALL ENDPOINTS except Cd repo in 96% effluent.Cd repor NOEC 76% PASSED ALL OTHERS. Note Conductivity less than other qt levels.. Also, lc50 of ref lowest of sep- DEC tests.			
12/12-20/2010	100	100	96	17.8	12.3	96	N/A	N/A	N/A	N/A	N/A	N/A		80	90	2470	1606	8	8.1	7.9	PASSED ALL ENDPOINTS in 96% cd only			
12/12-20/2010	90	90	96	17.8	12.3	96	N/A	N/A	96	N/A	N/A	41		80	90	2470	1606	8	8.1	7.9	PASSED 3 of 4, failed the fathead minnow growth (1st time since 2005, fathead minnow failure), 76% dilution water flea survival (0%) an anomalomy no reason for lethality in the 76% exposure			
1/18/2011	90	90	96	20.7	19.7	96	95	82.5	96	0.73	0.513	41		76	80	2300	1495	17	8.3	5.5	PASSED ALL ENDPOINTS including Cd repo in 96% effluent. NO EFFECTS EITHER END POINT			
2/15/2011	90	90	96	21.8	17	96	N/A	N/A	N/A	N/A	N/A	N/A		100	100	2380	2030	11	8.3	7.6	PASSED ALL ENDPOINTS in 96% cd only			
3/16/2011	100	90	96	30.1	18.5	32	N/A	N/A	N/A	N/A	N/A	N/A		164	124	3150	2220	11	8.2	7.6	PASSED 3 of 4, failed the water flea reproduction....non-dose response....higher cond/TDS than typical			
5/19/2011	90	70	96	23.5	14.4	32	95	92.5	96	0.372	0.178	32		96	88	2370	2010	9	8.3	7.2	PASSED 2 of 4 endpoints, , failed sub-lethal both species....non-dose response....cond/TDS not elevated when compaired to historical.			
6/14/2011	100	100	96	15.7	15.8	96	N/A	N/A	N/A	N/A	N/A	N/A		124	76	3240	2280	12	8.2	7.7	Passed ALL endpoints			
7/26/2011	100	70	96	19.3	3.1	32	96	96	96	0.525	0.64	100		112	92	3440	2440	33	8.1	8.2	Passed 3 of 4 failed cd repo. lc25 of ref tox , below mean indicating increased sensitivities in cultures. Response not dose response reduced repo to less than 32%			
8/16/2011	100	90	96	15.1	12.6	96	N/A	N/A	N/A	N/A	N/A	N/A		84	108	2980	2070	34	8.2	7.6	PASSED ALL endpoints. NOEC at 57 % had 17.4 repo only 5 more than 96%. IC25 of ref tox at minimum control levels. Indicating continues sensitivite of culture to ref tox.			
9/13/2011	100	70	96	22.6	12.7	54	N/A	N/A	N/A	N/A	N/A	N/A		112	180	3090	2980	40	8.4	7.8	PASSED survival but failed repo (Cdonly). Repo cnt at minimum required. Dose response atypical passed at max exposure but failed others. IC25 of ref tox at minimum control levels. Indicating continues sensitivite of culture to ref tox.			
10/18/2011	100	100	96	19.1	10.3	54	96	77.5	96	0.453	0.325	72		64	76	3140	2041	21	8.2	7.4	PASSED survival but failed sub in both at critical dilutions. Note NH3-N at 1.0 mg/L. Dose response atypical passed at max exposure but failed others. IC25 of ref tox rebounded from previous lows. Note changes in wQ, reduced hardness and alkalinity			
11/15/2011	90	60	96	17.4	4.3	76	N/A	N/A	N/A	N/A	N/A	N/A		168	124	4490	3110	16	8.3	7.9	PASSED survival but failed sub at critical dilutions. Note NH3-N at 0.5 mg/L.			
12/13/2011	90	70	96	20.1	9	76	N/A	N/A	N/A	N/A	N/A	N/A		104	112	3600	2510	8	8.4	7.8	PASSED survival but failed sub at critical dilutions. Note NH3-N at 0.5 mg/L. Ref tox remails below mean performance.			
1/16/2012	90	90	96	24.1	12.3	96	90	65	41	0.515	0.498	41		84	160	3110	2150	17	8.4	7.8	Passed only Cd lethality, failed fathead minnow lethality and growth in the 96 % critical dilutions. Fathead failure very atypical and cause not indicated in analytical chemistry completed with test.			
2/13/2012	90	90	96	18.2	9.2	76	100	92.5	96	0.465	0.385	96		96	136	3940	2720	11	8.3	7.6	PASSED 3 of 4 ,including both fat head minnow endpoints, failed only the water flea in 96 but passed in next exposure of series (76%). Note increased tDS and conductivity.			
3/12/2012	100	90	96	18.3	16.7	96	100	100	96	0.35	0.265	96		64	80	2800	1929	18	8.5	7.9	PASSED all 4 but not typical dose response . Higher dilutions not stat diff but lower were. Note lower QW levels across board. Including cond and TDS			
4/17/2012	90	100	96	21.5	0.3	<30	97.5	97.5	96	0.595	0.47	96		76	88	3390	2330	21	8.3	7.9	PASSED 3 of 4 ,including both fat head minnow endpoints, failed only the water flea sub lethal endpoint. Note increased TDS and conductivity. Nothing to cuse the sub-lethal results (NOEC <30%)			
5/15/2012	100	80	96	21.9	8.1	54	90	72.5	96	0.593	0.375	54		100	116	3970	2940		8.3	7.8	Passed both lethality endpoints and failed both sub-lethal			

mean 101.694915

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= Note worthy data