



# Comstock Mine Environmental Monitoring Report Second Quarterly 2002

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## Table of Contents

	<u>Page #</u>
<b>1.0</b> Introduction .....	1
<b>2.0</b> Water Monitoring.....	1
<b>2.1</b> W1 – Comstock Creek Upstream.....	1
<b>2.2</b> W2 – Main Adit Inlet.....	2
<b>2.3</b> W3 – Main Adit Outlet.....	2
<b>2.4</b> W4 – Base of Swansea Dump .....	2
<b>3.0</b> Erosion Monitoring .....	3
<b>3.1</b> E1 – East Wall of Allison’s Decline .....	3
<b>3.2</b> E2 – Southwestern Batter of Central Dump .....	3
<b>4.0</b> Summary.....	3
<b>Appendix A</b> – <i>Laboratory Analysis of Water Sampling</i>	
<b>Appendix B</b> – <i>Water Sampling Data Collection</i>	

## List of Figures

	<u>Page #</u>
<b>Figure 1.</b> Water sampling results for pH on 10/05/02.....	4
<b>Figure 2.</b> Water sampling results for TSS on 10/05/02 .....	4
<b>Figure 3.</b> Water sampling results for metals on 10/05/02.....	5

## 1.0 Introduction

The following report has been completed in compliance with Section 3.7.4 *Monitoring Schedule* of the environmental Permit Conditions issued by the Department of Primary Industries, Water and Environment, Tasmania, under the Environmental Management and Pollution Control Act 1994 for the Zeehan Zinc mine, leased by Oceania Tasmania Pty Ltd. This report summarises the required monitoring for the time period of April 2002 to June 2002.

Since April 2002, Zeehan Zinc Pty Ltd has not continued any mineral extraction operations at the mine site. There have been limited activities at the site during this time period.

As of July 6, 2001, the Department of Primary Industry, Water and Environment have published new permit conditions for a level 2 mining activity by Oceania Tasmania Pty. Ltd. at the Comstock Mine.

## 2.0 Water Monitoring

As required by the Permit Conditions, water monitoring of sites W1, W2, W3, and W4 has been completed.

The following four sub-sections summarise and interpret the sampling and analysis findings.

### 2.1 W1 – Comstock Creek Upstream

Sampling location W1 is situated upstream of the mine site in Comstock Creek adjacent to historical workings

Samples were taken on May 10, 2002 and analysed at 'Allison Laboratories' on May 21, 2002 for all of the required parameters (Figures 1, 2 and 3). Laboratory results are located in Appendix A.

Compared to previous sampling activities, the heavy metal content at this sampling location is at average levels, with a noted decrease in manganese and zinc. Since the last sampling event, the pH has returned from 4.7 to 4.3. Although the results from the last sampling event will be used in future correlations, it is probable that either a poor sample was obtained or a laboratory error had occurred.

Although business relations between Oceania Tasmania Pty. Ltd. and the DPIWE lab 'Analabs' was severed last year due to laboratory inconsistencies, Oceania is prepared to utilise this laboratory again beginning with the next quarter annual report. Oceania recognises that Analabs offers the best equipment to guarantee sample integrity from the time of sampling until it reaches the lab.

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## **2.2 W2 – Main Adit Inlet**

Sampling location W2 is situated in the collection areas beside the main adit inlet at the base of Allison's decline. These areas contain a sediment screen to reduce sediment flow off site, and limestone to reduce the acidity of the run off.

Samples were taken on May 10, 2002 and analysed at 'Allison Laboratories' on May 21, 2002 for all of the required parameters (Figures 1, 2 and 3). Laboratory results are located in Appendix A.

This site is presumed to be of the worst quality of water simply because of its location. Exposed pyritic material and, until recently, an inappropriately drained dump surrounds this site.

The pH at this location is an average 2.6. There is a noticeable decrease in most of the heavy metals content, possibly due to a recent rain event. It has been established that this sampling location is influenced by rainfall events, producing poorer quality water after being allowed to stand for a time. It does not accurately give a representative indication of the water quality in this area, although continuous treatment and monitoring will occur until permit conditions are revised with future developments.

## **2.3 W3 – Main Adit Outlet**

Sampling location W3 is situated at the main adit outlet.

Samples were taken on May 10, 2002 and analysed at 'Allison Laboratories' on May 21, 2002 for all of the required parameters (Figures 1, 2 and 3). Laboratory results are located in Appendix A.

The majority of the heavy metal results at this location are higher than recent sampling events, and the pH has fallen to its average of around 3.1. This could be attributed to recent storm events.

Oceania Tasmania Pty. Ltd. is looking forward to developing and implementing treatment options for this water before the gravity separation mill is commissioned.

## **2.4 W4 – Base of Swansea Dump**

Sampling location W4 is situated in a small pool at the base of the Swansea Tramway Waste Rock Dump.

Samples were taken on May 10, 2002 and analysed at 'Allison Laboratories' on May 21, 2002 for all of the required parameters (Figures 1, 2 and 3). Laboratory results are located in Appendix A.

Most heavy metals have increased in this area, showing consistency with samples of the rest of the site. The pH is 2.5, the lowest recorded pH in this area.

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As stated in the previous quarter annual report, plans are under way to gain safe and consistent access to this area for development and maintenance purposes. This access will be achieved in the second half of this year.

### **3.0 Erosion Monitoring**

As required by the Permit Conditions, erosion monitoring of sites E1 and E2 has been completed. The following two sub-sections summarise the findings.

#### **3.1 E1 – East Wall of Allison’s Decline**

This site represents the east wall of Allison’s decline.

The mine manager routinely inspects the decline’s wall for potentially damaging erosion. There has been no significant erosion in this area. Future activities dictate that this wall will be tapered back, widening the decline in preparation for mineral extraction.

Continued site inspections by the mining staff ensure that potentially damaging erosion will not become an issue in the future.

#### **3.2 E2 – Southwestern Batter of Central Dump**

This site represents the southwestern batter of the Central Mine Waste Rock Dump.

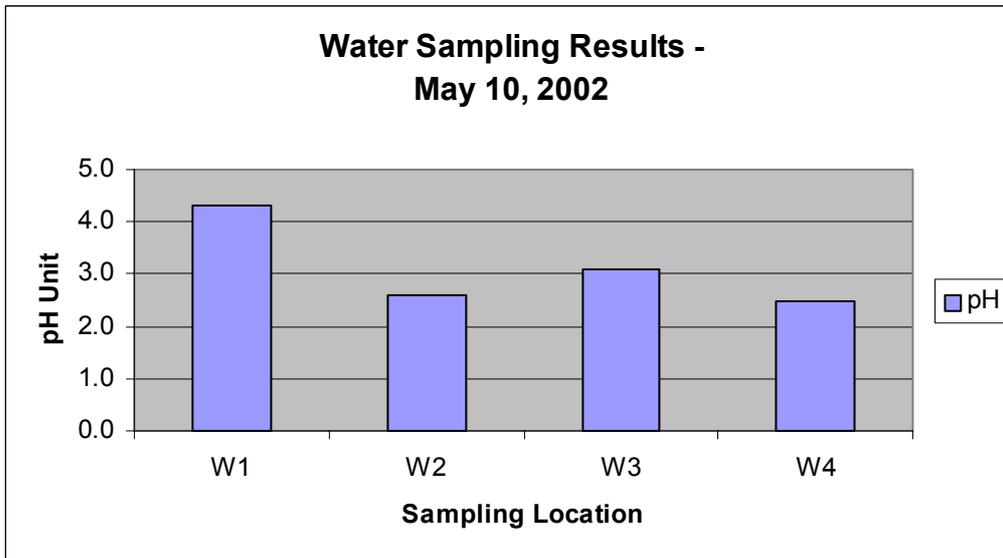
The Central Waste Rock Dump rehabilitation is continuing. Full re-contouring and partial clay capping has occurred. Within this procedure are practices that will ensure appropriate erosion control.

Continued site inspections by the mining staff ensure that potentially damaging erosion will not become an issue in the future.

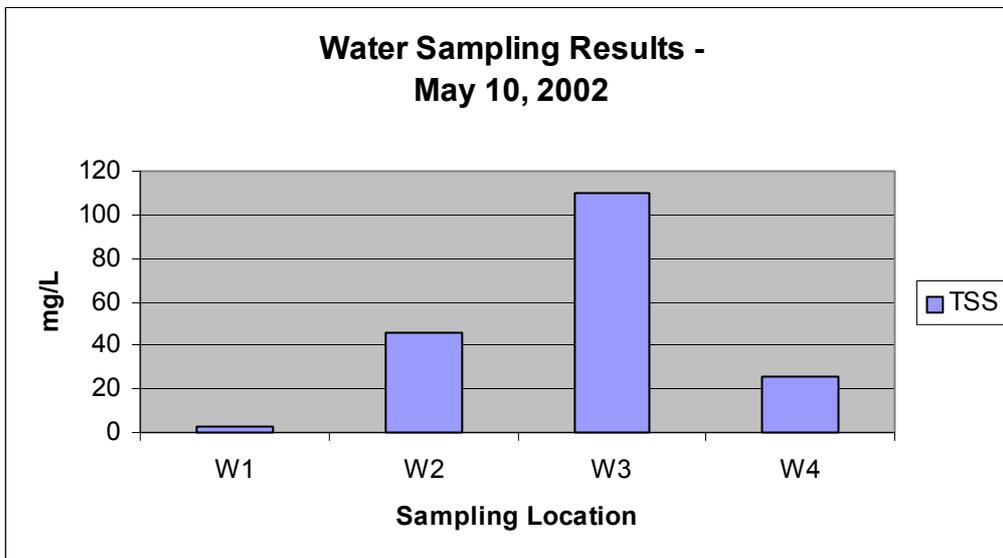
### **4.0 Summary**

Plans are presently being finalised for developments at the Comstock mine that will ensure a working and well maintained mine. With this status, the treatment and control of wastewater and erosion will be undertaken in a structured and routine manner.

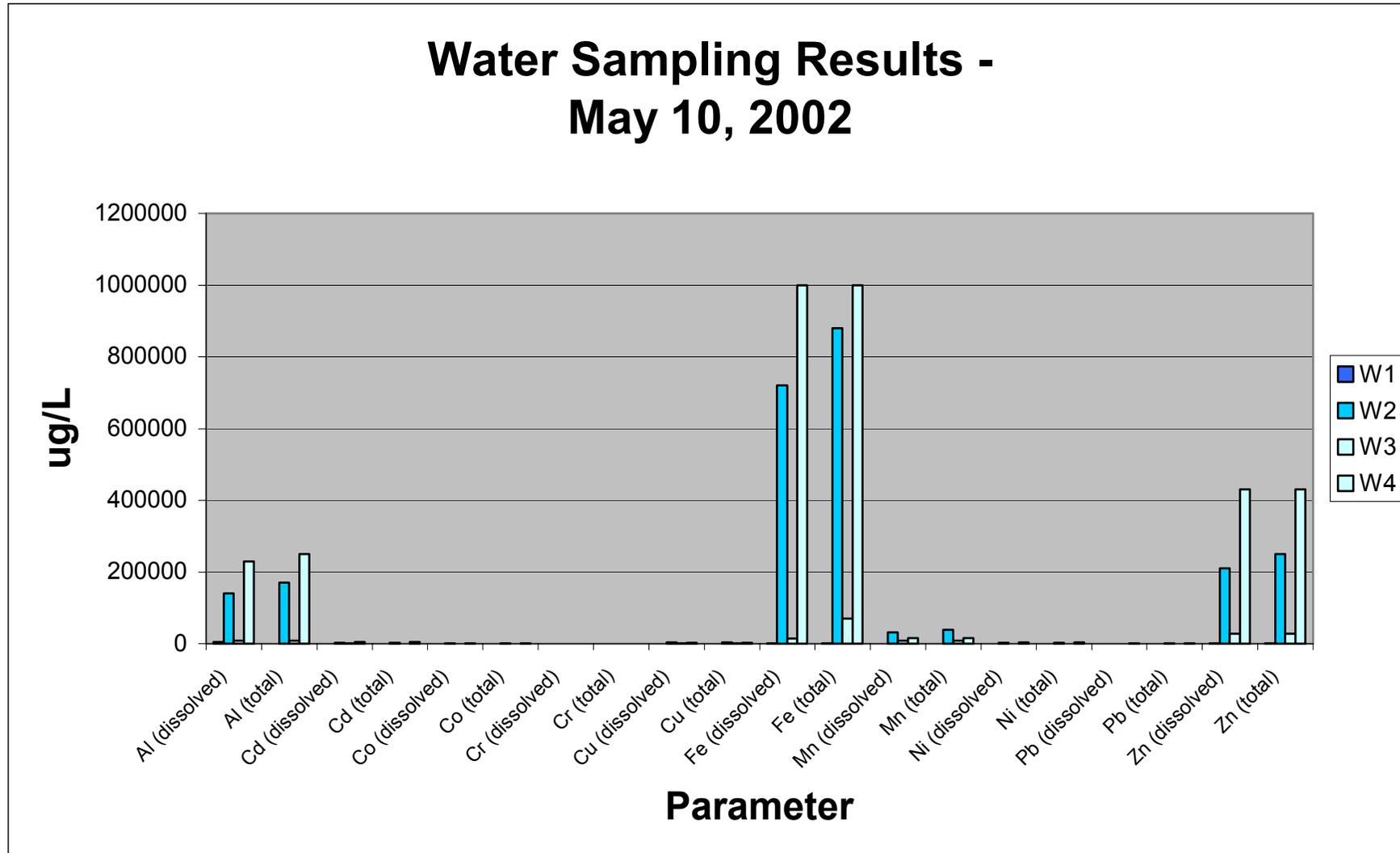
**Figure 1.** Water sampling results for pH on 10/05/02.



**Figure 2.** Water sampling results for TSS on 10/05/02

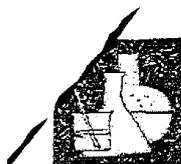


**Figure 3.** Water sampling results for metals on 10/05/02.



## **APPENDIX A**

### *Laboratory Analysis of Water Samples*



## ALLISON LABORATORIES

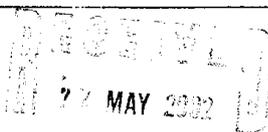
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page 1 of 2

### RESULTS OF ANALYSIS

Samples labelled as shown below were delivered to these laboratories. The results of analyses conducted on these are tabulated herewith:

Laboratory Reference	160890	160891	160892	160893
Sample Identification	W 1	W 2	W 3	W 4
pH	4.3	2.6	3.1	2.5
Conductivity $\mu\text{S}/\text{cm}$	100	3,480	1,020	4,710
Total Suspended Solids $\text{mg}/\text{L}$	3	46	110	26
Total Dissolved Solids $\text{mg}/\text{L}$	84	6,100	740	9,000
Acidity to pH 8.3 $\text{mg}/\text{L}$ as $\text{CaCO}_3$	11	2,700	200	4,000
Total Aluminium $\text{mg}/\text{L}$	0.51	170	8.6	250
Total Arsenic $\text{mg}/\text{L}$	0.0009	3.9	0.25	3.8
Total Cadmium $\text{mg}/\text{L}$	< 0.01	2.4	0.13	4.6
Total Cobalt $\text{mg}/\text{L}$	< 0.01	1.0	0.09	1.5
Total Chromium $\text{mg}/\text{L}$	< 0.02	0.15	< 0.02	0.38
Total Copper $\text{mg}/\text{L}$	< 0.01	3.3	1.4	2.0
Total Iron $\text{mg}/\text{L}$	1.3	880	70	1,000
Total Manganese $\text{mg}/\text{L}$	0.11	39	8.0	16
Total Nickel $\text{mg}/\text{L}$	$\leq$ 0.02	2.3	0.18	3.2
Total Lead $\text{mg}/\text{L}$	0.19	0.68	0.23	1.2
Total Zinc $\text{mg}/\text{L}$	0.75	250	28	430

K J Allison B.Sc.  
 Chemist

Samples received 10.05.02  
 Analysis completed 21.05.02

*Methodology: This sample was analysed essentially in accord with the relevant methods as set out in "Standard Methods for the Examination of Water & Wastewater" 17th Ed. (1989), APHA.*



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page 2 of 2

### RESULTS OF ANALYSIS

Samples labelled as shown below were delivered to these laboratories. The results of analyses conducted on these are tabulated herewith:

Laboratory Reference	160890	160891	160892	160893
Sample Identification	W 1	W 2	W 3	W 4
Dissolved Aluminium mg/L	0.46	140	8.6	230
Dissolved Arsenic mg/L	0.0005	3.9	0.038	3.2
Dissolved Cadmium mg/L	< 0.01	2.2	0.13	4.4
Dissolved Cobalt mg/L	< 0.01	1.0	0.08	1.5
Dissolved Chromium mg/L	< 0.02	0.14	< 0.02	0.29
Dissolved Copper mg/L	< 0.01	3.1	1.4	1.9
Dissolved Iron mg/L	1.1	720	14	1,000
Dissolved Manganese mg/L	0.11	32	8.0	16
Dissolved Nickel mg/L	< 0.02	2.2	0.17	3.1
Dissolved Lead mg/L	0.15	0.36	0.18	1.0
Dissolved Zinc mg/L	0.75	210	28	430

K J Allison B.Sc.  
Chemist

Samples received 10.05.02  
Analysis completed 21.05.02

*Methodology: This sample was analysed essentially in accord with the relevant methods as set out in "Standard Methods for the Examination of Water & Wastewater" 17th Ed. (1989), APHA.*

## **APPENDIX B**

### *Water Sampling Data Collection*

Site	Date	TSS mg/L	Alkalinity (total) CaCO3 mg/L	Acidity CaCO3 mg/L	pH	Al (dissolved) ug/L	Al (total) ug/L	Cd (dissolved) ug/L	Cd (total) ug/L
S14	10/22/97						2560		39
S10	10/22/97						2800		42
S14	06/10/99	59	<1	61		1780	2190	19	19
S14	08/10/99	59	<1	49		1430	2110	19	20
S2	08/10/99	6	2	9	6.2	287	370	<1	1
S10	03/08/00	57	<1	98		441	1960	12	14
S1	06/27/00				4.6	0		0	
S2	06/27/00				6.2	340		0	
S10	06/27/00				5.0	1150		50	
S14	06/27/00				5.3	630		30	
S12	06/27/00				6.2	110		20	
S11	06/27/00				6.2	220		10	
S3	06/27/00				3.3	13060		160	
S1	09/22/00				5.5	0		40	
S2	09/22/00				6.4	580		30	
S10	09/22/00				6.0	10		20	
S14	09/22/00				5.8	0		20	
S12	09/22/00				6.1	160		10	
S11	09/22/00				6.4	90		10	
S3	09/22/00				no flow	no flow		no flow	
S1	01/15/01	2			4.7	234	452	<1	1
S10	01/15/01	107			3.1	7040	8230	254	254
S13	01/15/01	132			3.0	78700	86600	514	530
S10	02/04/01	86	<1		3.5	<20	1870	<1	18
S10	03/28/01	68	<1		3.4	8250	8430	191	190
S13	03/28/01	163	<1		2.6				
S1	05/18/01	4	<1	20	4.2		1020	<5	<5
S9	05/18/01	16	4	11	5.5		905	15	14
S6	05/18/01	15	<1	63	3.5		4040	<5	<5
S4	05/18/01	19	<1	2760	2.5		164000	2010	2060
S5	05/18/01	16	<1	209	3.0		13400	<5	6
S2	05/18/01	<1	<1	22	4.1		1010	<5	<5
S10	05/18/01	64	<1	105	3.5		2260	106	129
S12	05/18/01	91	<1	135	3.2		11500	16	20
S13	05/18/01	17	<1	729	2.8		47500	46	62
S1	10/09/01	<1		9	4.3		420		<5
S4	10/09/01	4		1800	2.5		110000		2100
S10	10/09/01	50		740	3.0		2900		33
S13	10/09/01	75		1510	3.0		21000		260
S1	07/12/01	<1		8	4.3	340	430	10	10
S4	07/12/01	32		3500	2.4	180000	200000	4000	4200
S10	07/12/01	90		120	3.3	1800	2900	50	50
S13	07/12/01	110		590	2.8	19000	21000	260	280
S1	06/03/02	<1		18	4.7	290	250	30	30
S4	06/03/02	10		4100	2.5	240000	240000	4500	4300
S10	06/03/02	40		140	4.6	2900	510	60	60
S13	06/03/02	50		1000	2.9	39000	38000	680	640

S1	10/05/02	3		11	4.3	4600	510	10	10
S4	10/05/02	46		2700	2.6	140000	170000	2200	2400
S10	10/05/02	110		200	3.1	8600	8600	1360	130
S13	10/05/02	26		4000	2.5	230000	250000	4400	4600

Site	Date	Co (dissolved) ug/L	Co (total) ug/L	Cr (dissolved) ug/L	Cr (total) ug/L	Cu (dissolved) ug/L	Cu (total) ug/L	Fe (dissolved) ug/L	Fe (total) ug/L
S14	10/22/97		66		7		<5		59100
S10	10/22/97		76		8		6		67700
S14	06/10/99	23	23	<1	<1	10	12	351	25100
S14	08/10/99	25	26	1	<1	14	13	678	30700
S2	08/10/99	<1	<1	1	<1	11	9	681	1300
S10	03/08/00	37	40	<1	<1	2	2	11700	43100
S1	06/27/00	10		0		30		470	
S2	06/27/00	30		20		40		600	
S10	06/27/00	40		50		50		19820	
S14	06/27/00	40		50		40		13410	
S12	06/27/00	60		30		40		7440	
S11	06/27/00	90		50		0		37640	
S3	06/27/00	350		20		70		2470	
S1	09/22/00	50		40		10		46040	
S2	09/22/00	60		40		0		48980	
S10	09/22/00	60		0		60		8980	
S14	09/22/00	50		0		40		9240	
S12	09/22/00	90		20		30		34460	
S11	09/22/00	30		0		40		1050	
S3	09/22/00	no flow		no flow		no flow		no flow	
S1	01/15/01	3	3	<1	1	4	6	636	2360
S10	01/15/01	112	114	1	3	125	128	1010	49000
S13	01/15/01	1730	1710	92	186	69	73	139000	390000
S10	02/04/01	<1	50	<1	<1	<1	3	<20	43700
S10	03/28/01	53	55	<1	2	56	56	2220	33600
S13	03/28/01								
S1	05/18/01	7	8	<1	<1	27	26	866	850
S9	05/18/01	4	5	<1	<1	22	23	2290	2430
S6	05/18/01	11	11	3	3	123	122	3780	3810
S4	05/18/01	1230	1250	149	153	4650	4780	605000	622000
S5	05/18/01	42	42	2	3	55	70	18300	24400
S2	05/18/01	8	8	<1	<1	21	27	608	794
S10	05/18/01	32	39	<1	<1	7	7	31100	38300
S12	05/18/01	49	62	3	5	181	229	15900	20000
S13	05/18/01	446	579	33	43	264	341	77600	117000
S1	10/09/01		5		<1		10		670
S4	10/09/01		930		130		3000		500000
S10	10/09/01		63		<1		5		57000
S13	10/09/01		370		35		77		140000
S1	07/12/01	10	10	20	20	10	10	310	630
S4	07/12/01	1400	1500	200	200	4700	5000	770000	790000
S10	07/12/01	50	50	20	20	10	10	9300	54000
S13	07/12/01	340	350	20	200	75	77	100000	160000

S1	06/03/02	10	10	20	20	10	10	1200	1200
S4	06/03/02	1400	1400	210	200	5800	5600	950000	950000
S10	06/03/02	60	60	20	20	10	10	56000	43000
S13	06/03/02	410	400	120	100	300	300	250000	200000
S1	10/05/02	10	10.0	20	20	10	10	1100	1300
S4	10/05/02	1000	1000.0	140	150	3100	3300	720000	880000
S10	10/05/02	80	90.0	20	20	1400	1400	14000	70000
S13	10/05/02	1500	1500.0	290	380	1900	2000	1000000	1000000

Site	Date	Mn (dissolved) ug/L	Mn (total) ug/L	Ni (dissolved) ug/L	Ni (total) ug/L	Pb (dissolved) ug/L	Pb (total) ug/L	Zn (dissolved) ug/L	Zn (total) ug/L
S14	10/22/97		10800		147		380		33000
S10	10/22/97		12200		166		373		37700
S14	06/10/99	4290	4270	47	42	81	147	14700	14900
S14	08/10/99	4220	4230	51	51	80	155	14400	14900
S2	08/10/99	129	138	3	4	52	85	284	298
S10	03/08/00	8620	8770	73	75	<5	46	22500	23200
S1	06/27/00	40		40		80		230	
S2	06/27/00	70		50		140		170	
S10	06/27/00	2780		30		170		13590	
S14	06/27/00	1970		20		370		9710	
S12	06/27/00	6270		70		210		2880	
S11	06/27/00	5580		130		190		11670	
S3	06/27/00	820		380		5670		36000	
S1	09/22/00	7560		50		130		24600	
S2	09/22/00	7720		50		130		25760	
S10	09/22/00	6720		10		180		2840	
S14	09/22/00	6980		70		190		2730	
S12	09/22/00	5470		70		230		11870	
S11	09/22/00	120		0		210		650	
S3	09/22/00	no flow		no flow		no flow		no flow	
S1	01/15/01	285	281	9	11	64	142	345	366
S10	01/15/01	8680	8660	250	256	91	122	37200	37100
S13	01/15/01	13400	13000	5260	5150	3200	11600	258000	257000
S10	02/04/01	<5	8650	<1	95	<5	70	<1	20
S10	03/28/01	6340	6360	109	110	579	631	33700	33900
S13	03/28/01								
S1	05/18/01	336	335	15	15	593	591	3180	3130
S9	05/18/01	435	436	8	8	192	198	1180	1170
S6	05/18/01	269	269	20	22	488	488	6160	6130
S4	05/18/01	7620	7790	2630	2680	852	684	161000	161000
S5	05/18/01	443	687	55	71	1520	2020	6840	6930
S2	05/18/01	260	337	14	18	641	838	2520	3250
S10	05/18/01	5030	6080	62	75	231	287	13500	16500
S12	05/18/01	1370	1740	81	107	290	375	11900	15800
S13	05/18/01	4560	5770	991	1280	780	998	119000	160000
S1	10/09/01		210		20		240		1200
S4	10/09/01		5100		2100		670		120000
S10	10/09/01		8800		130		160		280000
S13	10/09/01		8100		800		390		850000

<b>S1</b>	07/12/01	190	190	20	20	170	220	910	920
<b>S4</b>	07/12/01	12000	13000	3000	3300	520	740	210000	220000
<b>S10</b>	07/12/01	9100	9300	110	110	120	250	26000	27000
<b>S13</b>	07/12/01	7500	8200	870	930	270	300	75000	83000
<b>S1</b>	06/03/02	1000	930	10	10	2300	1900	7200	6400
<b>S4</b>	06/03/02	38000	36000	3100	3000	450	450	450000	440000
<b>S10</b>	06/03/02	9200	8500	110	110	400	400	29000	28000
<b>S13</b>	06/03/02	6900	6600	1000	930	850	810	110000	110000
<b>S1</b>	10/05/02	110	110	20	20	150	190	750	750
<b>S4</b>	10/05/02	32000	39000	2200	2300	360	680	210000	250000
<b>S10</b>	10/05/02	8000	8000	170	180	180	230	28000	28000
<b>S13</b>	10/05/02	16000	16000	3100	3200	1000	1200	430000	430000

22/10/97, 10/06/99, 10/08/99, 08/03/00 (SEMF, Development Proposal and Environmental Management Plan, May 2000)

27/06/00, 22/09/00 (Meskanen, U., Acid Mine Drainage at the Comstock Ag-Pb-Zn Mine,... – Thesis, November 2000)

15/01/01 (Sarah Bunce – SEMF, March 21, 2001)

04/02/01 (Paul Heath – Oceania, March 21, 2001)

03/28/01 (Shane Bartel - Oceania Tasmania)

05/18/01 (Shane Bartel - Oceania Tasmania)

10/09/01 (Shane Bartel - Oceania Tasmania)

7/12/01 (Paul Heath - Oceania Tasmania)

6/03/02 (Shane Bartel - Oceania Tasmania)

**S1 - Comstock Creek - furthest upstream (was W1)**

**S2 - Comstock Creek - upstream beside old workings area**

**S3 - upper bench adit entrance**

**S4 - decline adit entrance (was W2)**

**S5 - marsh area east of proposed processing mill location**

**S6 - collection pond beside proposed processing mill location**

**S7 - main drainage inlet before treatment pond #1**

**S8 - discharge from treatment pond #1**

**S9 - Comstock Creek - before mixing with adit drainage**

**S10 - main adit drainage before mixing with Comstock Creek (was W3)**

**S11 - 2nd independent adit drainage south of Swansea dump after limestone buffer**

**S12 - 1st independent adit drainage south of Swansea dump after stormwater mixing**

**S13 - discharge from second collection dam west of Swansea dump (was W4)**

**S14 - Comstock Creek - downstream of mixing, before lease boundary**