Supporting Document B4

Giant Mine – Underground Mine Water Chemistry (SRK, 2005)

Giant Mine
Underground Mine Water Chemistry

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Underground Mine Water Chemistry

Department of Indian Affairs and Northern Development

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1 Introduction

Mine water sampling programs were completed by Fracflow Consultants in 1998 and 1999 and by the Department of Indian Affairs and Northern Development (DIAND) and SRK Consulting Inc. (SRK) from 2000 to 2004. The primary objectives of the sampling programs were:

- to characterize the geochemical and isotopic signatures of water types entering the mine workings;
- to identify and characterize "type" samples representing distinct sources of arsenic within the mine;
- to delineate the main flow paths through the mine;
- to develop an overall water and load balance for the mine;
- to establish seasonal variations in the water chemistry from the mine;

Discharges from the underground mine were also monitored on a regular basis by Miramar Giant Mine Ltd. (MGML) as part of the Surveillance Network Program (SNP).

This report presents relevant results from all of the underground mine water sampling programs. The report is organized as follows:

- Section 2 presents the methods.
- Section 3 provides results of the underground seepage sampling programs and discusses the chemical characteristics of each of the distinct sources of water in the mine.
- Section 4 presents results of the reconnaissance survey, the monthly sampling program and the ditch and sump sampling programs that were used to define the seasonal and spatial distribution of flows and arsenic loading in the mine, and develop water and load balances for winter and freshet conditions.
- Section 5 provides a summary and overall conclusions from the mine water sampling programs.

The results of the mine water sampling programs are used in conjunction with results from the solids sampling program to develop source concentrations for use in the arsenic load estimates (SRK 2005a).

2 Methods

2.1 Sampling Programs

2.1.1 1998/1999 Fracflow

The 1998/1999 Fracflow study included sampling trips in January 1998, March 1998 and September 1999. Further information is provided in Fracflow (1998).

2.1.2 2000/2001 DIAND/SRK

The 2000/2001 sampling program by DIAND and SRK included sampling trips in April, May, November, and December 2000, and January 2001. Sample locations were selected from the earlier Fracflow locations and from additional inspections to map flows and measure volumes of flow near the arsenic chambers. In addition, attempts were made to collect samples from the geographical extremities of the mine, and from locations that were removed from the influence of the arsenic chambers.

Two groups of samples were collected:

- Seeps, or discrete flows of water from fracture planes, drill holes and faults, were sampled with the intention of identifying distinct water sources.
- Major ditch flows were measured and sampled to define flow paths and to provide a basis for calculating overall water and load balances.

Sample locations are provided in Figures 2.1 (Seeps) and 2.2 (1999 to 2000 Ditch and Sump Flows).

Further information on the DIAND/SRK sampling program is provided in an internal memo by Paul Green (DIAND 2001), and in Supporting Document A1 of the 2001 Alternatives Report (SRK 2001).

The 1999/2000 data was also reviewed and interpreted by Dr. Ian Clark of the University of Ottawa, under a separate contract to DIAND. The results of his work are presented in *"Sources of Water and Arsenic in Mine Waters, Giant Mine, Yellowknife, NWT"* (Clark 2001). Relevant conclusions are included in this report.

2.1.3 2001-2004 DIAND/SRK Programs

The 2001-2004 sampling program included:

- Seepage surveys to characterize "type" samples representing distinct sources of water or discrete flows within the mine, including samples representing tailings and waste rock backfill.

- A reconnaissance level survey to map major flows and arsenic concentrations throughout the mine.
- Two rounds of flow measurements and sampling at select ditch and sump locations in the mine to define the spatial distribution of flows and arsenic loading and to develop water and load balances for winter and freshet conditions in the mine.
- Regular monthly monitoring of the mine sumps to establish seasonal variations in water chemistry from the mine.

Further detail on these programs is provided as follows.

Seepage Surveys

Seep surveys were completed in July 2001 and January 2004. The July 2001 survey included samples from approximately 15 existing sampling stations representing distinct types of water in the mine, and 10 new samples originating from stopes that have been backfilled with tailings and waste rock. The 10 samples representing backfilled stopes were re-sampled in the January 2004 survey to verify the results of the initial set of samples. The seep sample locations are shown in Figure 2.1. Complete results are provided in Appendix A.

Mapping of Flow and Arsenic Concentrations

The reconnaissance level survey of flow and arsenic concentrations was completed in July 2001, by Brodie Consultants Ltd. (BCL), under a subcontract to SRK Consulting. Major flows in each level of the mine were estimated and mapped on a 1:200 scale set of level plans. Filtered samples were collected from each of these locations (77 in total), and submitted for dissolved arsenic analyses.

Sample locations and results are provided in Appendix B (Brodie 2001). The results were used in conjunction with results from the 2000/2001 samples to plan the detailed ditch and sump sampling program.

Monthly Sampling

The monthly sampling program was initiated in August 2001, and continued through to present. The purpose of the sampling was to establish the seasonal variations in flow and chemistry from the mine. DIAND staff was responsible for collection of samples, while SRK provided direction for the program and were responsible for compiling and reviewing the data.

During the first few months, samples were collected from each of the main flows from the mine (i.e. from the 575 level and 1300 level sumps, via the 8” and 10” lines respectively, Figure 2.2). In December 2001, the flow system was changed such that all of the mine water was routed to the 1300 sump (Figure 2.3). Samples were then taken from the 1300 sump, the 1300 sump pump, and the discharge to the Northwest tailings pond (000-SW6, also referred to as SNP 43-17). In the past few years, the program was streamlined to include regular monitoring of the discharge to the Northwest

tailings pond, and occasional monitoring of the discharge to South pond (Figure 2.4). However, due to long intervals between pump cycles and the short operating season, very few samples were collected at the South Pond location.

In the more recent samples, short term variability in water quality caused by pumping cycles in the mine, (see Section 4.4.3), was minimized by collecting samples over a period of 1 to 2 hours, or at least 4 pump cycles. The samples were usually collected by opening a bleed valve located in the pump shack and allowing approximately 2 litres of water to drain into the pail each time the pump cycled on. The composite sample was then poured from the bucket into the sample bottles or filtered according to standard protocol. A few sample composites were collected at the pipe discharge during times when the bleed valve was not operating. Field measurements were taken on the final sample composite, and starting in May 2003, they were also taken on each sample aliquot.

Complete results of the monthly sampling programs, including the results of Miramar's routine sampling and relevant data from the ditch and sump sampling programs are provided in Appendix C.

Ditch and Sump Samples

The 2002 and 2003 ditch and sump sampling programs improved on earlier attempts to obtain an overall water and load balance for the mine, because they included all of the major flows and loads entering each of the mine sumps, and they were completed over short time periods. The 2002 survey was completed in February, and therefore represents relatively quiescent winter low flow conditions. The 2003 survey was completed in late May, during freshet.

Results from the reconnaissance level flow and arsenic survey and from the 2000/2001 programs were used to define key sectors of interest in the mine:

(1) South of Arsenic Trioxide Storage Sector (roughly south of C-shaft)

(2) Arsenic Trioxide Storage Sector (roughly C-shaft to 1000N)

(3) North of Arsenic Trioxide Storage Sector (north of 1000N)

Sampling locations were then selected such that flows and chemistry associated with each of the above sectors could be isolated. The locations were selected to represent key nodes in the flow system, and samples from the overall mine discharge. In the 2002 program, this comprised an extensive network of stations, as shown in Figure 2.3. In the 2003 program, stations with low flows and low arsenic loadings were eliminated to ensure that the program could be completed within the short time frame for which access to the underground workings was possible. The 2003 sample locations are shown in Figure 2.4.

The timing of the freshet sampling program was critical. Therefore, prior to initiating the program, pumping data were closely monitored to determine when flows had increased to freshet levels. Sampling commenced on May 15th and 16th, but had to be stopped due to other commitments by

support staff from the mine. Sampling was re-initiated on May 30th and was completed on May 31st. Some key sample stations were revisited during the second trip to ensure that flows and chemistry were representative of the second phase of sampling. However, due to the limited time available, data from some of the mid-May data were used in the assessment.

Samples were collected following standard protocols, as described in Section 2.2. Accurate measurement of flow was a priority in these program. Therefore, additional efforts were made to obtain accurate flow readings. The measurements were made using a bucket-wheel current meter (Pygmy type), the floating object method, or bucket and stopwatch methods depending on the physical configuration of the station.

The results are provided in Appendix D, and the water and load balance calculations are provided in Appendix E.

2.1.4 Routine Monitoring Programs

Routine sampling of the underground discharges to the Northwest Tailings Pond (SNP 43-17) and the South Tailings Pond (SNP 43-18) is also carried out as part of MGML's regular surveillance network program (SNP). Results from this program are presented along with the monthly sampling data in Appendix C.

2.2 Field Methods

Field measurements of pH, conductivity, redox and flow were taken at each station. The field meters were calibrated each day using fresh calibration standards. Flow measurements were made using the bucket and stopwatch method, or by measuring the cross sectional area and velocity. Where possible, the velocity was estimated using a bucket-wheel current meter. However, when flows were too small for a flow meter, or when the flow meter was not available, a floating object was used to estimate the velocity, and a correction factor was applied to account for differences between surface and average velocities.

Samples were collected following standard protocols recommended by the lab. Bottles for routine analyses, total metals and isotope analyses were rinsed three times prior to filling. The isotope samples were filled to the rim of the bottle to exclude any air bubbles. Samples for dissolved metal analyses and arsenic speciation were filtered in the field using 0.45 µm syringe filters. Samples for dissolved and total metals were preserved at the end of each day with laboratory provided nitric acid. The samples were refrigerated until they could be delivered to the lab.

Field duplicates and blanks were collected on a routine basis and submitted as blind samples to the laboratory.

2.3 Laboratory Analyses

To provide continuity with previous studies at the mine, the chemical analyses were completed by Taiga Laboratory in Yellowknife, and the isotopic analysis was carried out by the Environmental Isotope Laboratory at the University of Waterloo. The only exceptions were the Miramar samples which were sent to Miramar's Con Mine laboratory in Yellowknife. More recently, these have been completed at a commercial laboratory.

Table 2.1 lists the analyses included in each of the sampling programs.

Table 2.1: Summary of Analyses by Sampling Program

Parameter	Type Samples	Ditch and Sump Samples	Reconnaissance Survey	Miramar SNP Samples
Routine (pH, conductivity, acidity, alkalinity, chloride, sulphate)	X	X		X*
Nutrients (NH3, NO2+NO3, phosphate)	X	X		X*
Dissolved Metals (including As)	X	X		
Total Metals (including As)	X	X**		X*
Dissolved Arsenic			X	
Arsenic Speciation (AsO3, AsO4, monomethylarsenic acid, dimethylarsenic acid).	X	X		
Isotope Analyses (^{18}O, ^{2}H, ^{3}H, ^{13}C in DIC, ^{34}S in SO_4, ^{18}O in SO_4)	X			

Notes: * Limited Suite of Parameters
** Total metals were only included in the initial ditch and sump samples.

2.4 Data Compilation and Review

Laboratory data were compiled in a series of Excel spreadsheets. The results were reviewed for consistency with any previous results from the station, for internal consistency between dissolved and total metals, and consistency between duplicates. An ion balance was calculated as a check on the major element composition.

Equilibrium modelling was completed on some of the seepage sample results to determine the arsenic and iron speciation, and to identify any mineral phases that were close to saturation in the water. The modelling was completed using MINTEQA2 version 3.11 (Allison *et al*. 1991). The MINTEQA2 database was modified to incorporate the revised thermodynamic constants presented in Nordstrom *et al*. (1990) and additional data on arsenic geochemistry from Nishimura *et al*. (1988), Robbins (1985), and Krause and Ettel (1989). The results of the modelling are provided in Appendix F.

3 Water Types

3.1 Conceptual Model of Mine Inflows

A schematic cross section of arsenic sources and flow pathways in the Giant Mine is provided in Figure 3.1. Sources of clean water entering the mine workings from the ground surface are: direct infiltration, and Baker Creek water. Water also enters the underground workings from the Northwest Tailings Pond, the Polishing Pond, and possibly the North, South and Central Tailings Ponds. A small amount of deep saline groundwater flows laterally into the lower levels of the mine. Each of these sources of water has a unique isotopic signature, which is retained even after it has interacted with soils or rock in the groundwater system. Prior to February 2000 water from Great Slave Lake was used as service water, and was allowed to interact with the mine workings. Between February 2000 and December 2001, Great Slave Lake water was added to the mine water discharge line on surface to ensure that discharges from the mine reached the tailings pond before freezing. Since that time, it has been added to the mine water discharge line on the 750 level underground to maintain mine pumping capacity requirements. Therefore, the final discharge to the Northwest Tailings Pond is somewhat diluted by the lake water flows.

As the surface waters percolate downwards, they may interact with surface soils, bedrock, walls of the underground workings, waste rock and tailings backfill, or the arsenic chambers. These materials have geochemical characteristics that influence the water chemistry in different ways.

As discussed in Section 2, seep surveys were completed to characterize the different source of water in the mine. The program included isotope analyses to determine the origin of the different sources of water entering the mine, and chemical analyses to characterize the chemical evolution of the water before and after it had interacted with materials in the mine workings.

3.2 Seep Survey Results

Results from the seep surveys are provided in Appendix A, and summarized in Tables 3.1 to 3.6. The results are grouped according to the sources or types of water that they represent. Plots showing the isotopes tritium and deuterium versus oxygen-18 for each type sample are shown in Figures 3.2 and 3.3. Piper plots and radial plots showing the major ion composition of each water type are presented in Figures 3.4 and 3.5.

3.3 Geochemical and Isotopic Characteristics of Each Water Type

3.3.1 Direct Infiltration, Baker Creek and Great Slave Lake Water

The three sources of "clean" water entering the mine workings are direct infiltration, Baker Creek water, and Great Slave Lake[1] Water. The isotopic composition of precipitation in the Yellowknife area has been characterized by extensive studies at the Yellowknife airport and the nearby Pocket Lake (Fritz and Frape 1987, *in* FracFlow 1998). The mine water sampling programs have included a limited number of samples from Baker Creek and Great Slave Lake. Geochemical and isotopic results from these stations are summarized in Table 3.1.

The stable isotopes $\delta^{18}O$ and $\delta^{2}H$ results from the Yellowknife airport study were used to define the characteristic meteoric water line (MWL, shown in Figure 3.2) (Fritz and Frape 1987, *in* FracFlow 1998). $\delta^{3}H$ concentrations in the rain and snow samples were in the range of 10 T.U. to 40 T.U. (1989 to 1993 data), with lower values occurring in the winter months.

In contrast to direct precipitation, isotope data from Baker Creek shows a displacement (enrichment) from the MWL (Figure 3.2). The displacement is evidence of evaporation and reflects the relatively long residence time in small lakes in the upstream catchment area (Clark 2001). Baker Creek water is characterized geochemically by very low total dissolved salts concentrations, low calcium, magnesium, sodium and potassium concentrations. Bicarbonate is the dominant anion, with alkalinities in the range of 33 to 80 mg $CaCO_3$ eq/L. All of the samples contained a small amount of sulphate (13 to 44 mg/L), and trace amounts of ammonia (0.09 to 0.26 mg/L). Trace metal concentrations were low, with arsenic concentrations ranging from 0.0004 to 0.14 mg/L (the highest value was measured immediately prior to entering the lake).

Similar to Baker Creek, Great Slave Lake water has a strong evaporation signature and a low total dissolved salts content. However, lake water tends to have lower sulphate concentrations than Baker Creek water. The isotopic characteristics of the lake water are between those of Baker Creek and the Northwest Tailings Pond, and cannot be reliably distinguished from either. However, the lake water has the strong evaporation signature, and can be easily distinguished from modern precipitation. As mentioned previously this water is no longer allowed to interact with the mine workings.

Interaction between infiltrating water and contaminated soils was previously considered to be a major source of arsenic loading to the mine workings (Golder, 2001). A groundwater sample collected immediately adjacent the bag house (EBA BH3) had an arsenic concentration of only 1.7 mg/L (Table 3.1). However, arsenic concentrations in the shallow groundwater are expected to vary widely depending on the type and extent of contamination, and the soil conditions.

[1] Great Slave Lake Water is currently pumped into the mine, but is not allowed to interact with the mine workings. Seepage from Great Slave Lake to the mine workings has not been identified in the water sampling programs, and is not thought to be a significant source of water entering the workings.

As direct infiltration and creek water percolate downwards into the mine area, they interact with the mine workings and surrounding bedrock. This leads to increases in pH, alkalinity, sulphate, calcium, magnesium, sodium, potassium, ammonia and arsenic concentrations (Table 3.1). These changes reflect interactions with the soils, bedrock and mine workings. Arsenic concentrations in seeps from the extremities of the mine (i.e. 250 DH1 and 750 SP2) were generally very low (0.018 to 0.063 mg/L). However, arsenic concentrations in samples closer to C-Shaft, were slightly elevated (0.25 to 0.61 mg/L). Even after the geochemical changes, direct infiltration and creek water can still be distinguished by their isotopic composition (Figure 3.2). Based on the isotope data, the majority of seeps in the sampling program are derived from modern precipitation (i.e. direct infiltration of rain and snowmelt), while a few are characterized by a stronger evaporation signature similar to Baker Creek. Clark (2001) has indicated that the mine water are generally enriched in ^{18}O and ^{2}H relative to the average of annual precipitation, indicating that summer precipitation dominates the recharge.

As water moves even deeper into the system, chloride and sodium levels increase and alkalinity concentrations tend to decrease (Table 3.1), either due to mixing with water that has interacted with the Northwest Tailings Pond water (see next section) or mixing with deep groundwater. These changes result in a shift from the bicarbonate/sulphate dominated water to a sulphate/chloride type water (Figures 3.4 and 3.5). These deeper mine waters are difficult to distinguish from the Northwest tailings pond waters unless they are physically separated from them. However, they tend to have lower than average Na and Cl levels when compared to the Northwest Tailings Pond waters. The isotopic signature of these deeper waters is also less distinct due to mixing with different sources of water. However, most of the samples had isotopic compositions close to that of modern infiltration (Figures 3.2 and 3.3).

Geochemical modelling was completed on one of the seeps from the extremities of the mine (250-DH1). This seep had a relatively high iron content (7.6 mg/L), and a thick accumulation of iron oxide precipitates was noted downstream of this location. Based on the measured redox of –56 mV (144 mV standard reference), the modeling results indicate that the majority of the iron occurred as ferrous (Fe^{2+}) iron. Arsenate ($H_2AsO_4^-$ and $HAsO_4^{2-}$) were the dominant arsenic species. Saturation indices for barite, ferrihydrite, siderite, and two of the manganese oxides (birnessite and nsutite) were greater than 0, indicating they were close to, or above chemical saturation. The saturation index for calcite was close to 0 (-0.23), indicating this sample was close to equilibrium with calcite. The iron precipitates downstream of this location are consistent with precipitation of ferrihydrite following an increase in redox conditions. Freshly precipitated iron oxides are excellent scavengers for trace metals, and may be an important sink for dissolved arsenic species.

Table 3.1: Summary of Results from Baker Creek and Great Slave Lake

Station	Date	Routine Parameters			Major Ions						Nutrients		Metals				Isotopes		
		pH*	ORP*	TDS	Ca	Mg	Na	K	SO_4	Cl	NH_3-N	NO_3-N +NO_2-N	As-D	Sb-D	Fe-D	Zn-D	^{18}O in H_2O	^{2}H in H_2O	^{3}H in H_2O
Baker Creek																			
000SW3	6-Nov-00	6.55	70	144	24	8.5	5.22	1.99	13	4	0.09	-0.008	0.022		0.025	-0.01	-12.8	-123	12
000-SW3	9-May-00	7.07	185	86	11.5	4.03	2.58	1.26	44	2	0.091	0.068	0.028	0.003	0.27	-0.01	-14.1	-132	24
000-SW3a	11-Mar-98	6.60			19.5	6.1	4	1.98	34	8	0.257	0.185		3E-04	0.063	0.001			
000-SW4	9-May-00	7.41	165	153	24.6	7.21	5.44	2.01	44	7	0.247	0.226	0.14	0.06	0.14	-0.01	-14.6	-136	16
Great Slave Lake																			
000-SW5	6-Nov-00	5.94	110	40	5.51	1.72	1.81	0.87	4	2	0.066	-0.008	0.001	0.001	-0.03	0.01	-14.6	-133	30
000-SW1	28-Jan-98	6.10			5.96	1.46	1.99	0.545	5	4		0.066	0.033	0.091	-0.01	0.014	-15.2	-132	24
000-SW1	20-Sep-99	8.30			14.4	2.63	5.15	0.725	15	14	-0.005	0.228	0.009	0.013	-0.03	-0.01	-15.0	-137	31
000-SW1	17-Apr-00	7.01	580	34	0.55	0.2	1.9	0.58	5	3	-0.005	0.062	4E-04	0.002	-0.03	-0.01	-15.0	-136	27
000-SW1	9-May-00	6.84	610	32	6.97	1.81	2.14	0.85	-3	4	0.005	0.042	0.003	0.003	0.043	-0.01			
Contaminated Soils																			
EBA-BH3	17-Jul-01	6.66	262	2240	454	115	53	8.47	1060	52.4	0.012	0.232	1.69	0.355	-0.03	0.08			
Infiltration in Contact With Mine Walls																			
250-DH1	28-Jan-98	6.40			117	36.2	23	9.01	206	4		-0.008	0.041	0.005	1.9	0.024	-19.5	-155	18
250-DH1	21-Sep-99	7.10			180	62.5	19	10.7	367	5	0.074	0.015	0.063	0.012	4.9	-0.01	-19.5	-149	17
250-DH1	18-Apr-00	7.22	-80	482	86.8	33.4	32.2	3.7	147	19	0.134	-0.008	0.03	0.002	0.23	-0.01	-18.2	-153	9
250-DH1	9-May-00	6.80	<-80	789	157	51.4	28.8	4.12	303	15	0.115	0.039	0.023	0.02	5.42	-0.01	-19.0	-156	8
250-DH1	8-Nov-00	7.04	80	635	127	50	19.9	3.44	363	6	0.121	-0.008	0.019	0.002	0.011	-0.01	-18.8	-154	31
250-DH1	14-Jul-01	7.09	-56	729	128	49.2	25	4.07	301	10	0.094	0.013	0.013	0.022	7.6	-0.01	-18.8	-157	16
575-DH3	28-Jan-98	6.70			115	44.6	27.8	6.75	245	8		0.027	3	0.66	0.19	0.022	-19.5	-158	23
575-DH3	13-Mar-98	7.00			124	47.5	32.5	12.8	225	11	0.294	0.012		-0.01	0.12	0.001			
575-DH3	21-Sep-99	7.10			129	52.1	31.1	12.2	232	11	0.15	0.011	0.015	0.001	0.10	-0.01	-19.9	-152	21
575-DH3	3-May-00	8.87	<-80	725	136	54.6	24.5	5.22	121	7	0.149	0.009	0.019	0.002	0.13	-0.01	-19.2	-156	18
750-SP2	6-May-00	7.14	-60	1340	71.9	20.6	37.5	3.38	456	33	0.477	0.011	0.018	0.004	0.50	-0.01	-18.0	-147	22
750-SP2	7-Nov-00	7.32	-45	811	200	17.2	31	2.64	408	26	0.423	-0.008	0.018	0.002	0.24	-0.01	-18.5	-146	13
750-SP2	14-Jul-01	7.24	<-99	1120	277	21.8	39.6	3.48	474	34.1	0.589	0.012	0.015	0.079	0.38	-0.01	-18.2	-154	19
creek/walls																			
100-SP1	27-Jan-98	6.30			55.8	11.6	17.3	3.19	60	20		3.3	0.253	0.245	0.073	0.027			
100-SP1	8-May-00	6.74	135	226	50.2	10.2	11	3.54	59	11	5.5	1.34	0.681	0.215	0.10	0.021	-15.6	-140	9
100-SP1	8-Nov-00	7.41	95	378	59	17.2	30.5	4.75	132	44	0.064	0.173	0.662	0.429	-0.03	0.015	-13.1	-128	13
infiltration/walls/SO_4 (backfill?, chambers?)																			
250-SP2	8-May-00	6.89	125	1560	311	90.6	37.6	12.7	686	48	-0.005	0.476	0.456	0.927	-0.03	0.478	-21.5	-170	8
250-SP2	8-Nov-00	7.42	310	1810	316	101	53.1	13.3	1566	83	0.084	0.042	0.357	1.07	-0.03	0.572	-18.9	-153	22
250-SP2	13-Jul-01	7.52	266	1430	300	90.8	29.2	11.7	918	33.6	0.006	1.51	0.392	0.846	-0.03	0.334	-20.2	-159	16
A-shaft area (southerly)																			
575-DH1	6-Mar-98	8.10			195	78.4	114	9.8	625	122	-0.002	0.239		0.38	-0.01	0.006	-16.4	-148	25
575-DH1	31-Mar-00	8.20	n/a	1390	174	85.6	121	7.88	666	101	-0.005	19.6	0.529	0.297	-0.03	-0.01	-17.1	-151	14
575-DH1	3-May-00	7.67	100	1280	181	77	113	7.41	563	91	-0.005	16.3	0.642	0.389	-0.03	-0.01	-17.3	-148	25
575-DH1	9-Nov-00	8.12	130	551	109	37.2	24.8	3.36	310	13	0.052	0.297	0.493		-0.03	-0.01	-18.5	-152	20

Prepared by: KSS
Checked by: DBM

3.3.2 Northwest Tailings Pond Seepage

The Northwest Tailings Pond is a potential source of arsenic and water entering the mine workings. Processing at the Giant mine ended in December 1999. Therefore, some of the samples in the database reflect conditions during active processing, while others reflect gradual removal of the active processing water, discharges from the underground workings, and modern precipitation which falls within the catchment area of the pond. The isotopic composition of the Northwest Pond samples falls between typical lake or stream values and typical precipitation values. However, as shown in Figures 3.2 and 3.3, the data are sufficiently clustered that they fall into a group of their own.

Samples collected from the pond and from a shallow well in the pond tended to have elevated sodium, chloride, ammonia, nitrite and arsenic concentrations (Table 3.2). As the Northwest Tailings Pond water infiltrates into the mine, interactions with the rock result in some minor changes in geochemical composition. These include an increase in alkalinity and potassium, and a decrease in average nitrite and arsenic concentrations. Even at depth, NW Tailings water can be distinguished from the waters originating from direct infiltration by higher chloride levels and the predominance of chloride and sulphate over bicarbonate.

The 2001 samples from the Northwest Tailings Pond (000-SW2) contain somewhat higher arsenic concentrations than samples from previous years, reflecting an increased proportion of water originating from the mine workings. Two of the seeps (425-DH2 and 575-SP1) below the Northwest tailings pond also had somewhat higher arsenic concentrations in the 2001 samples, likely due to higher arsenic concentrations in the pond during the same period.

Geochemical modeling was completed on the 2001 samples from the pond (000 SW2), and one of the underground samples (575-SP1). The results indicate that both the iron and arsenic occurred in the oxidized state (Fe^{3+}, and $HAsO_4^{2-}$), and that both samples were saturated with respect to barite and ferrihydrite. The pond samples were supersaturated with respect to calcite, while the underground samples were close to equilibrium, reflecting a slight drop in pH. The underground samples were also supersaturated with respect to crystalline scorodite ($FeAsO_4 \cdot 2H_2O$). Precipitation of scorodite, and/or interactions between arsenic in the pond water, and iron oxides in the tailings solids may explain the somewhat lower arsenic concentrations in the underground samples.

3.3.3 Polishing Pond Seepage

The polishing pond is another source of water entering the mine workings. This water is represented by a single sample station located underground (575-SP2), which has lower chloride and arsenic concentrations (Table 3.3), but is otherwise similar in composition to water from the Northwest Tailings Pond.

Table 3.2: Summary of Results from the Northwest Tailings Pond

Station	Date	Routine Parameters			Major Ions						Nutrients		Metals				Isotopes		
		pH*	ORP*	TDS	Ca	Mg	Na	K	SO_4	Cl	NH_3-N	NO_3-N +NO_2-N	As-D	Sb-D	Fe-D	Zn-D	^{18}O in H_2O	^{2}H in H_2O	^{3}H in H_2O
Northwest Tailings Pond - Surface Samples																			
000-SW2	11-Mar-98	8.30			263	61.8	181	4.36	712	323	12.6	0.483		1.61	0.793	2.53			
000-SW2	20-Sep-99	8.10			338	81.2	148	7.05	884	241	8.88	12.9	11.4	3.29	-0.03	-0.01	-14.4	-128	19
000-SW2	17-Apr-00	7.35	295	1370	179	36.5	133	7.21	322	307	2.17	9.13	5.95	0.381	-0.03	0.036	-15.9	-141	17
000-SW2	9-May-00	7.98	235	1090	196	37	103	6.77	282	240	2.09	8.79	7.95	0.683	-0.03	0.023	-16.4	-142	17
000-SW2	16-Nov-00	7.27	150	1120	190	43.3	102	8.13	366	190	1.19	8.8	7.37		-0.03	0.047	-15.6	-141	20
000-SW2	9-Aug-01	8.27	171	1450	210	49.8	133	9.25	262	286	0.093	9.87	11.6	1.36	-0.03	-0.01			
Golder NWP	1-Aug-00				218	52.4	148	13.3	511	291		6.44	4.4	1.6	0.054	0.01			
Northwest Tailings Pond - Underground Samples																			
250-SU1	18-Apr-00	7.62	166	1590	287	84.6	173	12.9	600	229	5.13	0.476	0.273	0.258	-0.03	-0.01	-15.9	-145	10
250-SU1	6-May-00	7.68	75	1610	249	70.8	145	14	456	234	5.19	0.403	0.366	0.349	0.11	-0.01	-16.5	-144	18
250-SU1	7-Nov-00	7.64	70	1440	199	6.48	122	11.9	561	198	3.92	0.012	0.38	0.212	0.16	-0.01	-16.5	-145	17
250-SUI	14-Jul-01	7.66	89	1410	202	66.3	149	13.7	472	221	5.58	0.191	0.408	0.288	0.21	-0.01	-16.5	-145	17
425-DH2	7-Mar-98	6.90			244	70.4	183	13.1	640	237	5.58	0.064		0.116	0.52	0.004	-16.3	-143	27
425-DH2	21-Sep-99	7.60			243	76.1	159	12.9	671	230	6.59	0.038	0.807	0.227	1.8	0.012	-16.4	-138	40
425-DH2	2-Apr-00	7.80	n/a	1590	230	65.1	164	14.5	621	252	7.78	-0.008	1.27	0.35	3.1	-0.01	-15.8	-141	24
425-DH2	6-May-00	7.16	110	1640	271	70.3	154	15.4	583	242	8.38	0.158	0.736	0.89	0.28	0.026	-16.4	-144	21
425-DH2	14-Jul-01	6.92	256	1520	234	63.2	158	13.9	478	256	0.268	9.76	6.86	1.86	-0.03	0.079	-15.2	-139	26
575-SP1	6-May-00	7.34	130	1570	251	61.9	137	16.9	393	262	6.67	12.8	3.41	1.54	-0.03	0.014	-16.7	-145	23
575-SP1	7-Nov-00	7.52	90	1740	243	74.2	138	15.8	835	263	5.29	0.024	5	1.42	-0.03	-0.01	-14.7	-133	17
575-SP1	14-Jul-01	7.29	224	1410	234	68	137	11.5	405	258	1.15	5.34	6.66	2.05	-0.03	-0.01	-14.8	-135	21
750-SP1	8-Mar-98	7.20			323	76.6	177	8.52	932	208	9.61	0.162		1.66	0.013	0.004	-16.0	-140	25
750-SP1	1-Apr-00	7.80	n/a	2250	348	97.7	198	21.9		311		4.41					-15.0	-143	30
750-SP1	3-May-00	7.14	90	2150	353	95.8	192	21.5	1080	327	9.22	8.13	2.2	2.5	0.03	-0.01	-15.7	-141	24
750-DP1	9-Nov-00	8.00	110	1800	268	69.6	144	15.7	1229	211	6.06	1.6	2.25		0.16	-0.01	-16.4	-139	34

Prepared by: KSS
Checked by: DBM

Table 3.3: Summary of Results from the Polishing Pond

Station	Date	Routine Parameters			Major Ions						Nutrients		Metals				Isotopes		
		pH*	ORP*	TDS	Ca	Mg	Na	K	SO_4	Cl	NH_3-N	NO_3-N +NO_2-N	As-D	Sb-D	Fe-D	Zn-D	^{18}O in H_2O	^{2}H in H_2O	^{3}H in H_2O
575-SP2	8-May-00	7.39	115	1560	262	79	101	14.1	499	144	2.63	0.954	0.652	0.204	0.26	-0.01	-17.2	-150	28
575-SP2	16-Nov-00	7.27	190	1510	292	82.6	108	11.4	567	154	1.64	0.876	0.633		-0.03	0.014	-16.8	-145	9
575-SP2	12-Jul-01	7.52	276	1610	275	81.4	120	14.9	653	189	2.48	3.38	0.86	0.262	-0.03	-0.01	-16.3	-147	19

Prepared by: KSS
Checked by: DBM

3.3.4 Backfill Seepage

Backfilled tailing and waste rock are potential sources of arsenic in the underground mine. Prior to 2001, there was only one sample (1100-CH1) that was thought to represent tailings backfill. However, this sample was below the arsenic chambers, and may have been influenced by seepage from the chambers. An additional eight samples were collected in 2001, including four samples from stopes that contained tailings backfill, and four samples from stopes that may have contained waste rock backfill. The samples representing tailings backfill were re-sampled in 2004.

The results indicate that seepage from both the tailings and waste rock backfill is characterized by higher sulphate and lower chloride and ammonia concentrations compared to samples from the Northwest Tailings Pond (Table 3.4). Arsenic concentrations in the backfilled tailings samples ranged from 0.09 to 20 mg/L (median of 4 mg/L), while arsenic concentrations in the backfilled waste rock ranged from 0.23 to 1.63 mg/L. In contrast, samples from 1100-CH1 had arsenic concentrations in the range of 40 mg/L, and reflects seepage from backfilled stopes that have been influenced by seepage from the arsenic chambers.

In general, flows during the January 2004 sampling were much lower than in the July/August 2001 samples. However, the chemistry showed little seasonal variability. One exception was 950-DH4, which was significantly higher in the 2004 data. It is not clear whether this increase is due to a change in flows in the mine, which could have led to more influence from the arsenic chambers, or whether this reflects variability in the backfill.

The isotopic signatures of seepage samples from the backfilled tailings and one of the samples from the backfilled waste rock samples were similar to that of modern precipitation. Seepages from the other three waste rock samples were isotopically similar to samples from the Northwest Tailings Pond.

Geochemical modeling was completed on one of the tailings backfill samples (950-CH2). Based on the measured redox of 224 mV (standard reference of 424 mV), both the arsenic and the iron occurred in their oxidized form (arsenate and ferric iron respectively). This sample was saturated with respect to calcite and ferrihydrite, and close to equilibrium with respect to barite, gypsum, and crystalline scorodite.

Table 3.4: Summary of Results from Backfilled Stopes

Station	Date	Routine Parameters			Major Ions						Nutrients		Metals				Isotopes		
		pH*	ORP*	TDS	Ca	Mg	Na	K	SO_4	Cl	NH_3-N	NO_3-N +NO_2-N	As-D	Sb-D	Fe-D	Zn-D	^{18}O in H_2O	^{2}H in H_2O	^{3}H in H_2O
Tailings Backfill																			
1250-SP1	17-Jul-01	7.7	216	2710	501	120	101	20.8	1360	90.3	0.616	10.2	0.399	1.35	0.079	3.312			
1250-SP1	21-Jan-04			2640	535	103	99.1	14.5	1370	127	0.501	2.49	0.091	0.424	0.154	1.36			
950-CH2	21-Aug-01	8.02	172	1420	267	58.4	46.2	5.89	733	23	0.022	10	5.41	0.615	-0.03	0.706	-18.5	-151	15
950-CH2	21-Jan-04			1340	254	67	50.7	5.7	814	27.1	0.024	7.58	6.86	0.464	-0.05	1.33			
950-CH3	21-Aug-01	8.29	172	945	136	53.1	24	5.72	355	14	-0.005	4.41	2.03	0.129	-0.03	0.01	-18.8	-155	15
950-CH3	21-Jan-04			768	135	53.7	31.8	6.1	358	21.5	0.021	7.14	2.55	0.146	-0.05	0.027			
950-DH4	21-Aug-01	8.02	163	864	148	54.2	25.3	5.97	413	18	0.038	7.28	6.61	0.403	-0.03	-0.01	-18.3	-152	15
950-DH4	21-Jan-04			1130	202	72.4	38.8	6.7	632	27.5	0.022	13.6	20	0.633	-0.05	0.031			
Tailings Backfill with Chamber Influence																			
1100-CH1	23-Jan-01	7.60	n/a	2670	441	118	70.3	8.6	829	37.9	0.045	138	41.5	2.1	0.03	1.52			
1100-CH1	17-Jul-01	7.95	228	1760	314	112	68.8	79.9	772	29	-0.005	61.4	42.1	2.35	-0.03	0.961	-18.5	-154	-6
WR Backfill																			
1250-CH1	17-Jul-01	8.09	224	2090	384	119	101	15.3	1020	85.1	-0.005	27.4	1.55	3.08	-0.03	0.337	-16.4	-146	31
250-CH1	13-Jul-01	7.66	247	1490	295	81.8	24.4	11.7	896	27.5	0.01	2.78	0.233	0.874	-0.03	0.211	-20.2	-162	15
575-CH1	14-Jul-01	8.17	218	1760	260	119	149	16.5	759	197	-0.005	9.18	0.353	0.869	-0.03	0.018	-16.1	-142	13
950-CH1	21-Aug-01	7.42	179	2000	314	97.3	106	12.5	1060	133	0.009	18.9	1.63	0.647	-0.03	0.073	-16.9	-142	17

Prepared by: KSS
Checked by:

3.3.5 Arsenic Chamber Seepage

Seepage from the arsenic chambers is characterized by very high arsenic and antimony concentrations. Only those samples with arsenic concentrations greater than 2000 mg/L were included as "type" samples. These samples tended to have slightly acidic pH's (5.75 to 6.65), high TDS, magnesium, sulphate, and phosphate (may be a chemical interference) and slightly elevated ammonia concentrations (Table 3.5). Arsenic concentrations were in the range of 3500 to 4000 mg/L, and antimony concentrations were between 13 and 308 mg/L. The arsenic speciation data showed considerable spatial and temporal variation, with arsenite dominant in some samples and arsenate dominant in others. However, the arsenic speciation data is somewhat suspect in that it does not consistently add up to 100% of the dissolved arsenic. Lead, nickel and titanium were also significantly elevated compared to other samples in the mine.

Isotope compositions were typical of direct infiltration, with one exception below Chamber C212, where the water is more characteristic of Baker Creek. As indicated in Clark (2001), chamber waters have a wide range of ^{18}O, and no correlation with ^{2}H. This suggests that the waters have been modified by exchange with oxygen in the arsenic trioxide dust during hydration reactions in the chamber.

As part of the remediation work associated with bulkhead 15 (chamber B208), two water samples were collected from behind the bulkhead. These samples had arsenic concentrations of 5320 and 4340 mg/L respectively, which was much higher than typically observed in seepage from the same bulkhead (250-SP3). The samples were not filtered, therefore they may have contained some particulates. Equilibrium modeling indicated that these samples were still below saturation with respect to the arsenic trioxide minerals, suggesting that concentrations in a flooded arsenic chamber could be even higher than the above values.

Geochemical modeling was completed on two of the high arsenic seeps (250-sp1 and 575-dh1). In both cases, the arsenic species dominated the ionic composition, and a reasonable ion balance could not be obtained unless the redox was lowered to a value of approximately 50 mV (compared to standardized measured values of <349 and 234 mV respectively). The balanced values indicated arsenite was the dominant ion, with values of approximately 3000 mg/L, but that arsenate was still significant with values of approximately 1000 mg/L. The iron was present as ferrous iron (Fe^{2+}). Barite, gypsum, manganese oxides (birnessite and nsutite), and several antimony oxides were saturated or close to equilibrium. Saturation indices for arsenolite and claudetite were –2.0 and –1.8 respectively, indicating that the waters were below saturation with respect to arsenic trioxide minerals. Saturation indices for calcium, magnesium, and iron arsenates were also well below saturation. However, field observations indicated that there was a white to light pink precipitate at all of these seepage sites. Chemical analyses (SRK 2005b), indicate that these precipitates were comprised of calcium, magnesium, and arsenic, suggesting a calcium or magnesium arsenate or arsenite mineral is the likely form. It is therefore thought that the thermodynamic database is incomplete for these species.

Table 3.5: Summary of Results from Arsenic Chambers

Station	Date	Routine Parameters			Major Ions						Nutrients		Metals				Isotopes		
		pH*	ORP*	TDS	Ca	Mg	Na	K	SO_4	Cl	NH_3-N	NO_3-N +NO_2-N	As-D	Sb-D	Fe-D	Zn-D	^{18}O in H_2O	^{2}H in H_2O	^{3}H in H_2O
250-SP1	2-May-00	6.65	60		152	144	126	14.7					3540	12.7	0.48	0.043	-17.8	-157	7
250-SP1	9-Nov-00	6.37	150	7560	241	186	98.6	14.9	1213	150	3.98	-0.008	4210		5E-04	0.057	-17.2	-152	-6
250-SP1	16-Jul-01	6.6	<149	3870	366	206	125	16.9	524	167	5.98	0.008	4180	14.3	0.683	0.042	-17.8	-156	8
250-SP3	15-May-00	5.91	175	6470	204	107	37.5	4.75	968	41	0.633	0.445	2980	72.1	0.347	0.351	-21.7	-169	-6
250-SP3	8-Jun-00	5.75	145	4967	311	121	41.6	11.4	9	69	0.282	0.164	2280	39.6	0.18	0.419			
250-SP3	16-Nov-00	6.08	180	2210	183	231	69.2	15.4	1184	84	0.883	-0.008	3410		0.39	0.153	-18.8	-157	11
250-SP3	12-Jul-01	6.2	298	3700	430	176	50.3	16.1	935	53.8	0.475	-0.008	2830	54.7	0.31	0.098	-19.9	-159	15
425-DH1	2-May-00	6.14	70	7870	245	147	66.2	14.4	1450	59	-0.005	-0.008	3510	88.4	0.45	0.012	-20.6	-164	17
575-DH2	28-Jan-98	6.30			468	585	104	34.6	2882	67		-0.008	2120	143	0.81	0.02	-19.0	-153	16
575-DH2	13-Mar-98	6.40											3620	308	0.85	0.006			
575-DH2	21-Sep-99	6.60			505	565	102	37.7	2490	70	2.84	-0.008	3960	194	0.69	0.016	-19.4	-152	16
575-DH2	19-Apr-00	6.54	0	10300	235	607	106	28	2980	60	3.1	-0.008	3530	199	0.78	0.015	-17.0	-156	13
575-DH2	4-May-00	6.43	-20	9760	216	612	109	29.9	3610	60	2.81	-0.008	3460	291	0.73	0.012	-17.7	-156	12
575-DH2	16-Jul-01	6.4	34	6830	415	555	104	26.7	587	62.4	2.98	-0.008	2810	194	1.1	0.012	-16.8	-155	14
575-150N	12-Jul-01	6.62	126										3040						

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Checked by: DBM

Several other samples below the arsenic chambers contained high arsenic concentrations. Results from these samples are included in the complete database in Appendix A. These samples reflect a mixture of clean infiltration, and seepage from the arsenic chambers. In general, arsenic concentrations in these samples tended to decrease with depth. Arsenic speciation data for these samples indicates that arsenate is the dominant species.

3.3.6 Deep Groundwater

Deep groundwater in the mine is expected to include a combination of all of the previously described water types and deep regional groundwater from the surrounding rocks. Studies at the nearby Con Mine and earlier work by Douglas *et al*. (2000) indicate that the regional groundwater is comprised of a mixture of glacial meltwater and brine. Deep samples at the Giant Mine are likely a combination of these waters and modern water that has moved through the mine workings.

Deep groundwater is easily distinguished from other waters in the mine by a very high total dissolved salts content, high calcium, sodium and chloride concentrations (Table 3.6). Bromide, iodide, barium, lithium, selenium and strontium are also significantly elevated compared to other samples from the mine workings. However, despite the very high concentrations, the deep groundwater is still much more dilute than the brines measured in the deeper portions of the Con mine (Clark 2001). Arsenic concentrations appear to be inversely correlated with salinity, suggesting that the arsenic content of the deep groundwater is due to mixing with water originating from within the mine (Clark 2001).

Geochemical modeling was completed on one of the stronger brine samples (2000 DH2). The results indicate these samples are close to equilibrium, or saturated with respect to barite and manganese oxides (birnessite and nsutite). However, despite the very high dissolved solids content, most other minerals were well below saturation. This suggests the brine has been slightly diluted by a fresh water source.

Most of the samples from 2000 DH1 had an isotopic composition that was similar to the modern precipitation samples. Sample 2000 DH2 had a higher deuterium excess, ploted above the meteoric water line and close to a brine mixing line defined in an earlier regional study (Fritz and Frape 1987, *in* FracFlow 1998), suggesting that it may be closer in composition to the regional deep groundwater. This sample also had the highest TDS content. The isotope ^{34}S in SO4 was also characteristic of this water type, and was similar to brines in the Con Mine, with values ranging from 17.6 to 22.5 ‰.

Table 3.6: Summary of Results from Deep Groundwater

Station	Date	Routine Parameters			Major Ions						Nutrients		Metals				Isotopes		
		pH*	ORP*	TDS	Ca	Mg	Na	K	SO_4	Cl	NH_3-N	NO_3-N +NO_2-N	As-D	Sb-D	Fe-D	Zn-D	^{18}O in H_2O	^{2}H in H_2O	^{3}H in H_2O
Deep gw (brine)																			
2000-DH2	5-May-00	6.60	<-80	47200	7530	525	5810	31.6	766	23700	0.052	6.5	1.49	0.114	4.9	-0.01	-20.9	-152	9
2000-DH2	20-Aug-01	6.31	--100	50800	8800	683	8430	74.7	110	30900	-0.005	0.008	0.036	0.003	9.6	-0.01	-21.8	-151	2
Deep gw (recharge)																			
2000-DH1	5-May-00	6.96	-80	10800	2370	70.1	1570	12.7	492	5610	0.26	0.07	11	0.055	0.38	-0.01	-19.9	-155	19
2000-DH1	6-Nov-00	7.11	100	10600	1710	67.4	1280	15.7	301	4900	0.377	-0.008	11		0.39	-0.01	-19.9	-157	14
2000-DH1	30-Jan-98	7.00			1960	61.4	1200	18.5	449	5460		0.038	14.4	0.04	0.88	0.004	-20.3	-158	22
2000-DH1	22-Sep-99	7.20			2100	57.7	1500	19	383	5480	0.128	0.109	12.5	0.073	0.38	-0.01	-20.2	-153	24
2000-DH1	19-Apr-00	7.00	-20	12300	1640	62.7	1390	22.2	527	5210	0.694	0.089	8.99	0.052	0.07	6.65	-19.6	-155	10
2000-DH1	20-Aug-01	7.34	-80	10400	1900	68.6	1540	18	447	5440	0.104	-0.008	5.31	0.021	0.56	-0.01	-20.0	-155	15

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3.4 Implications for Source Concentrations

The results of the seepage samples provide a reasonable indication of the concentrations that can be expected in areas of the mine that will remain above the water table. Testing of the solids (SRK 2005b) has indicated that the wall rock, waste rock, and backfilled tailings has a negligible potential for acid generation. Therefore, it is unlikely that these concentrations would change significantly over time. The seepage data is therefore suitable to use as source concentrations for unsaturated flow conditions in the mine. A summary of the seepage data for each of the mine components is provided in Table 3.7. These results will be used in conjunction with results from the solids characterization program (SRK 2005b) to derive load estimates for current and post-closure conditions.

Table 3.7: Summary of Seepage Data for Sources Above the Water Table

Mine Component	Source	As (mg/L)
Soils, Bedrock, and Mine Walls	Table 3.1	0.05
Northwest Tailings Pond	Table 3.2	5
South, Central and North Tailings Ponds	Note 1.	5
Polishing/Settling Ponds	Table 3.3	1
Backfilled Tailings	Table 3.4	5
Backfilled Waste Rock	Table 3.5	1.5
Arsenic Chambers	Table 3.6	4000

Notes: 1. Seepage from the South, Central, and North Tailings areas are assumed to the same as the Northwest Tailings Pond.

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4 Seasonal and Spatial Distribution of Flows and Arsenic Loading in the Underground Mine

4.1 Overview

As discussed in Section 2, several of the sampling programs included collection and analysis of samples from ditches and sumps in the mine. The purpose of this sampling was to develop a water and load balance for the underground workings. The water and load balance was used to estimate the total arsenic load from the mine under current flow conditions and to determine the main sources and pathways for arsenic loading within the mine. Regular sampling of the overall mine discharges provided information on seasonal variations in flows and concentrations. The results of the mass balance can also be used to evaluate other interim water management strategies, such as flooding the lower levels of the mine, or separate collection and pre-treatment of high arsenic flows within the mine. However, an evaluation of these other interim strategies has not been included in this report.

A water and load balance was initially attempted using the results of the 1999 and 2000 ditch and sump sampling programs. The water balance could not be closed for several reasons, including limited information on the overall mine discharges, lack of data on some of the flows, differences in sampling times, and inaccuracies in flow estimation caused by variations in pumping. The work plan for the 2001/2002 sampling programs therefore recommended monthly sampling of the overall mine discharge, a reconnaissance survey of flows and arsenic concentrations in the mine to ensure all of the flow pathways were identified, and a single campaign of ditch and sump sampling over a short time period. The ditch and sump sampling program was repeated in May 2003 to determine whether there were any seasonal differences in the distribution of flow and arsenic loadings within the mine. The results of the 2001 and 2003 programs are provided in the following sections

4.2 Results

4.2.1 Reconnaissance Survey

Results from the reconnaissance survey are provided in Appendix B. As mentioned previously, the purpose of the reconnaissance level survey was to map major flows and arsenic concentrations throughout the mine. The results from the survey are summarized in Appendix B. These results were used to design the 2002 ditch and sump monitoring program.

4.2.2 Monthly Samples

Results from the monthly sampling programs are provided in Appendix C.

Samples collected in from December 2001 to August 2004 from the main discharge from the underground mine (SNP 43-17) typically had neutral pH, conductivities of approximately 3000 μS/cm, alkalinities of approximately 130 mg $CaCO_3$ eq/L and total suspended solid (TSS)

levels of approximately 50 mg/L. The major ions were predominantly calcium, sodium, sulphate, and chloride, with lesser amounts of bicarbonate and magnesium. The average arsenic concentration was 17 mg/L and the maximum arsenic concentration was 83 mg/L. The arsenic occurred primarily as arsenate. Antimony (0.59 mg/L)[2], cobalt (0.05 mg/L), copper (0.017 mg/L), iron (median 0.07 mg/L), nickel (0.04 mg/L), and zinc (0.092 mg/L) concentrations were somewhat elevated. The discharge at South Pond (SNP-43-18) had an average arsenic concentration of 30 mg/L in 2002 and an average arsenic concentration of about 10 mg/L in 2003.

The data quality review indicated that there were a few issues with poor ion balances. There were also two samples where the reported arsenic values were anomalously low. None of the laboratory issues could be resolved because the results were not available from the lab until well after the holding times had been exceeded. The suspect data is flagged in the database to indicate the specific concerns. However, the database as a whole is sufficiently robust that these issues do not adversely affect the conclusions of the study.

The results were used to evaluate seasonal trends in flows and arsenic loads from the mine. These are discussed in Sections 4.3 and 4.4.

4.2.3 Ditch and Sump Sampling

Results from the ditch and sump sampling programs are provided in Appendix D.

The 2002 winter and 2003 freshet results were the basis for the water and load balances presented in the following sections, and in Appendix E. The earlier results were used to supplement these where necessary.

The data quality review for the 2003 data indicated that several samples (000-SW6-4, 000-SW6-5, 100-SU1, 750 DF2, 950-DF3, 950-DF4, 1300-SU1, and 1650-RSI) had poor ion balances and concentrations of one or more major ion constituents that were anomalously low compared to previous samples from those locations. This indicated there were likely errors in the major ion analyses. Two other samples (1650-RSI and 1650-SU2) also had poor ion balances, but more typical major ion concentrations. In those cases, arsenic was a major ionic component, concentrations were anomalous compared to previous samples, and more typical concentrations would have given a better ion balance, suggesting that the arsenic concentrations may not have been accurately quantified by the laboratory. Neither of the above issues could be resolved due to holding time issues. Suspect data were included in the assessment, but were flagged to indicate that there may be problems. The concerns over the analytical data were resolved by substituting data from the earlier programs where necessary to close the mass balances. Although the data quality issues did introduce some uncertainties in interpretation of the data, closure of the mass balances ensured that the conclusions of the study were not adversely affected.

[2] Average concentrations are shown in brackets except where indicated.

4.3 Flows

4.3.1 Monthly Discharges from the Mine

Water from the underground mine is discharged to the Northwest Pond throughout the year and also to the South Pond during some periods in the summer months. The discharge to the Northwest Pond includes a small amount of water from Great Slave Lake used for domestic and sanitation purposes in the Townsite and mine Dry. A small additional amount of lake water is used during winter, to maintain flow rates and prevent freezing of the fresh water supply line.

Results from the monthly monitoring program and the SNP monitoring program indicated that discharge flow rates to the Northwest Pond were variable, ranging from 400 L/min to 3500 L/min (Figure 2a), while average monthly flows (summer only) to the South Pond were on the order of 800 to 1000 L/min. Higher flows to the Northwest Pond were typically observed during freshet, and lower flows were observed during the winter months. However, the peaks were muted and spread out compared to the surface hydrograph, reflecting storage of water at various locations within the mine.

The total monthly readings, excluding the contribution from Great Slave Lake (Figure 2b) are more useful for evaluating true seasonal changes in flow from the mine. Winter low flows were approximately 1300 L/min, while average monthly flows during freshet were approximately 2600 L/min. The overall average flows from the mine in 2002 and 2003 were 1692 and 1675 L/min respectively. Since 2003 is considered to be a more typical year in terms of precipitation at the site, 1675 L/min (2412 m^3/day) should be used to represent average flow from the underground mine in the water and load balance for the site.

Total flows to the Northwest Pond include Great Slave Lake water. Therefore this source should be considered in the water balance for the Northwest Pond. Average GSL flows in 2002 were 492 L/min in 2002, and 139 L/min in 2003. Modifications were made to the fresh water supply system in late 2002, which substantially reduced the required GSL input.

4.3.2 Flow Pathways

Water in the underground workings is collected in a series of ditches and is directed by gravity flow to sumps at the 950 level, 1300 level and 2000 level. Until December 2001, water in the 950 sump was pumped to the 575 sump, and then to surface via an 8” line, water in the 2000 sump was pumped to the 1300 level, and combined flows from the 1300 sump and the 2000 sump were pumped via a 10” line to the ground surface. The combined flows were then routed to the Northwest Tailings pond via the pipeline previously used for tailings discharge. The flow pathways for the earlier flow configuration are shown in Figure 4.2.

In December 2001, the pumping configuration was changed to simplify the operations, and reduce the potential for freezing between the point of discharge and the Northwest Tailings pond. All of the mine water is now directed to the 1300 sump, pumped to the 750 level, piped north along the 750

level to the Supercrest area, and then pumped directly to the Northwest pond. Water from Great Slave Lake is also pumped to the 750 level, where it joins water from the 1300 sump. Figures 4.3 and 4.4 show the flow configurations as understood during the 2002 winter and 2003 freshet surveys. Figures 4.5 and 4.6 show simplified flowsheets representing this flow configuration for winter and freshet conditions.

As shown in Figure 4.3 and 4.4, there are four main pathways for flow to the 1300 sump. Flowsheets showing the flows at key locations along each of these pathways for winter and freshet conditions are provided in Figures 4.7 to 4.12. A summary of the flows by pathway and area is provided in Table 4.1.

Table 4.1: Summary of Flows by Pathway and Area

Flowpath	Winter Survey (February 2002)				Freshet Survey (May 2003)			
	South (L/min)	Central (L/min)	North (L/min)	Total (L/min)	South (L/min)	Central (L/min)	North (L/min)	Total (L/min)
1	0	230	0	230	0	719	0	719
2	84	168	35	287	174	272	155	601
3	156	1	598	755	0	1	1061	1062
4	0	14	156	170	0	0	113	113
Total	240	413	789	1442	174	992	1329	2495

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Flows along each pathway can be described as follows:

- Pathway 1 (Figures 4.7 and 4.8) is from the 2000 sump. In the winter survey, these flows represented approximately 16% of the flow to the 1300 sump. In the spring survey, these flows represented approximately 29% of the flow to the 1300 sump. The majority of these flows originate between C-Shaft and 1000 North (latitude on the underground geology grid). However, the source of the flows measured at 1650-RM1 (on the ramps) and 2000-SB1 (the shaft bottom) are not known, and may have originated from outside of the central area of the mine. Flows in the freshet survey were approximately three times higher than in the winter survey.
- Pathway 2 (Figures 4.9 and 4.10) includes the combined flow from the 575 and 950 sumps. These represented approximately 20% and 24% of the flow to the 1300 sump in the winter and freshet surveys respectively. Approximately 29% of these flows were from south of C-shaft, 45 to 59% were from C-shaft to 1000 North, and 12 to 26% were from North of 1000 North. Flows in the freshet survey were approximately two times higher than in the winter survey.
- Pathway 3 (Figure 4.11 and 4.12) represented 52% and 43% of the flow to the 1300 sump in the winter and freshet surveys respectively. During the winter survey, 79% of this flow originated from north of 1000 North, approximately 21% entered from the south of C-Shaft,

and a small amount (<1%) was from the central portion. During the freshet survey, essentially all of this flow was from north of 1000 North due to the seasonal use of the 750 level bulkhead to hold back flows from the Southern portion of the mine. Flows during the freshet survey were 140% higher than during the winter survey.

- Pathway 4 (Figure 4.11 and 4.12) represented 12% and 5% of the flow to the 1300 sump during the winter and freshet surveys respectively. The winter survey indicated that the majority of this flow (92%) enters the mine from north of 1000 N, with the remainder from the central portion of the mine. The distribution of flows along this pathway were not quantified during the freshet survey.

Total flows from each sector were:

- 174 to 240 L/min or 7 to 17% from south of C-Shaft
- 413 to 992 L/min or 29 to 40% from C-Shaft to 1000N
- 789 to 1329 L/min or 53 to 55% from north of 1000N

High flows in the north were likely due in part to the Northwest Pond, which was close to maximum annual levels during both surveys. However, previous observations between 1000 N and the Supercrest area indicate there are inflows to the mine in many other areas during freshet. Relatively low flows from the south end of the mine during the freshet survey were due in part to the seasonal closing of the 750 Level bulkhead valve which controls flow from this area. Low flows during the winter surveys may be due to retardation of flow due to ice and cold ground conditions which have been observed in that area (*pers comm*. John Brodie).

4.3.3 Water Balance

Winter Survey

As described above, the combined flows to the 1300 sump were approximately 1442 L/min. Average flows from Great Slave Lake during the sampling period were 744 L/min. Combined flows measured at the discharge monitoring station (SNP 43-17) ranged from 1645 to 2461 L/min in the five samples collected during the ditch and sump monitoring program. The results indicate that the flow estimates from the different areas within the underground mine were reasonable, and that all of the significant flows to the 1300 sump were measured during the sampling program.

Freshet Survey

The combined flows to the 1300 sump during the freshet ditch flow program were approximately 2496 L/min. Actual measured flows from the sump, based on the SNP station flow meter values,

were 2513 L/min, indicating that the overall flow balance was good[3]. However, some discrepancies in flow were evident within flow paths:

- Flows measured from the 2000 sump were approximately two times greater than the sum of flows entering the sump. This flow measurement was estimated by using a level logger to measure the change in sump water level during pump cycles and the frequency of pump cycles over two days, and is considered to be reasonably accurate. In contrast, flows to the 2000 sump from 1650-SU2 and 2000-SB1 were very difficult to estimate, and could easily have been much higher than estimated. 1650-SU2 sump is a very large reservoir of flooded mine workings which is used during freshet to equalize the rate of dewatering from the mine (the pump is manually controlled). Since the peak in freshet had passed by the time the flow measurements were taken on May 30/31, it is likely that the rate of pumping from the sump was higher than the measured rate of inflow to the sump. Evidence for higher flows to the sump prior to the May 30/31measurements include a May 15th flow measurement at 1650 RS1, which was approximately 2.5 times higher than the May 30/31 reading at this location.
- Flows measured at the 575-Drain were greater than the sum of the inflows from 575-DF4 and 575-DF1 (see Figure 4.10). This estimate was by bucket and stopwatch methods and was considered to be reasonably accurate. Flows at 575-DF4 were small and the measurement was considered to be reasonably accurate. Therefore, the flow at 575-DF1 appears to have been underestimated. The implication of higher flows at 575-DF1 is that flows from the southern portion of the mine could be higher than indicated in Table 2. Due to the relatively low arsenic concentrations in this sample, the arsenic loading would not change significantly.
- Flows in 950-DF4 were higher than flows at 950-DF3. Since these were very large flows, the accuracy in flow measurement techniques may have been a factor. However, the flow path between the two locations was not accessible for inspection and it is possible that some flow was lost via an unknown pathway to a lower level in the mine.
- Due to time and access constraints, flows at 1100-DF1, 1100-DF2 and 1250-DF2 were not measured, and flows at 1250-DF1 were only measured on May 15th. Data from the February 2002 indicated these contributed a relatively small amount of flow. Therefore the February 2002 and May 15, 2004 data was used in the flow balance.

4.4 Arsenic Concentrations and Loads

4.4.1 Average Monthly Arsenic Concentrations and Loads from the Mine

As discussed in Section 4.4.3, pump cycles in the mine have a strong influence on spot measurements of arsenic concentrations and therefore loads at monitoring station SNP 43-17. Since December 2002, samples have been collected over a period of at least 4 pump cycles in an effort to

[3] At the time of the survey, the discharge to South Pond was not in operation.

smooth the effects of cycles in the underground pumping stations. Despite this, there is still substantial variability in arsenic concentrations from the mine (Figure 4.13a), and there are no consistent seasonal patterns. Some of the high and low concentrations observed in the database can be explained by specific management activities that have occurred over the last two years. For example, very high concentrations in the late summer/early fall of 2003 may be due to testing of the dewatering pump installed in the distribution drifts beneath the B208 stope. Similarly, low concentrations observed in March 2004 can be attributed to a short period when the Baker Creek channel froze and flows from Baker Creek went into the underground mine via one of the open pits. Other variations may be due sampling and/or laboratory errors, for example, high concentrations were measured in the SNP samples collected in April and May 2003, but not in the DIAND samples that were taken within a day of those readings.

To minimize the effects of the day to day variability in flows and concentrations, average monthly loads were calculated from the average monthly flow and average concentration data at each of the two discharge monitoring locations. However, since there was often only 2 samples collected at the monitoring station each month, much of the variability is still evident. The combined loading from the underground mine is shown in Figure 4.13b.

Despite the day to day variability, some seasonal differences are still evident, with the highest loads occurring during the summer months (60 to 130 kg/day), and lowest loads (20 to 40 kg/day) occurring in the winter. Average arsenic loads from the mine were 61 kg/day in 2002 and 56 kg/day in 2003. Because 2003 was a more typical year in terms of precipitation, the 2003 loads are recommended for use in the underground water and load balance. Arsenic loads during the first half of 2004 appear to be significantly lower (20 to 30 kg/day), possibly reflecting recent changes in water management in the B208 stope area, or generally low precipitation and runoff during the 2003 freshet.

4.4.2 Distribution of Arsenic Loading

The distribution of arsenic loads within the mine is presented in Figures 4.5 through 4.12. Similar results for chloride, nitrate+nitrite, and calcium are provided in Appendix E. Loads at each of the sampling stations were calculated by multiplying the measured flows and arsenic concentrations. Loads at points of convergence, such as the sumps, were obtained by adding all of the contributing loads. These are indicated as “calculated” values in the figures.

The distribution of arsenic loading by flowpath and area is summarized in Table 4.2.

Table 4.2: Summary of Arsenic Loads by Pathway and Area

Flowpath	Winter Survey (February 2002)				Freshet Survey (May 2003)			
	South (kg/day)	Central (kg/day)	North (kg/day)	Total (kg/day)	South (kg/day)	Central (kg/day)	North (kg/day)	Total (kg/day)
1	0	12.5	0	13	0	74	0	74
2	0.07	20	0.08	21	0.14	8.6	0.23	9.0
3	0	1.0	2.7	3.7	0	2.1	5.1	7.2
4	0	1.0	0.3	1.3	0	0.8	0.2	1.0
Total	0.07	35	3.1	38	0.14	86	5.5	91

Prepared by: KSS
Checked by: DBM

Key observations are as follows:

- The 2000 Sump (Flowpath 1, Figures 4.7 and 4.8) was responsible for approximately 12.5 kg/day, or 33% of the arsenic load to the 1300 sump during the winter survey, and 74 kg/day or 81% of the arsenic load to the 1300 sump during the freshet survey. Most of this load was from the UBC sump (100 SU1) and the sump and workings below the B208 area (250 DF3) which are directed down the Alimak raise to the 1650 level sump (1650-SU2) and then the 2000 level sump. The remainder was from the shaft bottom, which is comprised of a mixture of several different water types.
- The 950 sump (Flowpath 2, Figures 4.9 and 4.10) was responsible for approximately 20.5 kg/day, or 54% of the load during the winter survey, and 9 kg/day or 10% of the load to the 1300 sump during the freshet survey.
- Loads of approximately 9.5 kg/day and 7.7 kg/day were found on the 575 level between C-shaft and 1000N, during the winter and freshet surveys respectively.
- Loads of approximately 11 kg/day and 1.3 kg day were from the 750 level, also between C-shaft and 1000 N, during the winter and freshest surveys respectively.
- Flowpaths 3 and 4 (Figure 4.11 and 4.12) contributed approximately 5 kg/day of arsenic to the 1300 sump during the winter survey and 6.1 kg/day to the 1300 sump during the freshet survey. Most of the load from Flowpath 3 was associated with the relatively large volume of flow on the 950 level, which originates north of 1000 N. At least some of this load is due to re-circulating water from the Northwest Pond, which is used to store water from the underground mine. The remainder was from the 1100 and 1250 levels, between C shaft and 1000 N, which can be attributed to high arsenic seeps in this area.

In summary, the total arsenic loads were 38 and 91 kg/day, during the winter and freshet surveys respectively, distributed as follows:

- 0.07 to 0.14 kg/day or 0 to 0.2% from south of C-shaft
- 35 to 86 kg/day or 92 to 94% from C-shaft to 1000 N
- 3.1 to 5.5 kg/day or 6 to 8% from north of 1000 N.

The area between C-shaft and 1000 N is the area that is within the influence of the arsenic chambers, and is where the majority of the arsenic load originates.

The current set of results indicates that, with some changes to the water management system, most of the high arsenic flows could be managed separately. Separate management of the high arsenic flows would simplify any efforts to pre-treat the water.

4.4.3 Load Balance

The 1300 sump was the ultimate point of convergence for all of the loads from the underground mine during the winter and freshet surveys (Figures 4.5 and 4.6). During both surveys, actual measured loads from the 1300 sump and at the 1300 sump discharge to the Northwest Pond were comparable to the loads entering the 1300 sump, indicating that a reasonable mass balance was obtained.

Winter Survey

During the winter survey, the total load to the sump was approximately 38 kg/day (Figure 4.5). Loads were also calculated from five samples collected at the discharge pipe to the Northwest Tailings Pond. This location includes the flows from Great Slave Lake, which are assumed to have negligible arsenic concentrations, and flows from the 1300 sump, which represent the total loading from the underground mine. Therefore, while the total flows are higher at the discharge station, the loads should provide a reasonable indication of the loads from the underground mine. The measured loads ranged from 35 to 108 kg/day. This was significantly more variable than expected, and higher than the loads measured at the 1300 sump.

One explanation for the high degree of variability is the cycling of pumps in the mine.

- Cyclical pumping from the UBC sump (100-SU1) and the sump and workings below the B208 area (250 DF3) could result in variable loading rates down the Alimak raise to the 1650 level and then to the 2000 sump.
- Cyclical pumping from the 2000 Sump could result in variable arsenic loads to the 1300 sump, which in turn could lead to variable concentrations and loads in the 1300 sump, sump pump and discharge to the Northwest tailings pond.

A level logger was used to record water levels and therefore pumping cycles in the 2000 sump over a 24 hour period in early May 2002. Figure 4.14 shows the pumping cycle at the 2000 sump. The results indicate that cycles alternate between a 188 minute cycle with 160 minutes off, then 28 minutes on, and a 136 minute cycle, with 108 minutes off, then 28 minutes on. The alternating cycles suggest that one of the sources of water to the 2000 sump was also cyclic, with cycles roughly 2x longer than the 2000 sump cycles.

The average cycle was 162 minutes, with 28 minutes on and 134 minutes off. Therefore, the load from the 2000 sump is effectively delivered at a rate that is approximately 5.8 times higher than the average rate, for only 17% of the time. This has obvious implications for any samples taken of the

mine discharges. For example, since the average arsenic load from the 2000 sump is 12.5 kg/day, or 33% of the total load, the instantaneous load to the 1300 sump when the pump cycle is on could be 72 kg/day, resulting in a total load from the 1300 sump of 98 kg/day. When the 1300 sump is off, the load to the 1300 sump would be zero, resulting in a total load from the 1300 sump of only 25.5 kg/day. This range is similar in magnitude to the observed range of 35 to 108 kg/day. An independent demonstration of the effect of the 2000 pumping cycles is also evident in the results of the chloride mass balance (Appendix E).

If the UBC sump and the sump and workings below B208 were off when the underground samples were collected, this could lead to additional differences in the overall loading. As shown in Figure 4.4, variable loads have also been measured at the Alimak raise station (1650-RS). For example, in August 2001, flows were 120 L/min, and arsenic loads were 55 kg/day. This is in contrast to the February 2002 sampling, where the Alimak raise (1650-RS) appeared to be frozen, but flows immediately downstream (at 1650-DF2) were approximately 10 L/min. One explanation for the differences would be that the pump was "off" when the February 1650 RS sample was attempted, "off" but still flowing when the February 1650-DF2 station was sampled, and "on" at the peak of flow when the August 1650-RS station was sampled.

Freshet Survey

The average load from the mine during the freshet survey was 91 kg/day (Figure 4.6). Loads calculated for samples collected on May 30 and May 31, when most of the underground sampling was completed were reasonably consistent with this value, ranging from 66 to 91 kg/day. Therefore it is concluded that the issues with variability caused by pumping cycles were not as significant in the freshet sampling program as compared to the February 2002 program. This was due in part to a greater recognition of the effects of pump cycles, and higher flows during this round of sampling, which effectively resulted in shorter pump cycles.

5 Summary and Conclusions

The 2001 through 2004 underground mine water sampling programs included characterization of type samples, a reconnaissance level mapping of arsenic concentrations and flows in the mine, winter and freshet ditch and sump surveys, and monthly sampling of the main flows from the mine.

The results of the seepage survey were used as the basis for estimating source concentrations for the arsenic chambers, open mine workings, backfilled tailings, backfilled waste rock and the northwest tailings pond. A summary of the source concentrations was provided in Table 3.7 (Section 3). The source concentrations will be used to develop arsenic load estimates for unsaturated flow conditions (SRK 2005a).

The results of the reconnaissance survey have improved our understanding of the distribution of arsenic and flow patterns within the mine. A map showing the distribution of arsenic in the ditch samples is provided in Appendix B. The results indicate that almost all of the high arsenic concentrations occur between C-shaft and 1000 N.

The monthly sampling programs indicate annual average flows of 1675 L/min (2412 m^3/day) in 2003, which is considered to be a reasonably typical flow year. This value is recommended for use in the overall water and load balance for the site. An additional 139 L/min (200 m^3/day) of water from Great Slave Lake was pumped into the underground dewatering system and discharged to the Northwest Pond.

Although there is substantial day to day variability in arsenic concentrations, the highest arsenic loads occurred during the summer months (60 to 130 kg/day), and lowest loads (20 to 40 kg/day) occurred in the winter. Higher loads during the summer are attributed to increased infiltration through the mine workings during the open water season. The day-to-day variation in loading can be explained by cycles in the underground sump pumps. Average arsenic loads in 2003 were 56 kg/day. Because 2003 was a more typical year in terms of precipitation, the 2003 loads are recommended for use in the water and load balance.

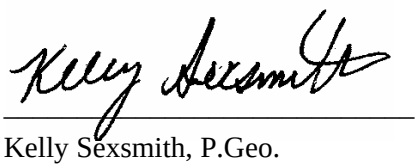
The ditch and sump sampling program were used to develop water and load balances for the underground mine under winter and freshet conditions. The results indicate:

- The majority (92 to 94%) of the arsenic loading in the workings entered the ditches and sumps between C-shaft and 1000N. This is the area of the mine that is within the influence of the arsenic chambers.
- Approximately 6 to 8% of the load is from north of 1000 N, and can be traced primarily to the Northwest tailings pond.
- Less than 0.2% of the load is from south of C-shaft.

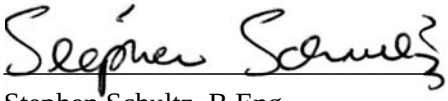
6 Recommendations

Monthly sampling and flow metering of the underground discharges has provided a means of calculating the seasonal and annual variations in arsenic loading from the mine. Given the high degree of variability observed over the past few years of monitoring, the monthly monitoring should be continued to further define pre-closure conditions and as a means of monitoring the effects of interim remediation activities.

This report, **"Giant Mine – Underground Mine Water Chemistry"**, has been prepared by SRK Consulting (Canada) Inc.



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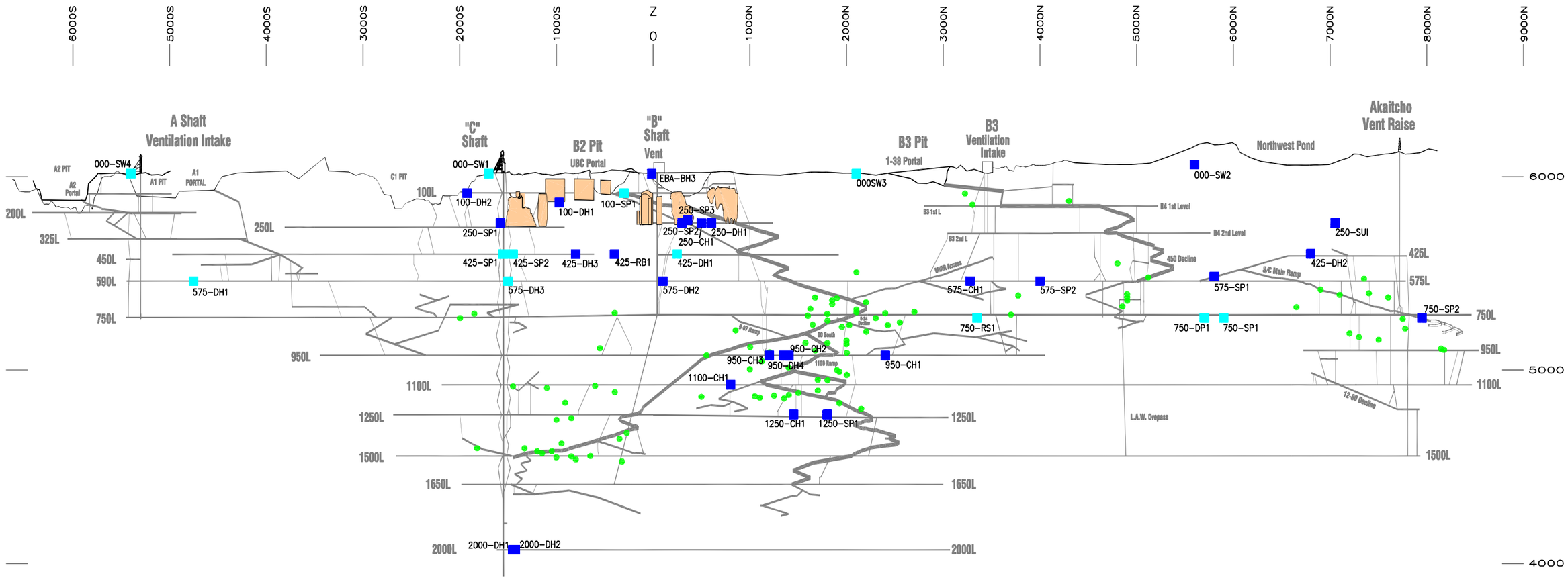
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Figures



FEET

500
400
300
200
100
0

0 400 800 1200 1600 2000 Feet

SCALE

NOTE: 2:1 VERTICAL EXAGERATION

LEGEND:

750-RS1 1999 – 2000 Seep Sample Location

950-CH1 2001 – 2004 Seep Sample Location

– LOCATION OF TAILINGS BACKFILLED STOPES (approximately the centre of the stope opening)

– LOCATION OF ARSENIC CHAMBERS

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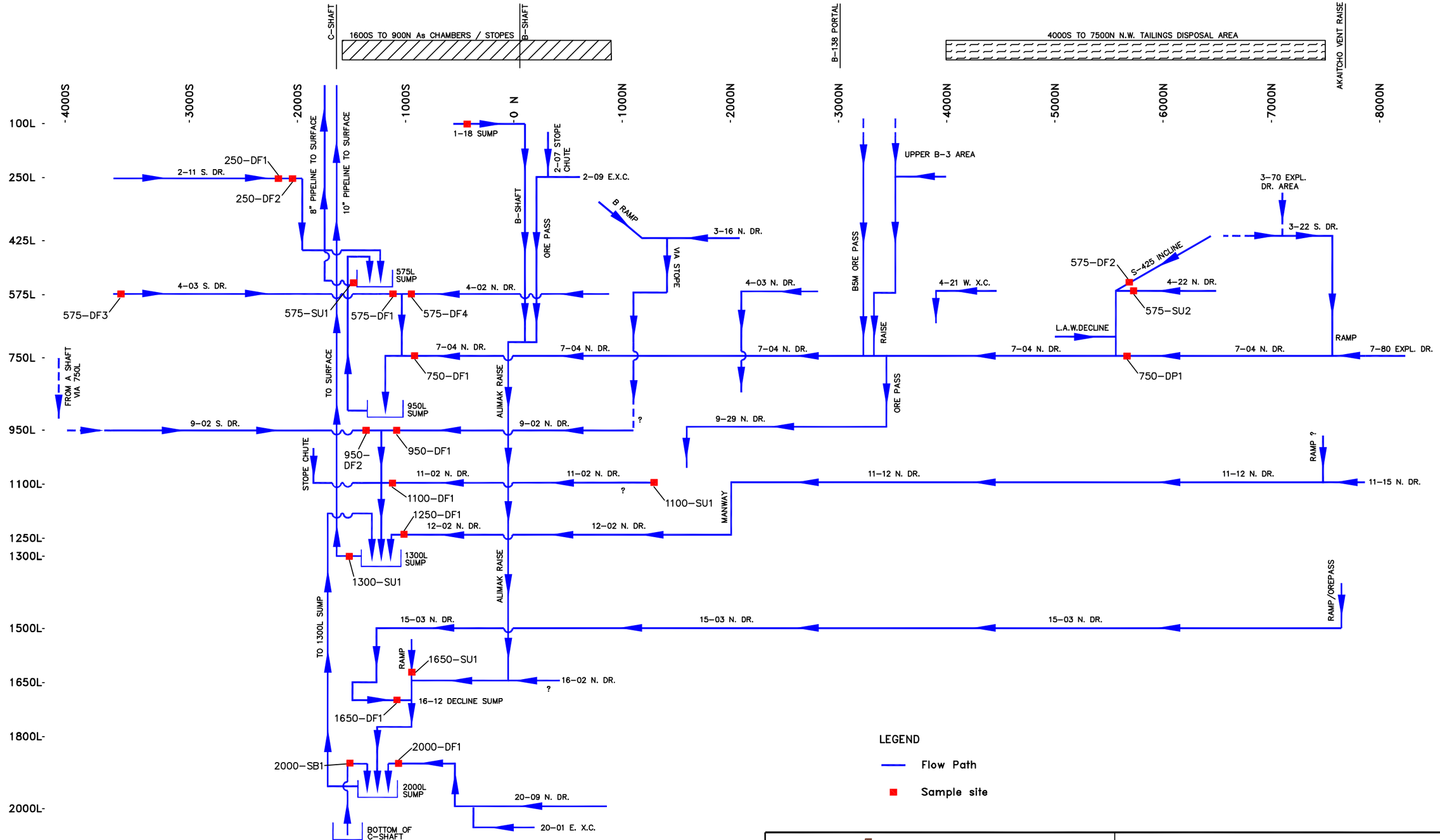
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Giant Mine

SEEP SAMPLE LOCATIONS
(Projected on to Common Section)

PROJECT NO.	DATE	APPROVED	FIGURE
1CI001.12	May 2005	KSS	2.1

File Ref: GiantLong-Seep2.dwg



File Ref: Water_Flow_Network_Fig 4.1.dwg

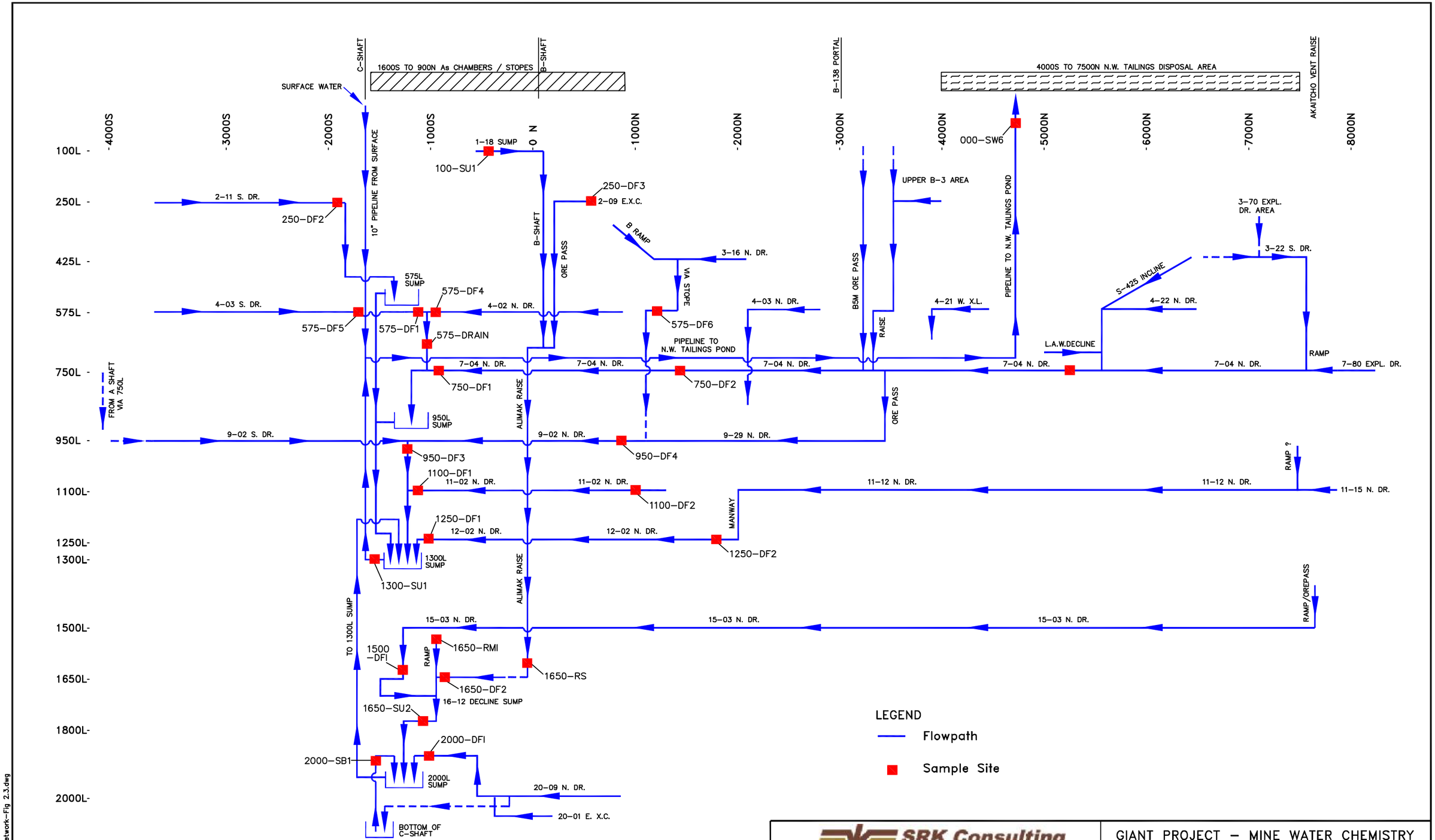
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GIANT PROJECT – MINE WATER CHEMISTRY

1999/2000 DITCH/SUMP SAMPLE LOCATIONS

PROJECT NO.	DATE	APPROVED	FIGURE
1CI001.07	July, 2002		2.2



File Ref: Water_Flow_Network-Fig 2.3.dwg

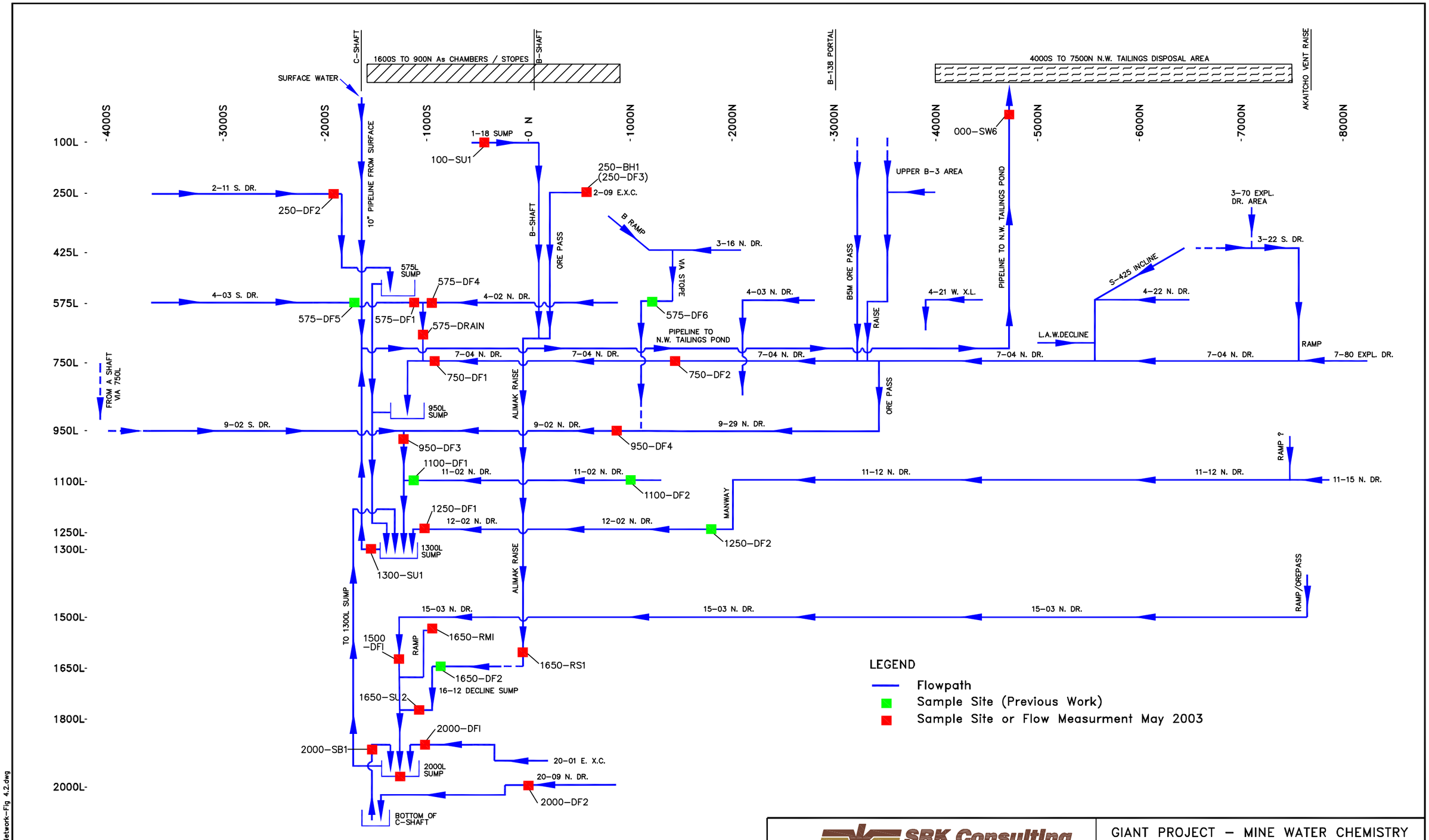
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GIANT PROJECT – MINE WATER CHEMISTRY

2002 DITCH/SUMP SAMPLE LOCATIONS

PROJECT NO.	DATE	APPROVED	FIGURE
1CI001.12	May 2005	KSS	2.3



File Ref: Water_Flow_Network-Fig 4.2.dwg

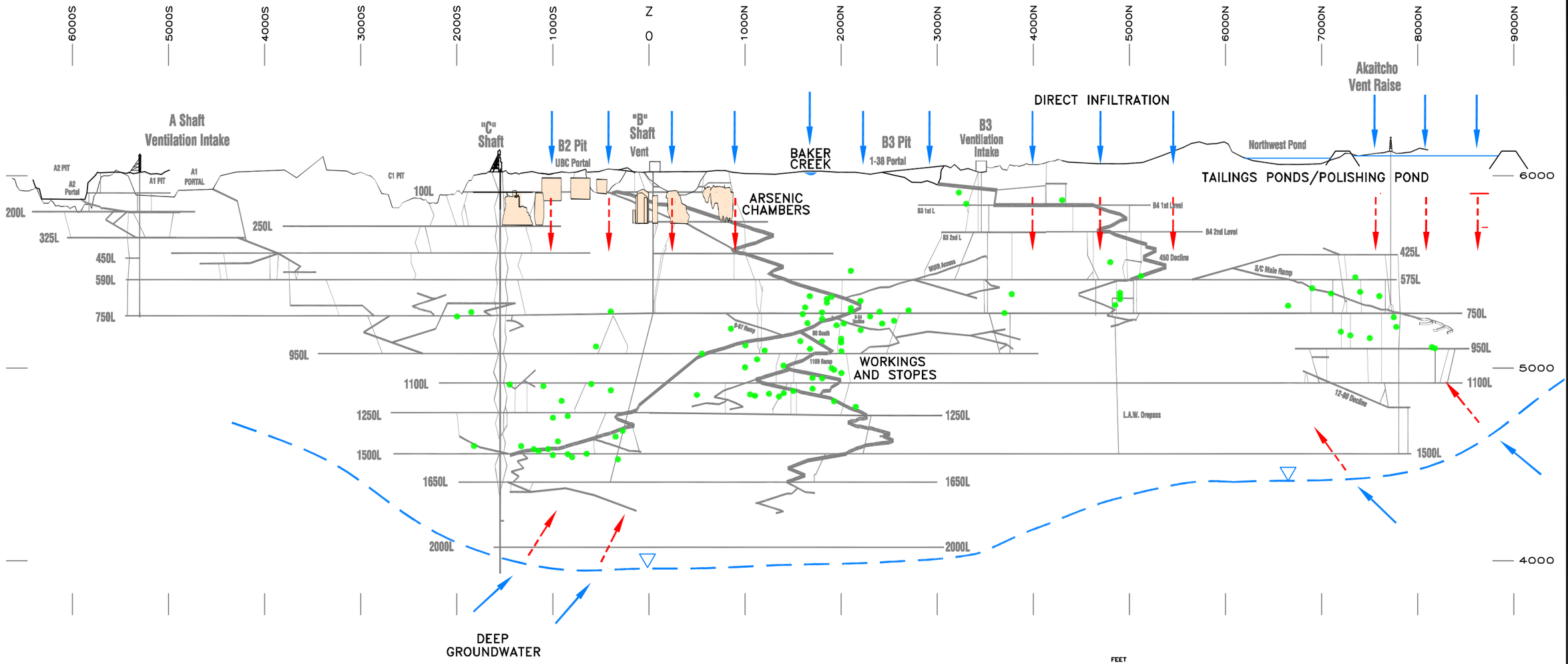
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Indian and Northern Affairs Canada

GIANT PROJECT – MINE WATER CHEMISTRY

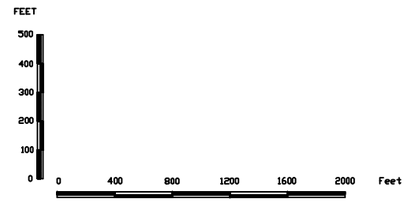
2003 DITCH/SUMP SAMPLING LOCATIONS

PROJECT NO.	DATE	APPROVED	FIGURE
1CI001.12	May 2005	KSS	2.4



LEGEND:

- – LOCATION OF TAILINGS BACKFILLED STOPES (approximately the centre of the stope opening)
- – LOCATION OF ARSENIC CHAMBERS (approximately the centre of the stope opening)
- – INFLOWS TO THE MINE (eg. infiltration, deep groundwater)
- – INTERACTION WITH MINE WORKINGS
- – ASSUMED GROUND WATER TABLE



SCALE

NOTE: 2:1 VERTICAL EXAGERATION

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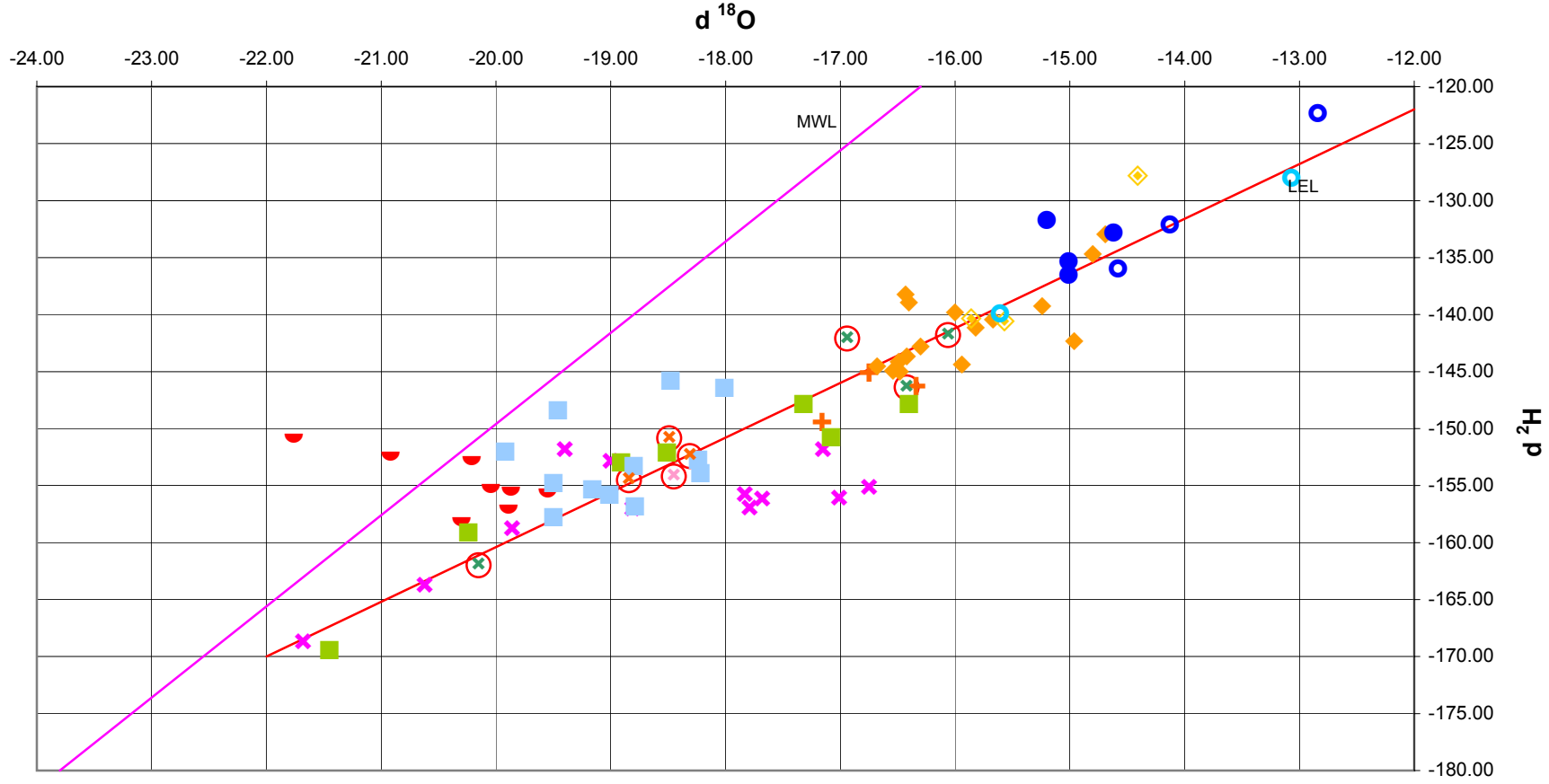
GIANT PROJECT – MINE WATER CHEMISTRY

SCHEMATIC CROSS SECTION SHOWING MAJOR WATER TYPES AND SOURCE CONCENTRATIONS

PROJECT NO.	DATE	APPROVED	FIGURE
1CI001.07	July 2002		3.1

File Ref: GiantLong-Fig 3.1.dwg

FILE REF: 2002_Master_Giant_WQ_Data.kss_ck.xls



Legend			
creek water	○	NW Tailings/surface	◇
lake water	●	NW Tailings/underground	◆
creek/walls	○	polishing pond	+
infiltration/walls (shallow)	■	arsenic chambers	×
infiltration/walls (deeper)	■	deep groundwater	▬
tailings backfill	×	waste rock backfill	×
tailings backfill (chambers)	×		

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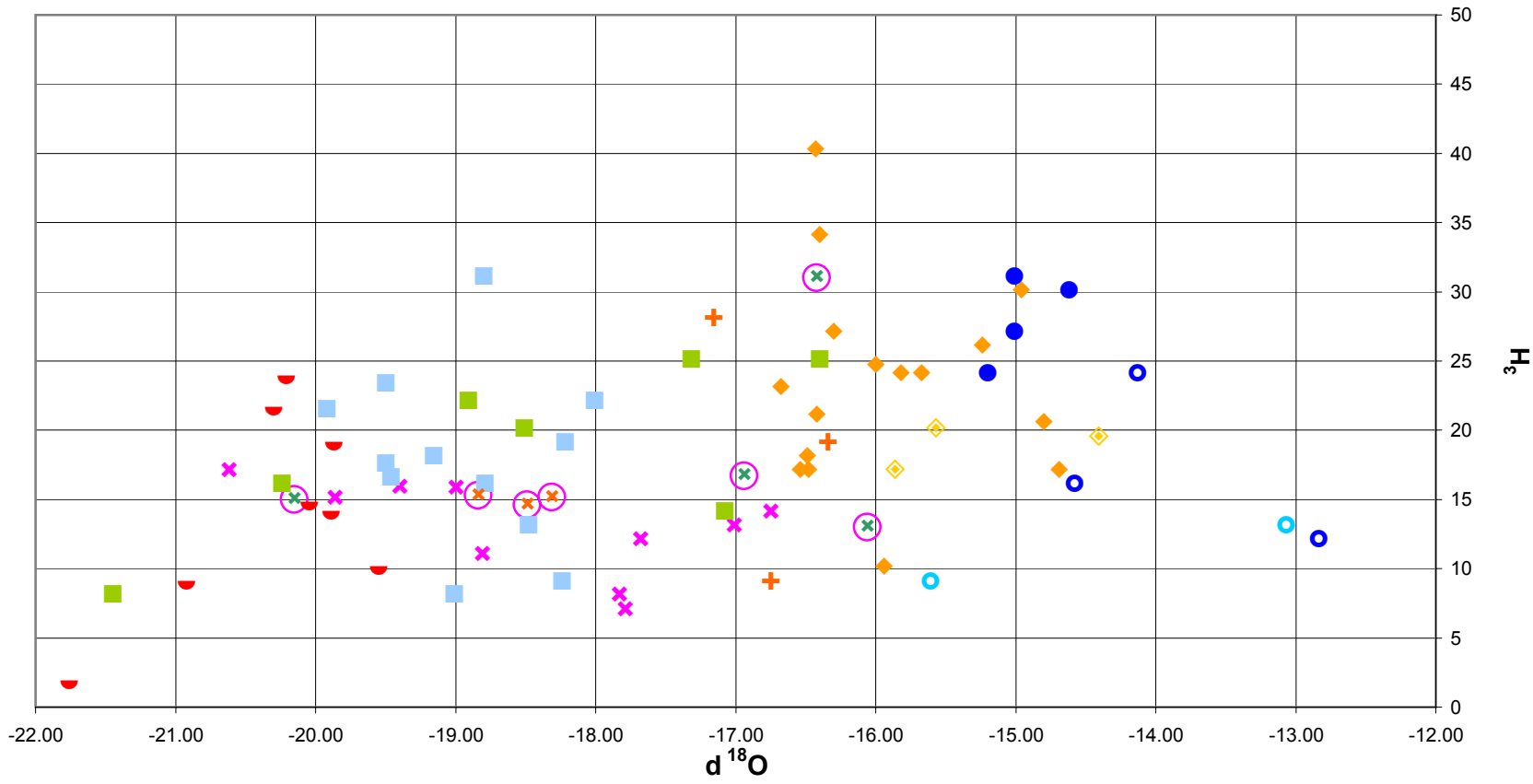
Indian and Northern Affairs Canada

Giant Project
Mine Water Chemistry

^{18}O versus ^{2}H by water type

PROJECT	DATE	APPROVED	FIGURE
1CI001.07.340	July 2002		3.2

FILE REF: 2002_Master_Giant_WQ_Data.kss_ck.xls



Legend			
creek wate	○	NW Tailings/surface	◈
lake wate	●	NW Tailings/underground	◆
creek/walls	○	polishing pond	+
infiltration/walls (shallow	■	arsenic chambers	×
infiltration/walls (deeper	■	deep groundwate	▬
tailings backfill	×	waste rock backfil	×
tailings backfill (chambers	×		

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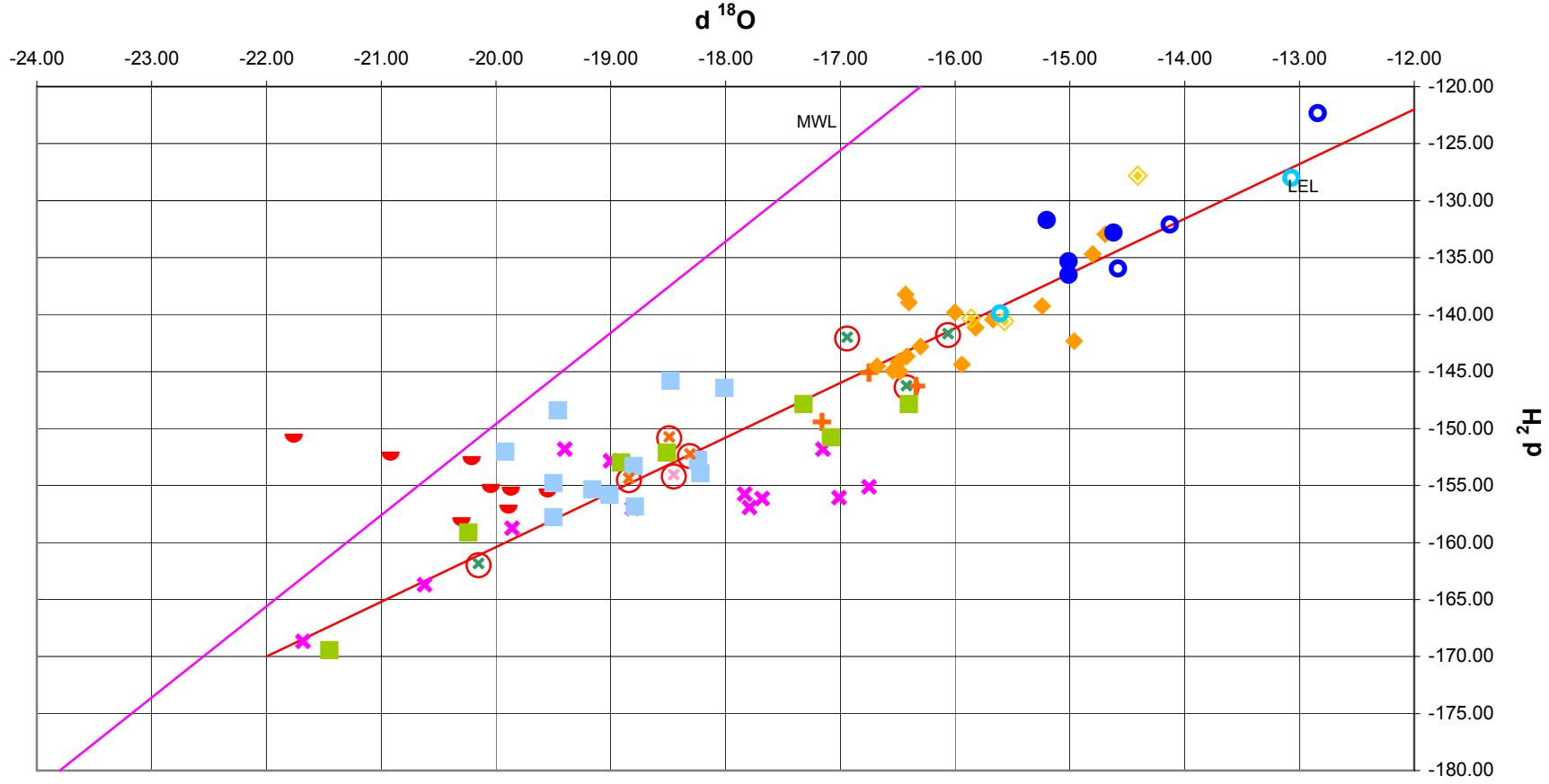
Indian and Northern Affairs Canada

Giant Project
Mine Water Chemistry

^{18}O versus ^3H by water type

PROJECT	DATE	APPROVED	FIGURE
1CI001.07.340	July 2002		3.3

FILE REF: 2002_Master_Giant_WQ_Data.kss_ck.xls



Legend			
creek water	○	NW Tailings/surface	◇
lake water	●	NW Tailings/underground	◆
creek/walls	○	polishing pond	+
infiltration/walls (shallow)	■	arsenic chambers	×
infiltration/walls (deeper)	■	deep groundwater	▬
tailings backfill	×	waste rock backfill	×
tailings backfill (chambers)	×		

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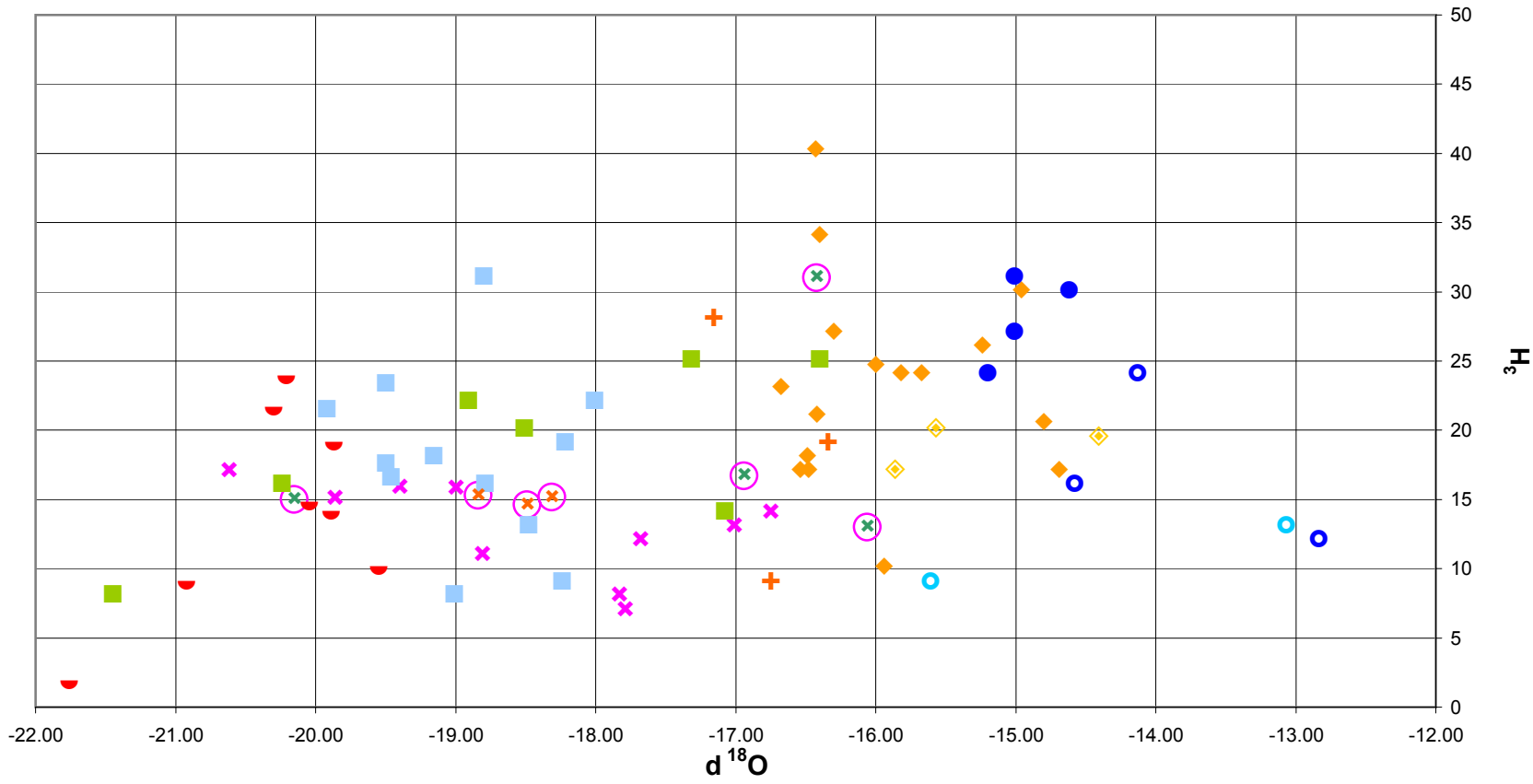
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Giant Project
Mine Water Chemistry

^{18}O versus ^{2}H by water type

PROJECT	DATE	APPROVED	FIGURE
1CI001.07.340	July 2002		3.2

FILE REF: 2002_Master_Giant_WQ_Data.kss_ck.xls



Legend			
creek wate	○	NW Tailings/surface	◈
lake wate	●	NW Tailings/underground	◆
creek/walls	○	polishing pond	+
infiltration/walls (shallow	■	arsenic chambers	×
infiltration/walls (deeper	■	deep groundwate	▬
tailings backfill	×	waste rock backfil	×
tailings backfill (chambers	×		

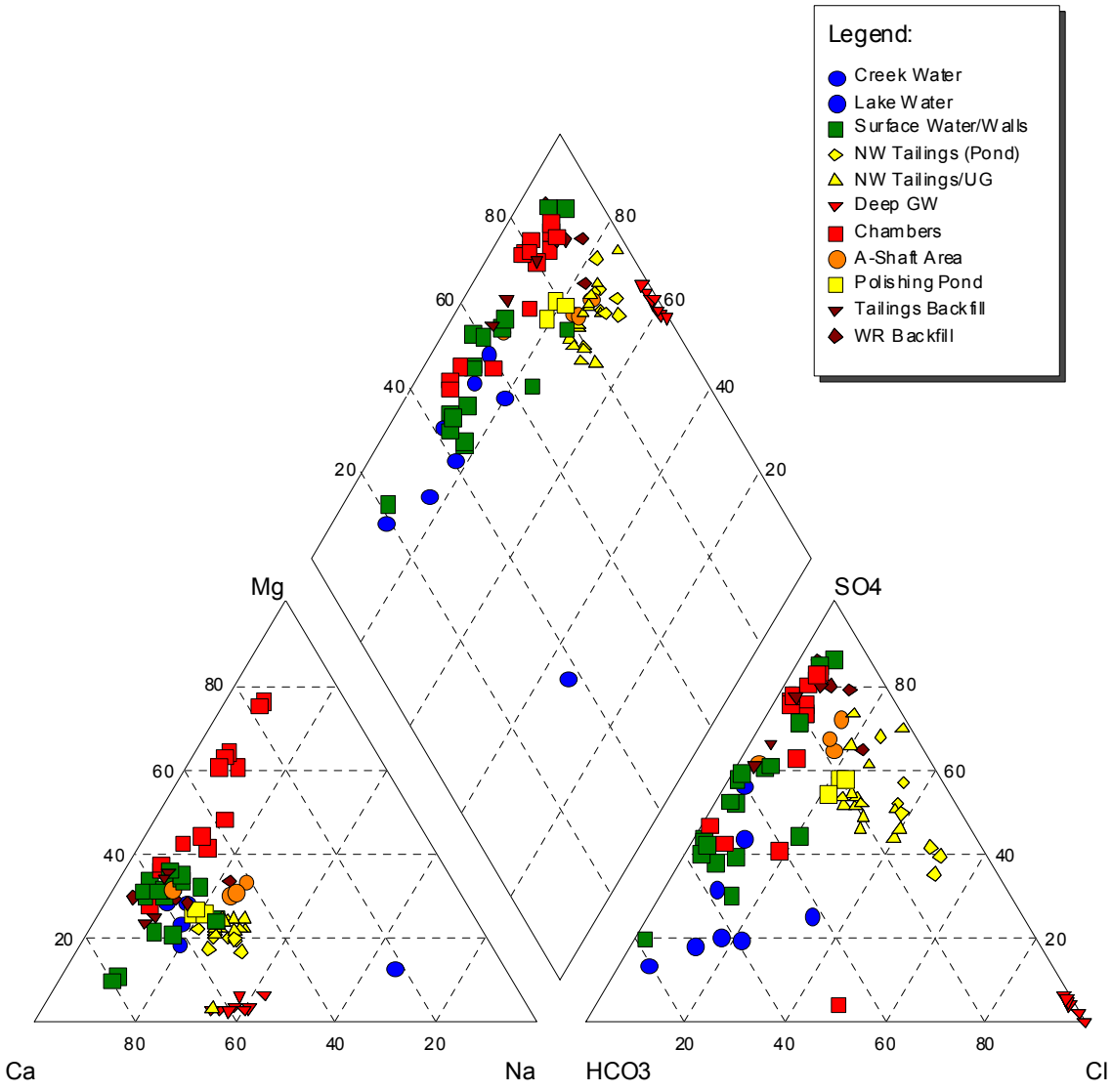
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Giant Project
Mine Water Chemistry

^{18}O versus ^3H by water type

PROJECT	DATE	APPROVED	FIGURE
1CI001.07.340	July 2002		3.3



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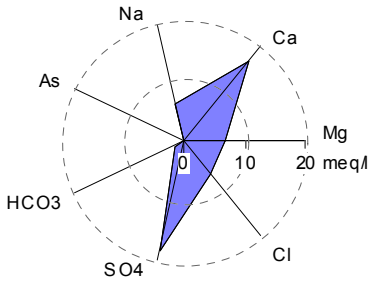
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Giant Mine – Mine Water Chemistry

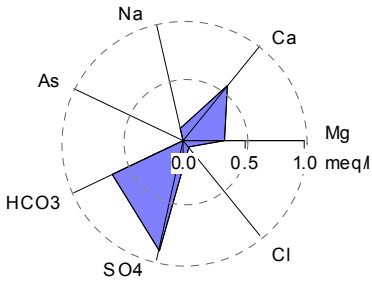
Piper Plots showing Major Ion Composition of Water Types

PROJECT:	DATE:	APPROVED:	FIGURE::
1CI001.10	November 2002		**3.4**

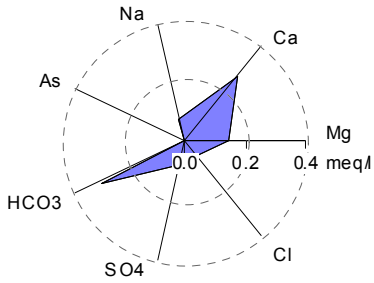
NW Tailings (Pond)



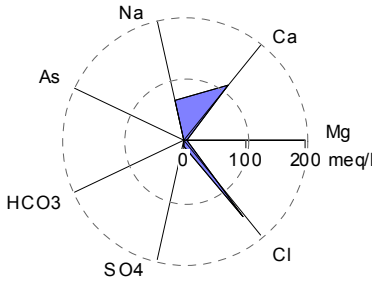
Creek Water



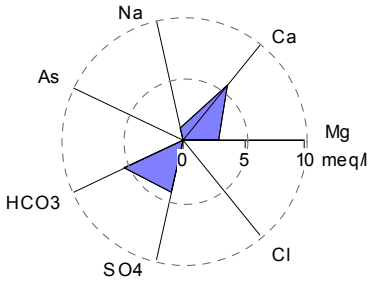
Lake Water



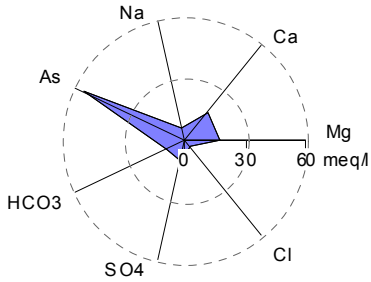
Deep GW



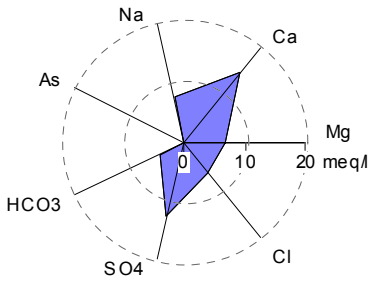
Surface Water/Walls



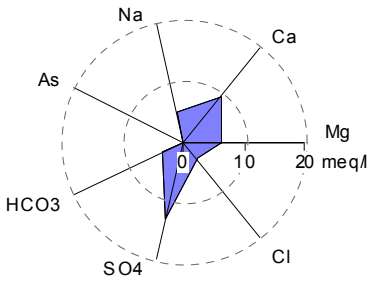
Chambers



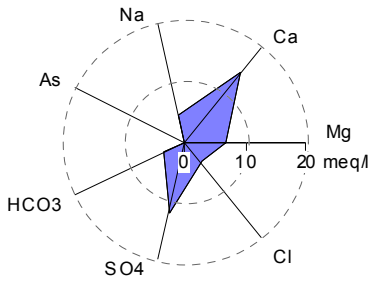
NW Tailings (u/g)



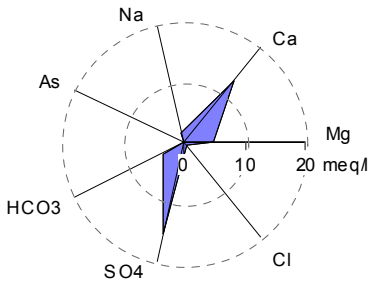
A-Shaft Area



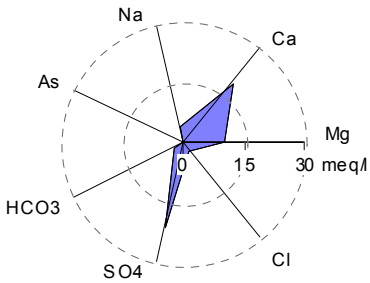
Polishing Pond



Tailings Backfill



WR Backfill



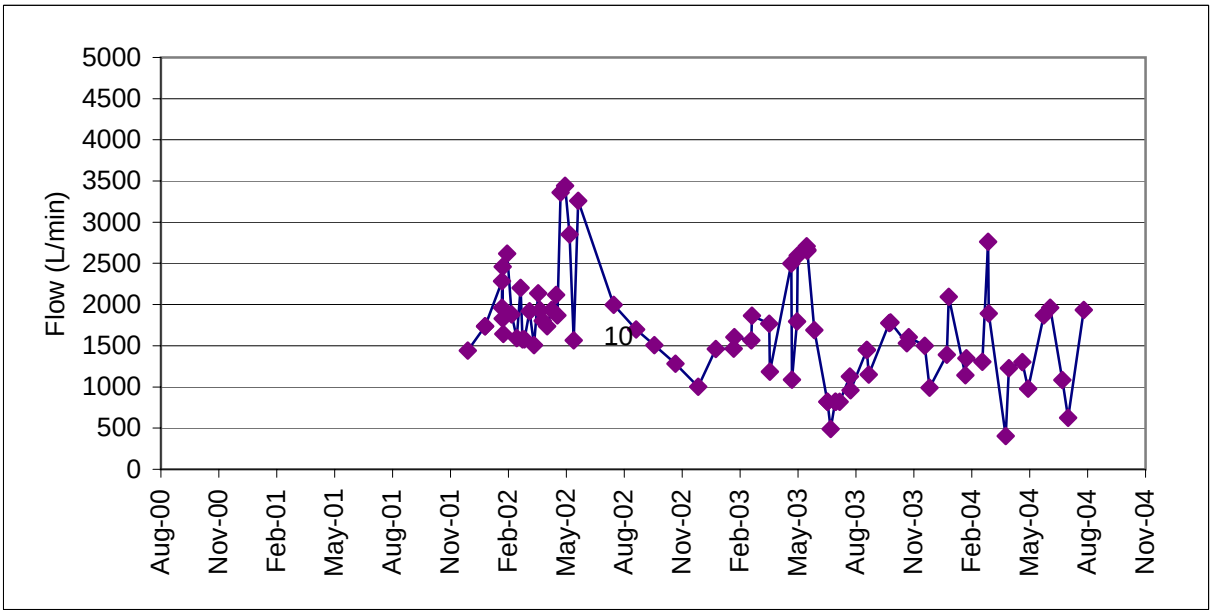
SRK Consulting
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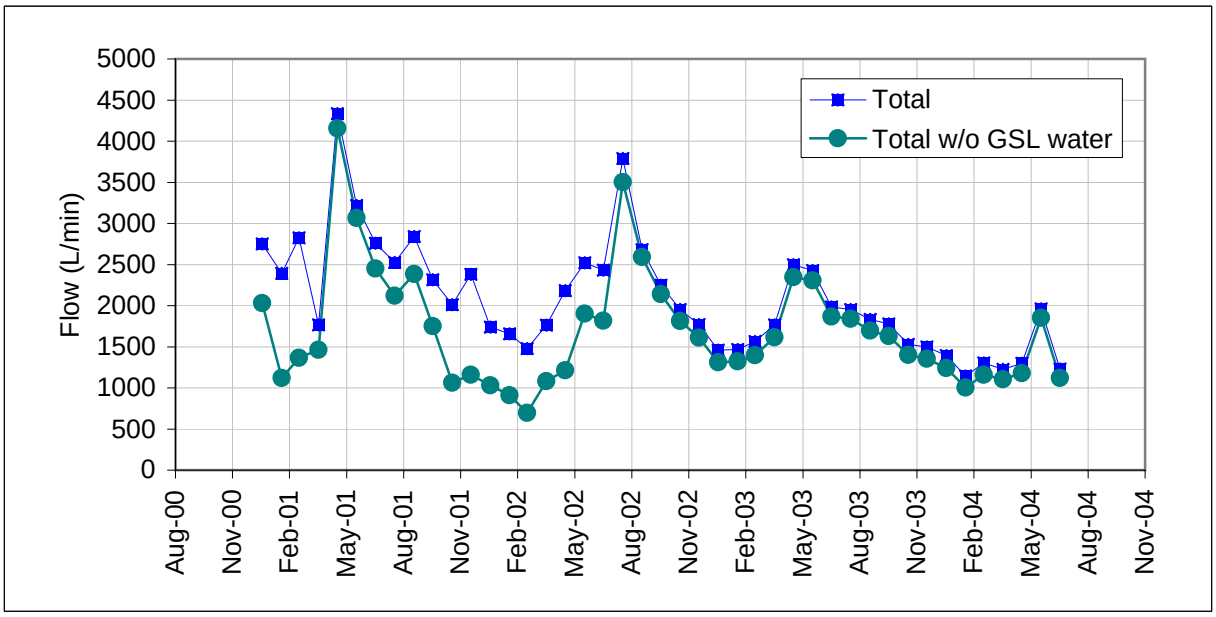
Giant Mine – Mine Water Chemistry

Radial Plots showing Major Ion Composition of Water Types

PROJECT:	DATE:	APPROVED:	FIGURE::
1CI001.10	November 2002		**3.5**



a) Spot flow estimates from the Northwest Pond (flows associated with SNP samples are monthly averages)



b) Average monthly flows from the mine

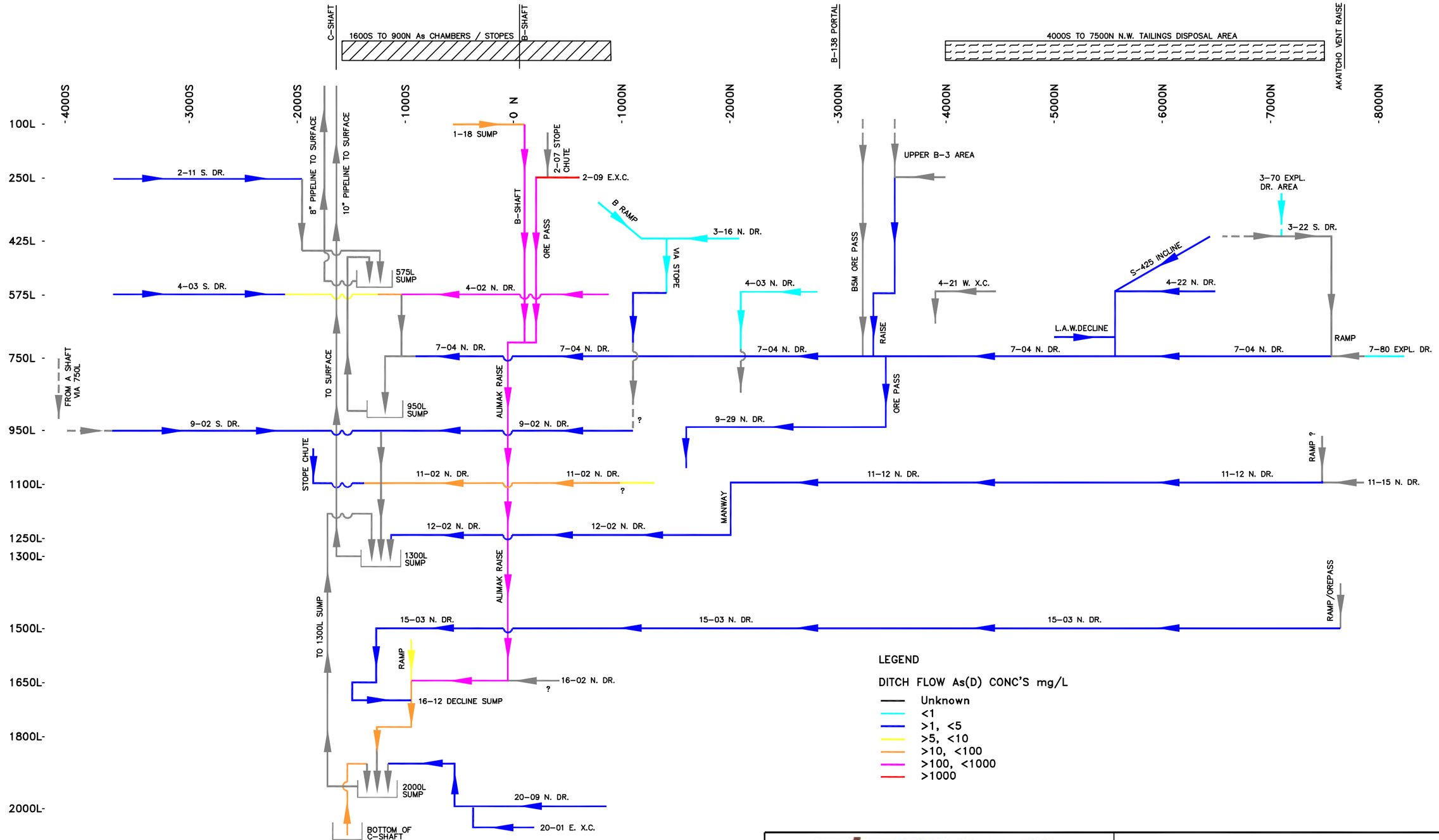
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Giant Mine - Underground Water Sampling

Flows from Mine

Project	Date	Approved	Figure
1CI001.12.B5	May-05	KSS	4.1



File Ref: Water_Flow_Network_Fig 4.1.dwg

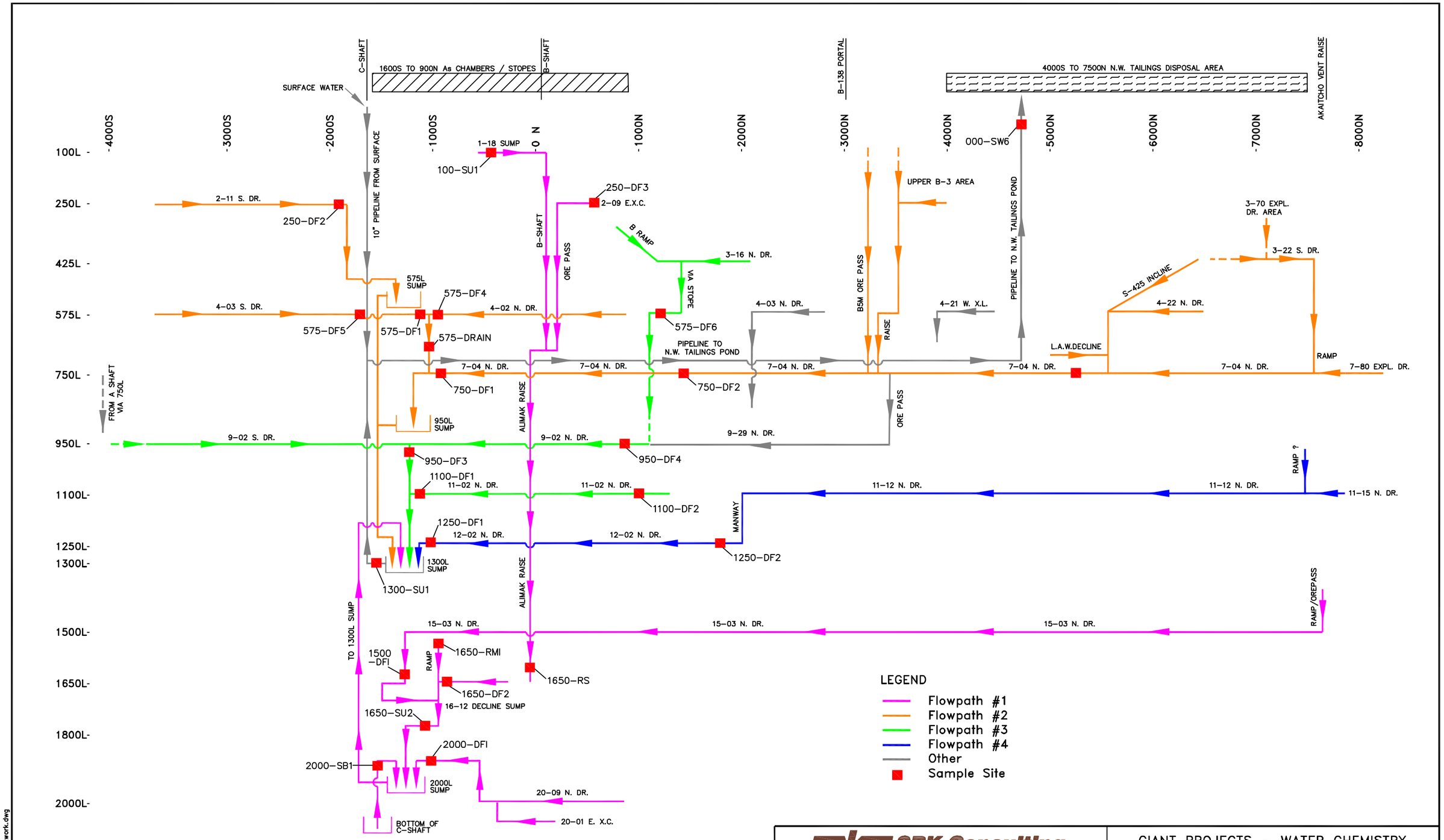
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GIANT PROJECT – MINE WATER CHEMISTRY

FLOW CONFIGURATION
PRIOR TO DECEMBER 2001

PROJECT NO.	DATE	APPROVED	FIGURE
1CI001.12	May 2005	KSS	4.2



File Ref: Water_Flow_Network.dwg

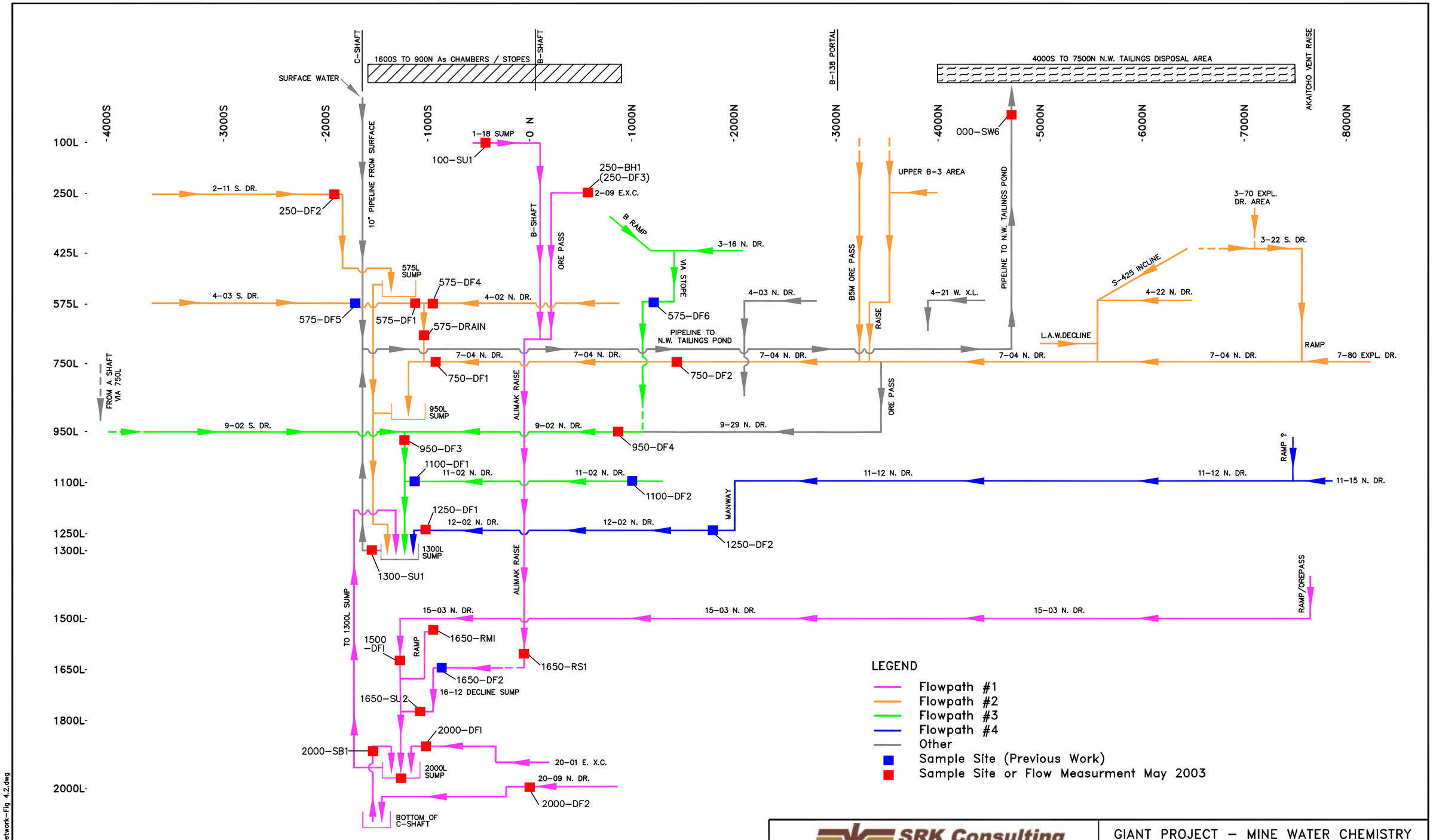
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GIANT PROJECTS – WATER CHEMISTRY

FLOW CONFIGURATION AND SAMPLE LOCATIONS – WINTER SURVEY (FEB. 2002)

PROJECT NO.	DATE	APPROVED	FIGURE
1CI001.12	May 2005	KSS	4.3



File Ref: Water_Flow_Network-Fig 4.2.dwg

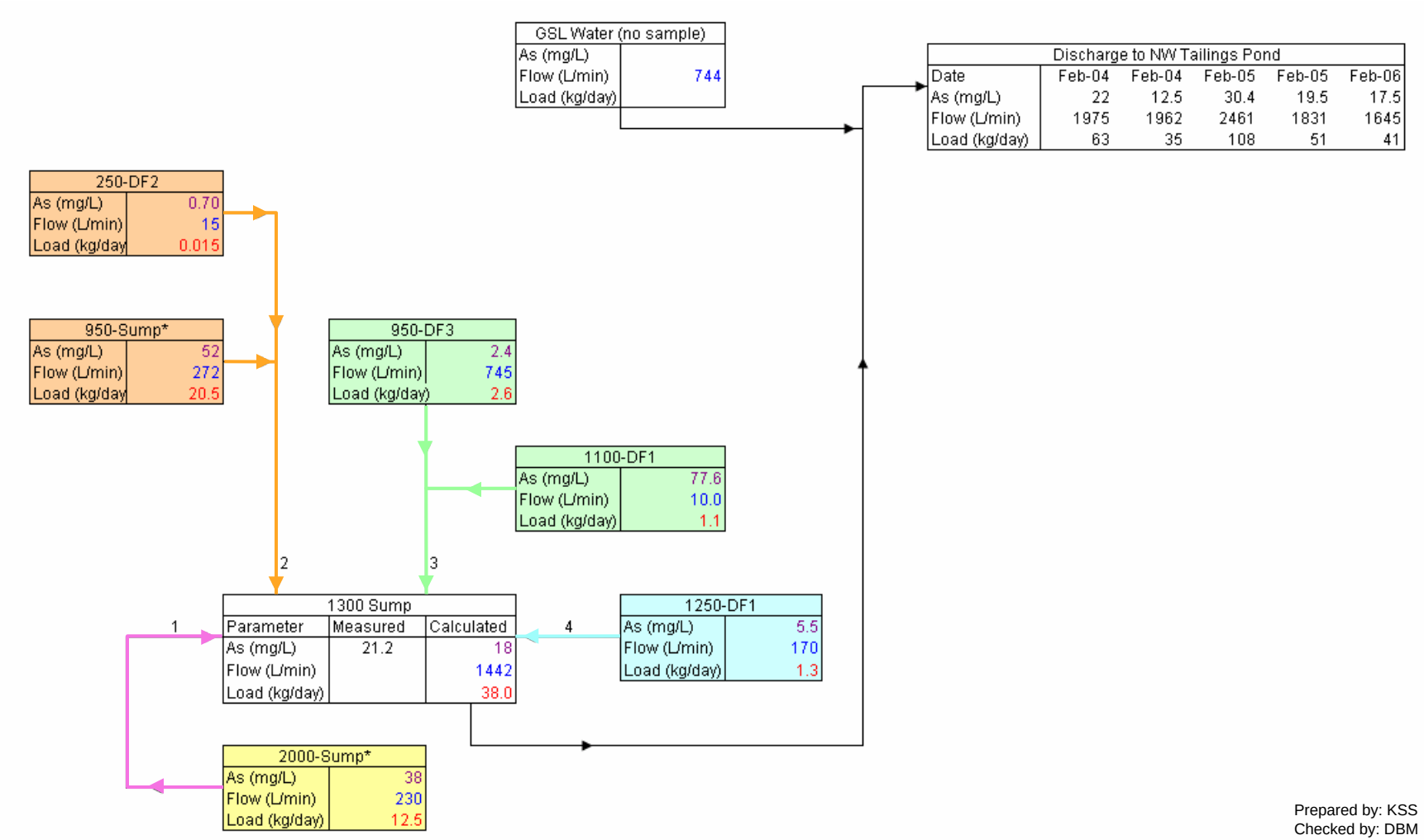
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GIANT PROJECT – MINE WATER CHEMISTRY

FLOW CONFIGURATION AND SAMPLE LOCATIONS–FRESHET SURVEY (MAY 2003)

PROJECT NO.	DATE	APPROVED	FIGURE
1CI001.12	May 2005	KSS	4.4



Prepared by: KSS
Checked by: DBM

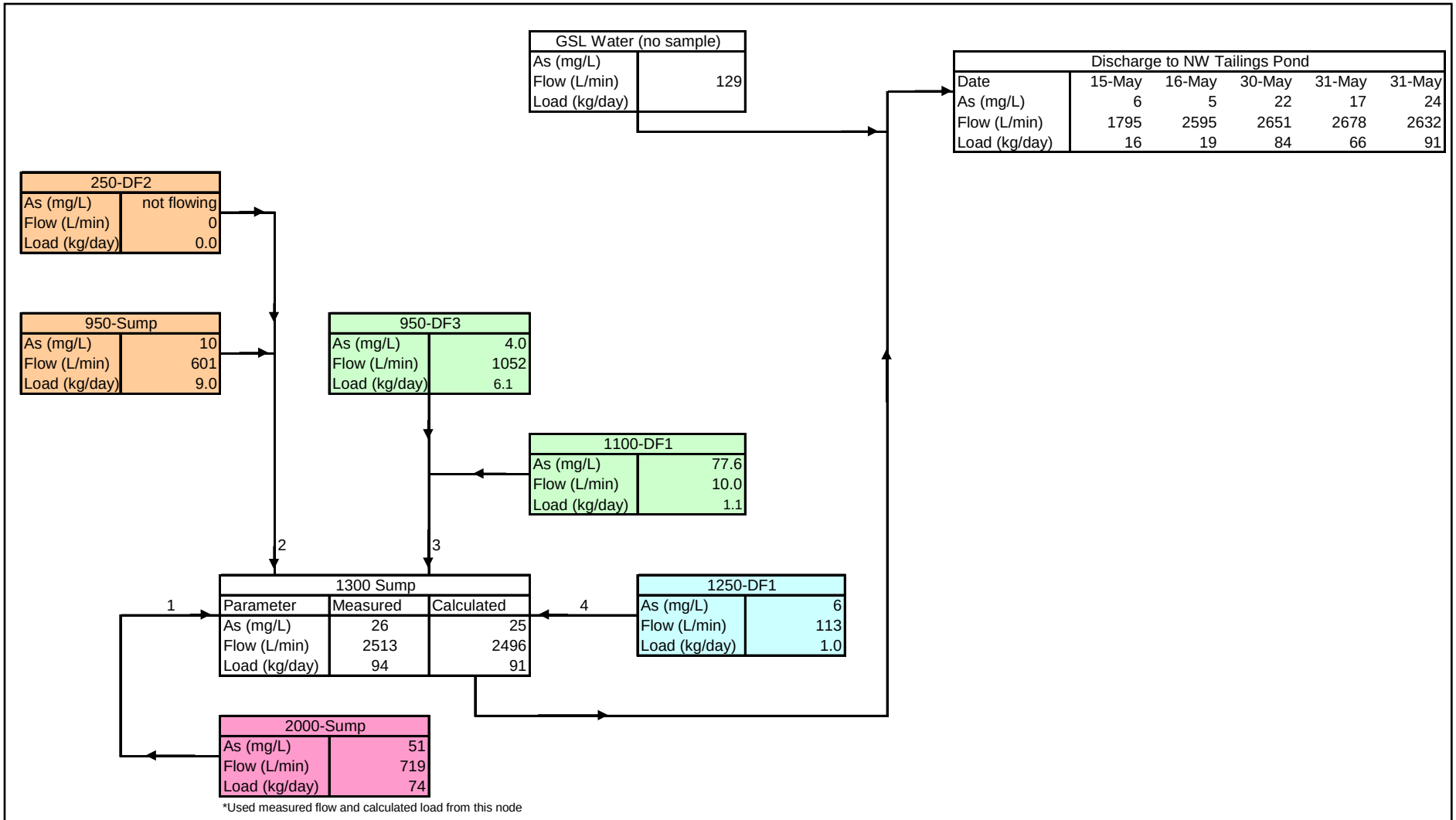
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Indian and Northern Affairs Canada

Giant Mine
Underground Mine Water Chemistry

Flowsheet showing Flows, Concentrations and Loads to the 1300 Sump – Winter

PROJECT:	DATE:	APPROVED:	FIGURE:
1CI001.12.B5	May 2005	KSS	**4.5**



Overall Mass Balance (Arsenic)

Notes: * indicates the values are calculated from flowpaths entering this location

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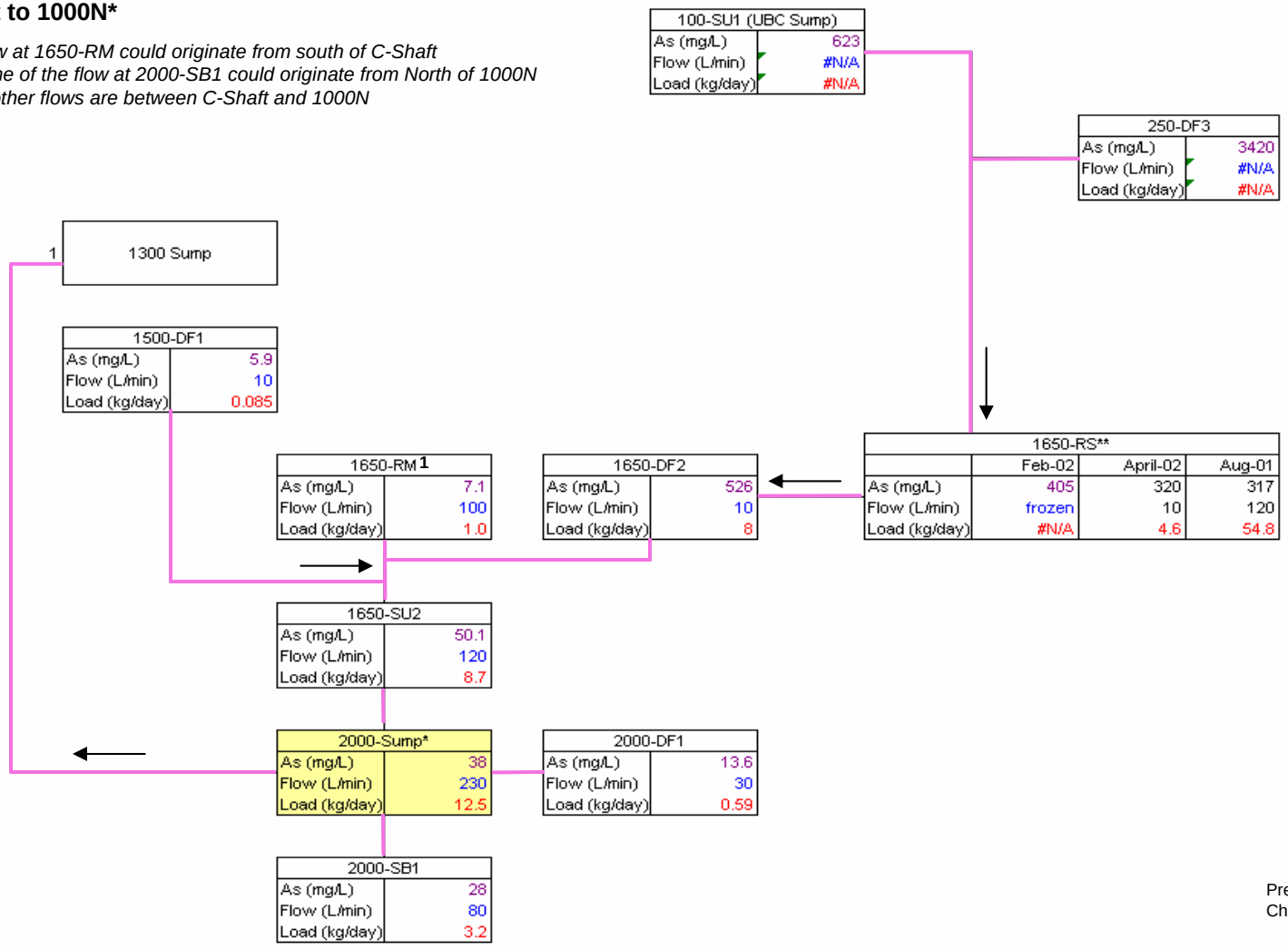
Giant Mine
Underground Mine Water Chemistry

Flowsheet showing Flows, Concentrations and Loads to the 1300 Sump – Freshet

PROJECT:	DATE:	APPROVED:	FIGURE
1CI001.12.B5	May 2005	KSS	**4.6**

C-Shaft to 1000N*

Note: Flow at 1650-RM could originate from south of C-Shaft
Some of the flow at 2000-SB1 could originate from North of 1000N
All other flows are between C-Shaft and 1000N



Prepared by: KSS
Checked by: DBM

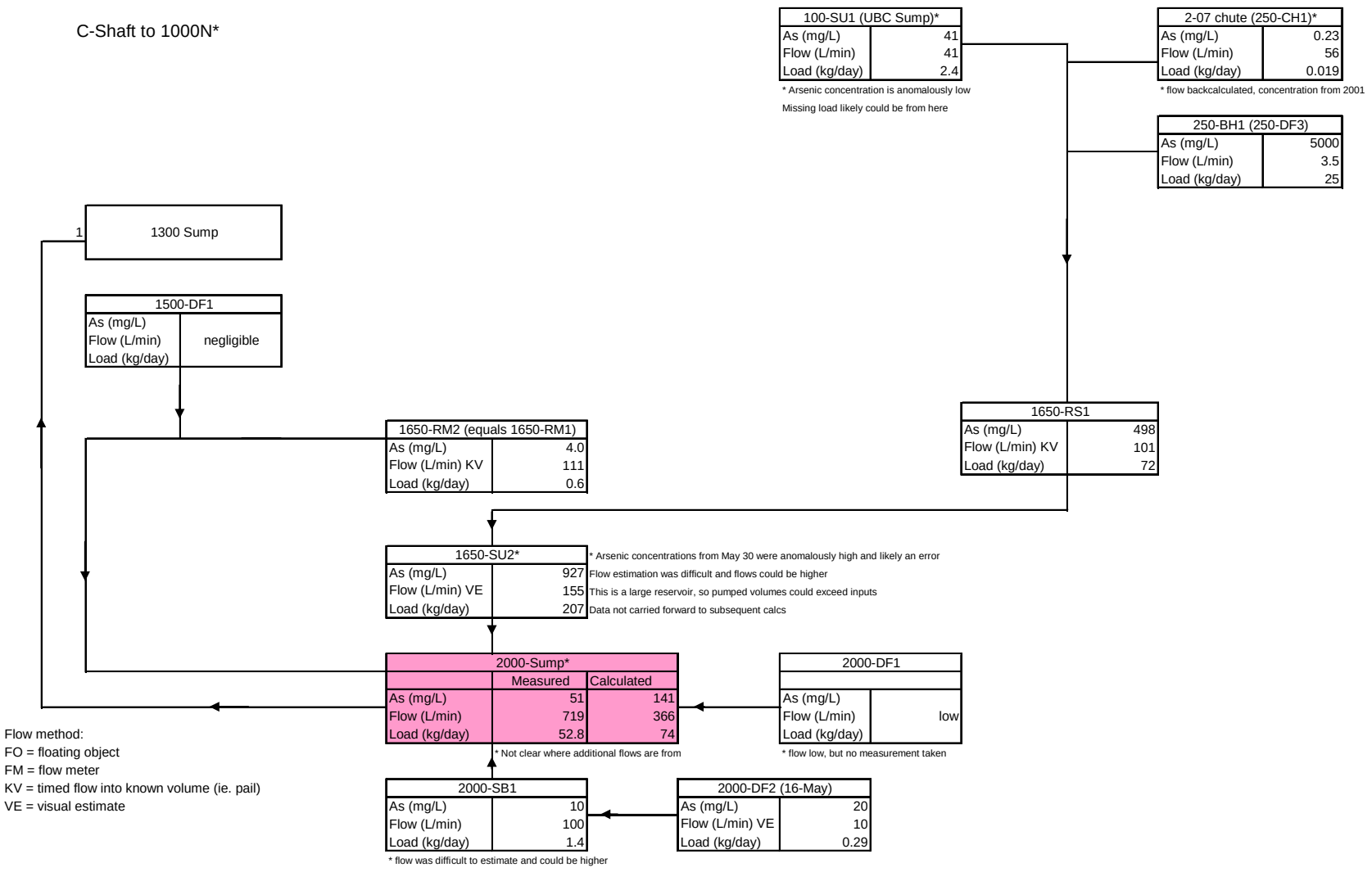
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Indian and Northern Affairs Canada

Giant Mine
Underground Mine Water Chemistry

Detail of Flow Pathway #1 - Winter

PROJECT:	DATE:	APPROVED:	FIGURE:
1CI001.12.B5	May 2005	KSS	**4.7**



Flow Pathway #1, Concentration, Flows and Loads (Arsenic) May-30 unless otherwise indicated

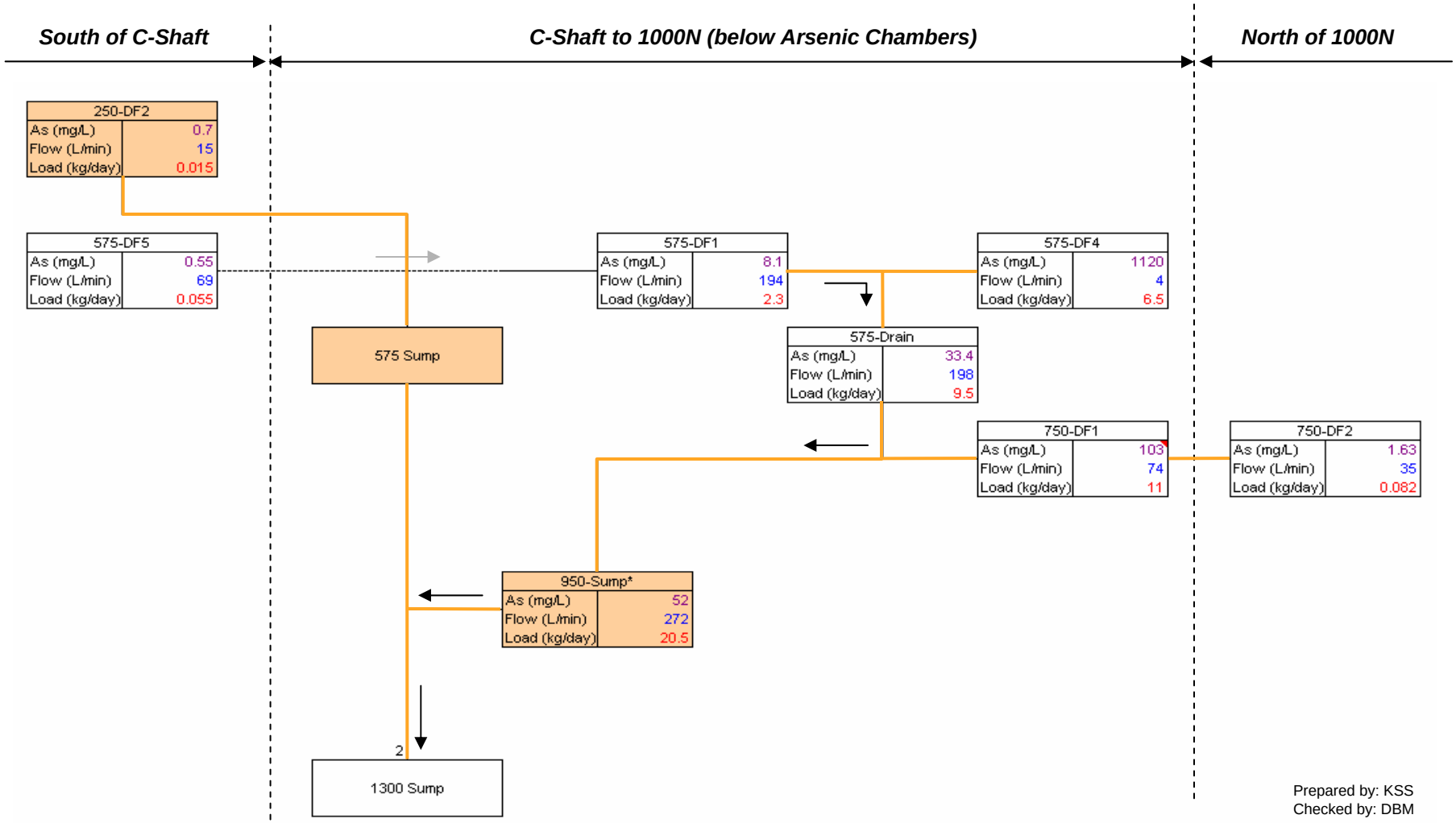
SRK Consulting
Engineers and Scientists

Indian and Northern Affairs Canada

Giant Mine
Underground Mine Water Chemistry

Detail of Flow Pathway #1 - Freshet

PROJECT:	DATE:	APPROVED:	FIGURE
1CI001.12.B5	May 2005	KSS	4.8



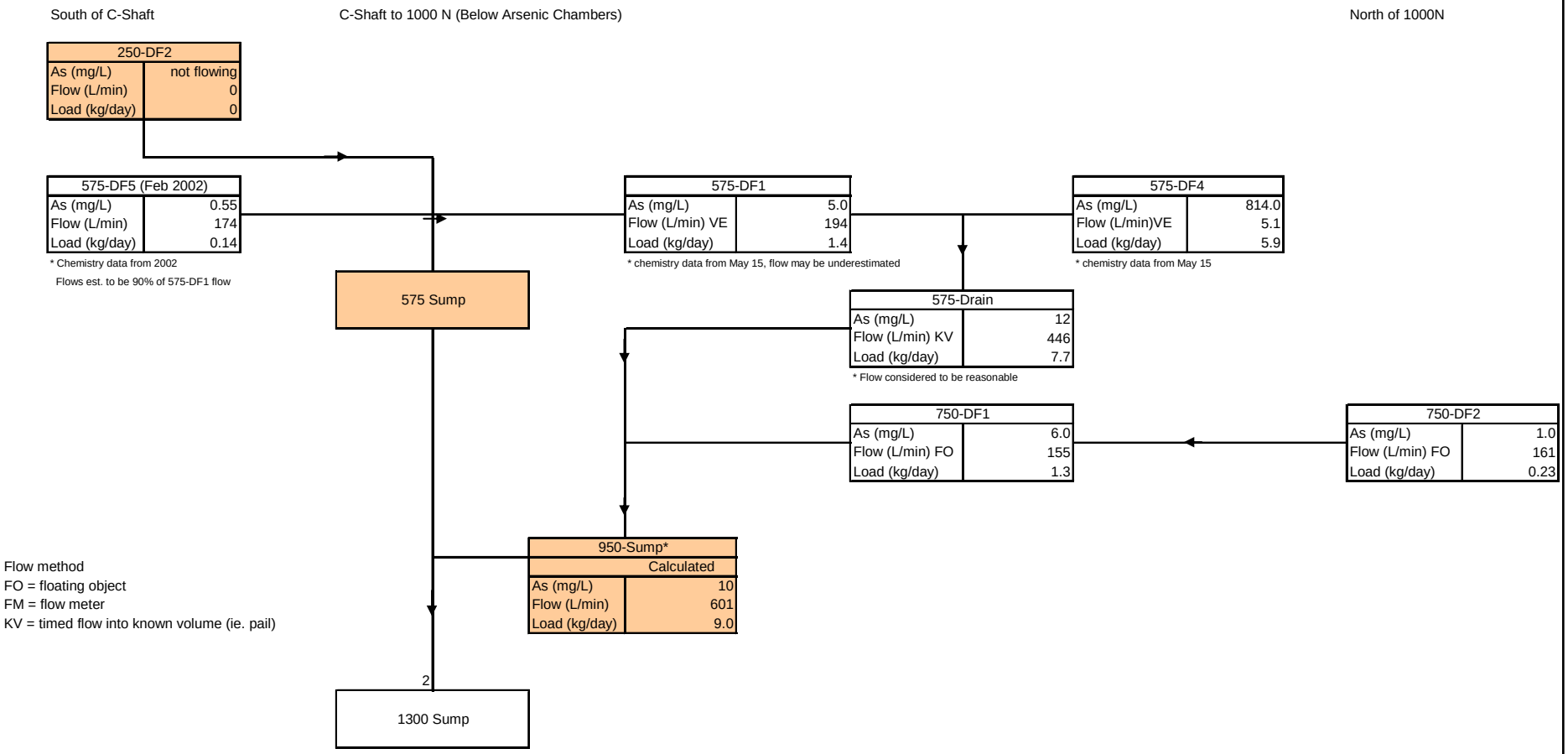
SRK Consulting
Engineers and Scientists

Indian and Northern Affairs Canada

Giant Mine
Underground Mine Water Chemistry

Detail of Flow Pathway #2 - Winter

PROJECT:	DATE:	APPROVED:	FIGURE:
1CI001.12.B5	May 2005	KSS	4.9



Flow Pathway #2, Concentration, Flows and Loads (Arsenic) May 30, 31, 2003 (unless otherwise indicated)

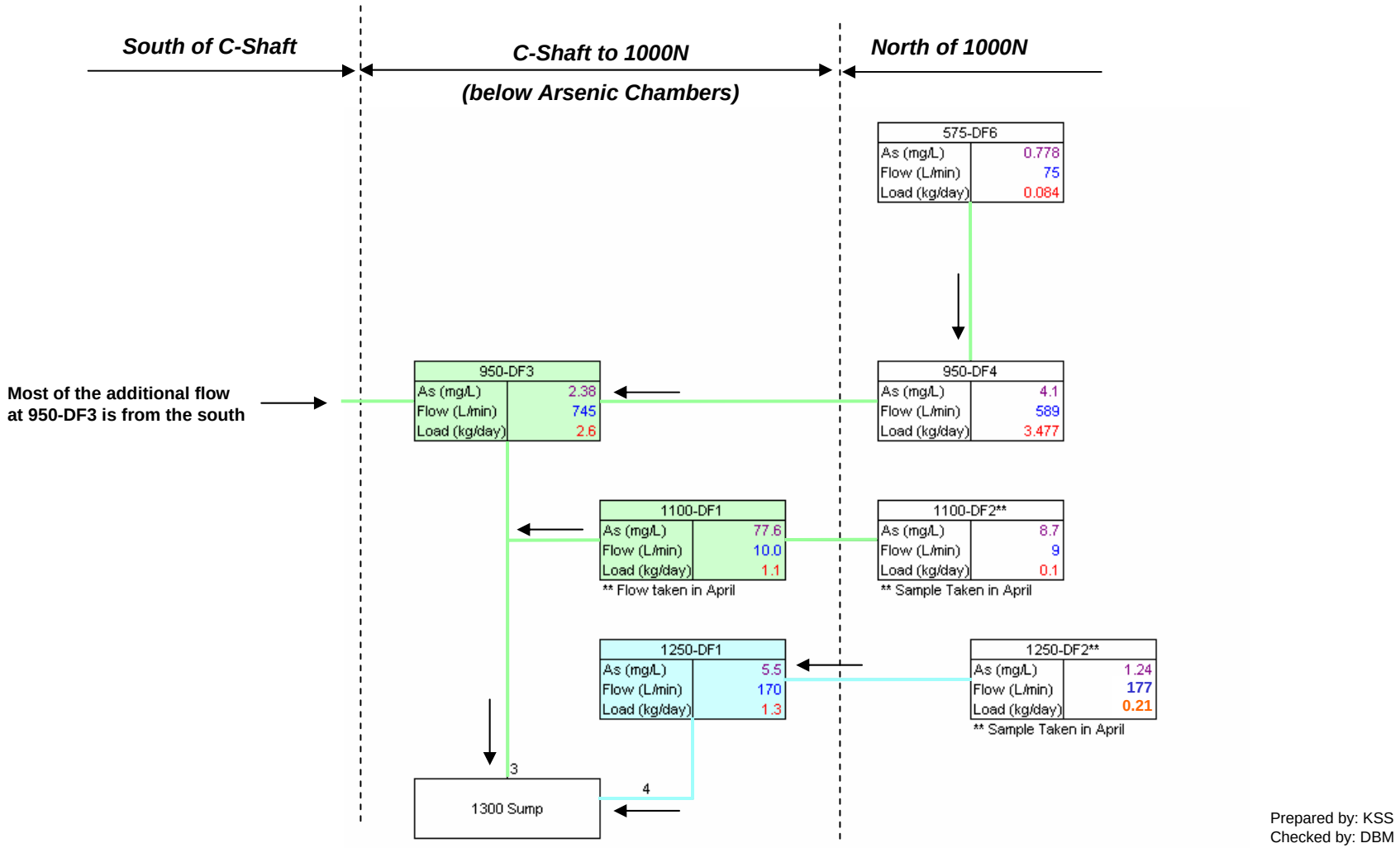
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Giant Mine
Underground Mine Water Chemistry

Detail of Flow Pathway #2 - Freshet

PROJECT:	DATE:	APPROVED:	FIGURE
1CI001.12.B5	May 2005	KSS	**4.10**



Prepared by: KSS
Checked by: DBM

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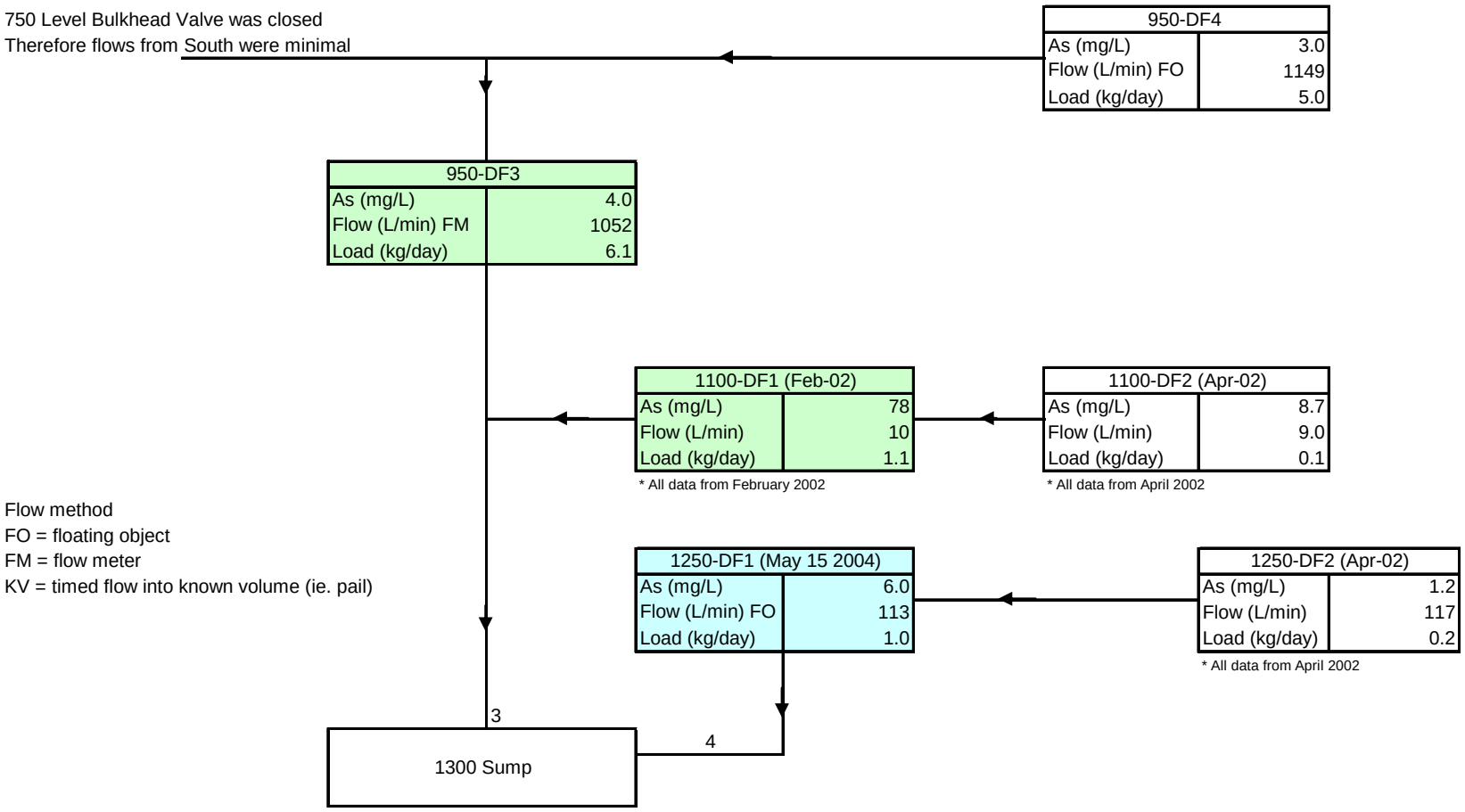
Giant Mine
Underground Mine Water Chemistry

Detail of Flow Pathways #3 and #4 Winter

PROJECT:	DATE:	APPROVED:	FIGURE:
1CI001.12.B5	May 2005	KSS	**4.11**

South of C-Shaft | C-Shaft to 1000 N (Below Arsenic Chambers) | North of 1000N

750 Level Bulkhead Valve was closed
Therefore flows from South were minimal



Flow method
FO = floating object
FM = flow meter
KV = timed flow into known volume (ie. pail)

Flow Pathways #3&4, Concentration, Flows and Loads (Arsenic)-May 30,31, 2004 (unless otherwise indicated)

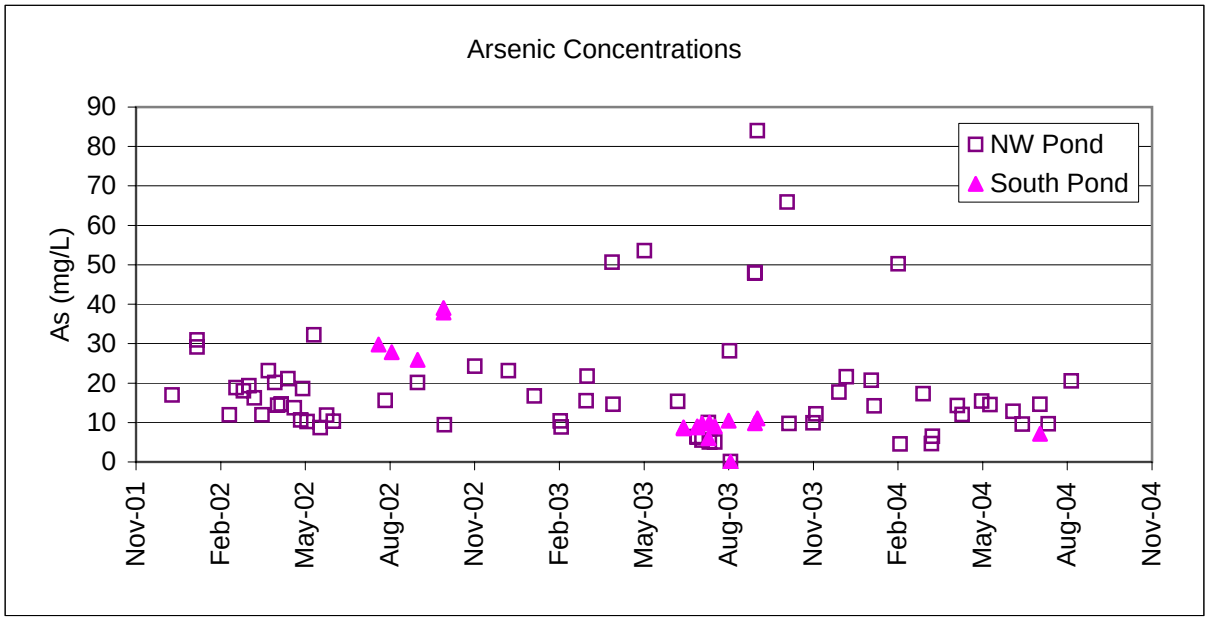
SRK Consulting
Engineers and Scientists

Indian and Northern Affairs Canada

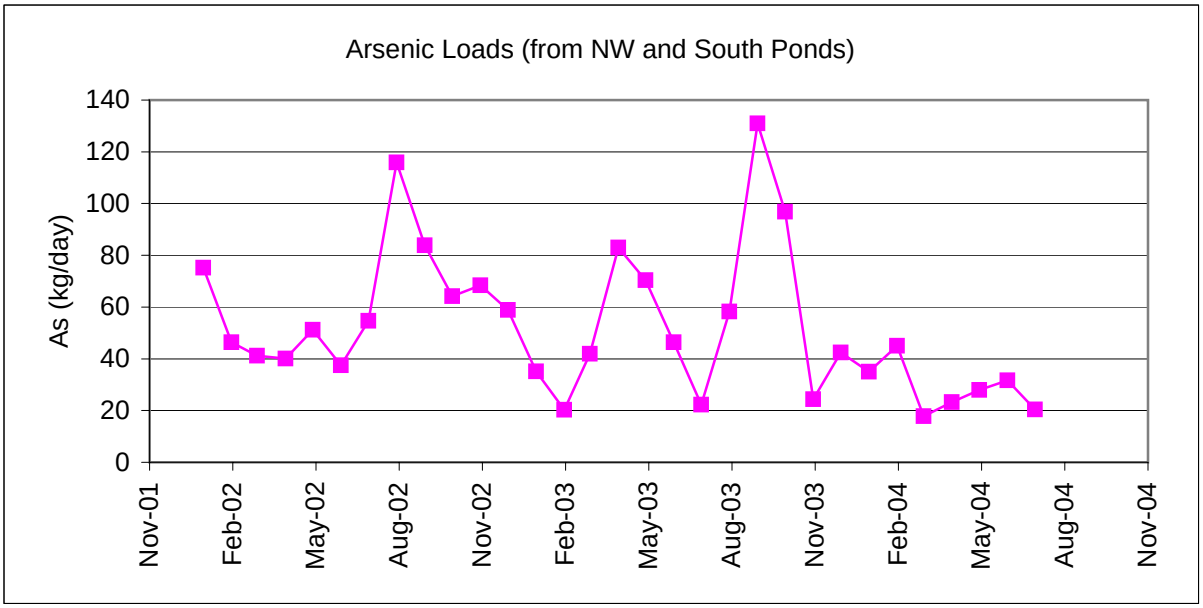
Giant Mine
Underground Mine Water Chemistry

Detail of Flow Pathways #3 and #4 Freshet

PROJECT:	DATE:	APPROVED:	FIGURE
1CI001.12.B5	May 2005	KSS	**4.12**



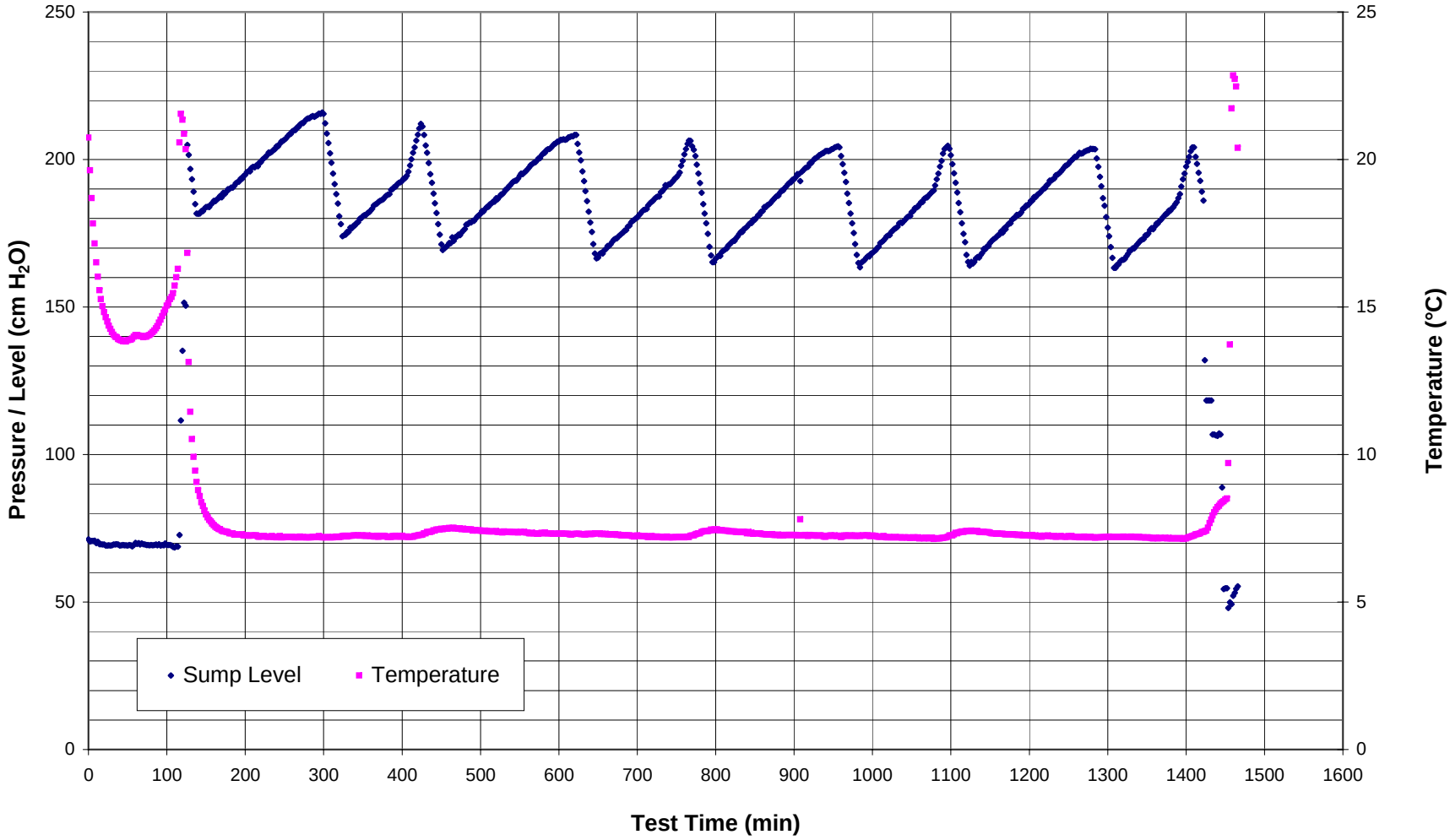
a) Variability in spot measurements of arsenic concentrations



b) Average Monthly Arsenic Loads

SRK Consulting Engineers and Scientists		Giant Mine - Underground Water Sampling		
Indian and Northern Affairs Canada		Arsenic Concentrations and Loads in Mine Discharge		
	Project	Date	Approved	Figure
	1CI001.12.B5	May-05	KSS	4.13

FILE REF: Fig4-14.xls



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Giant Project
Underground Mine Water Chemistry

Cycles in the 2000 Sump

PROJECT	DATE	APPROVED	FIGURE
1CI001.12	May 2005	KSS	**4.14**

Appendix A

Seep Survey Results

Attachment A - Seep Survey Results

"Type" Samples

Location	Date(x)	Site Description	Level	N	E	Isotope	Geochem	Geochem Type	Water Type	pH	Cond uS/cm	ORP mV	Alk $CaCO_3$eq	Temp (°C)	Flow (l/min)	Lab Tag	TSS mg/L	TDS mg/L	EC uS/cm	pH pH	Alk mg/L	DIC mg/L	DOC mg/L	Ca mg/L	Mg mg/L	Na mg/L	K mg/L	SO4 mg/L	Sulphide mg/L	Cl mg/L	Bromide mg/L	F mg/L	I mg/L	NH3-N mg/L	NO3-N mg/L	NO3-N+NO2-N mg/L	Ortho P mg/L	Si mg/L
000-SW3	6-Nov-00	Baker Creek upstream of effluent discharge.	0	2100	-2300	b	Ca-Mg-HCO3	1a	creek water	6.55		70	75			202617	6	144	189	7.8	80	15.8		24	8.5	5.22	1.99	13	-0.05	4	-0.3		0.003	0.09	0.019	-0.008	0.006	
000-SW3	9-May-00	Baker Creek upstream of effluent discharge.	0	2100	-2300	b	Ca-Mg-SO4-HCO3	1a	creek water	7.07	99	185		6.2		200744	14	86	98.2	7.51	32.6	7.7	13.6	11.5	4.03	2.58	1.26	44	-0.05	2	-3		0.002	0.091	-0.008	0.068	0.01	
000-SW3a	11-Mar-98	Baker Creek upstream of effluent discharge.	0	2100	-2300	nd	Ca-Mg-HCO3-SO4	1a	creek water	6.60	145			0.2		980333			160	7.66	64.8		20	19.5	6.1	4	1.98	34		8	-0.1	0.15	-0.02	0.257		0.185		1.02
000-SW4	9-May-00	Baker Creek at outlet to Yellowknife Bay.	0	-5400	2200	b	Ca-Mg-HCO3-SO4	1a	creek water	7.41	191	165		6.6		200746	11	153	209	7.67	48.4	11.1	13.7	24.6	7.21	5.44	2.01	44	-0.05	7	-3		0.002	0.247	-0.008	0.226	0.056	
000-SW5	6-Nov-00	Great Slave Lake water at pump inlet. (unchlorinated)				c	Ca-Mg-HCO3	1a	lake water	5.94	68	110	-50	0.3		202616	-3	40	48.9	7.39	15.5	3.6		5.51	1.72	1.81	0.87	4	-0.05	2	-0.3		-0.002	0.066	0.018	-0.008	-0.004	
000-SW1	20-Sep-99	C-dry tap water. (chlorinated)	0	-1700	600	c/b	Ca-HCO3-Cl-SO4	1a	lake water	8.30	133			13.0		992280			132	7.9	25.6		6	14.4	2.63	5.15	0.725	15		14		0.09		-0.005		0.228		1.12
000-SW1	17-Apr-00	C-dry tap water. (chlorinated)	0	-1700	600	c	Na-HCO3-SO4-Cl	1a	lake water	7.01	104	580	n/a	8.7	n/a	200610	-3	34	52.8	7.24	16	4	4.2	0.55	0.2	1.9	0.58	5	-0.05	3	-0.3		-0.002	-0.005		0.062	-0.002	
000-SW1	9-May-00	C-dry tap water. (chlorinated)	0	-1700	600	c/b	Ca-Mg-HCO3-Cl	1a	lake water	6.84	64	610		8.4		200742	-3	32	57.6	7.32	17.3	4.6	4.6	6.97	1.81	2.14	0.85	-3	-0.05	4	-3		-0.002	0.005	-0.008	0.042	0.006	
000-SW1	28-Jan-98	C-dry tap water. (chlorinated)	0	-1700	600	nd	Ca-Mg-HCO3	1a	lake water	6.10	53			11.3		980109			51.2	7.46	15.7		6.1	5.96	1.46	1.99	0.545	5		4	0.6	0.05	0.004			0.066		0.841
250-DH1	28-Jan-98	Horiz DH at western extremity of workings.	250	600	-1925	a	Ca-Mg-HCO3-SO4	1b	infiltration/walls	6.40	806			1.1		980104			765	7.75	267		7.6	117	36.2	23	9.01	206		4	0.2	0.18	0.013			-0.008		3.5
250-DH1	21-Sep-99	Horiz DH at western extremity of workings.	250	600	-1925	a	Ca-Mg-SO4-HCO3	1b	infiltration/walls	7.10	1107			1.6		992291			1110	7.44	268		5.7	180	62.5	19	10.7	367		5		0.14		0.074		0.015		3.74
250-DH1	18-Apr-00	Horiz DH at western extremity of workings.	250	600	-1950	a	Ca-Mg-SO4-HCO3	1b	infiltration/walls	7.22	669	-80	n/a	1.6	3	200614	7	482	729	7.53	222	54	4.1	86.8	33.4	32.2	3.7	147	-0.05	19	-0.3		0.009	0.134	-0.008	-0.008	0.004	
250-DH1	9-May-00	Horiz DH at western extremity of workings.	250	600	-1950	a	Ca-Mg-SO4-HCO3	1b	infiltration/walls	6.80	1033	<-80		1.7	5.3	200740	14	789	1090	7.72	266	64.8	4.9	157	51.4	28.8	4.12	303	-0.05	15	-3		0.008	0.115	-0.008	0.039	0.003	
250-DH1	8-Nov-00	Horiz DH at western extremity of workings.	250	600	-1950	a	Ca-Mg-SO4-HCO3	1b	infiltration/walls	7.04	1052	80	180	1.6	3.75	202667	16	635	921	7.27	249	48.4		127	50	19.9	3.44	363	-0.05	6	-0.3		0.006	0.121	-0.008	-0.008	0.005	
250-DH1	14-Jul-01	Horiz DH at western extremity of workings.	250	600	-1950	a		1b	infiltration/walls	7.09	1639	-56		1.8	5	211536	18	729	990	7.17	267		17.8	128	49.2	25	4.07	301		10				0.094		0.013	0.012	
575-DH3	28-Jan-98	Horiz DH w/ valve oriented west.	575	-1500	175	a/e	Ca-Mg-HCO3-SO4	1b	infiltration/walls	6.70	1060			4.2		980107			870	8.05	326		5.2	115	44.6	27.8	6.75	245		8	-0.1	0.18	0.005			0.027		4.52
575-DH3	13-Mar-98	Horiz DH w/ valve oriented west.		-1500	175	nd	Ca-Mg-HCO3-SO4	1b	infiltration/walls	7.00	1000			3.6		980343			948	7.68	333		5	124	47.5	32.5	12.8	225		11	-0.1	0.16	0.003	0.294		0.012		5.1
575-DH3	21-Sep-99	Horiz DH w/ valve oriented west.	575	-1500	175	a/e	Ca-Mg-HCO3-SO4	1b	infiltration/walls	7.10	917			4.7		992287			980	7.78	311		4.6	129	52.1	31.1	12.2	232		11		0.18		0.15		0.011		4.85
575-DH3	3-May-00	Horiz DH w/ valve oriented west.	575	-1500	-175	a	Ca-Mg-HCO3-SO4	1b	infiltration/walls	8.87	887	<-80	240	4.7	15	200681	4	725	1010	7.52	487	79.9	11.4	136	54.6	24.5	5.22	121	-0.05	7	-3		0.006	0.149	-0.008	0.009	0.015	
750-SP2	6-May-00	Seep from fault in 7-80 exploration drift, northern extremity of worki	750	7950	-2425	a	HCO3-SO4	1b	infiltration/walls	7.14	1520	-60		4.1	5	200717	7	1340	1610	8.08	143	65	12.9	71.9	20.6	37.5	3.38	456	-0.05	33	-3		0.006	0.477	-0.008	0.011	0.008	
750-SP2	7-Nov-00	Seep from fault in 7-80 exploration drift, northern extremity of worki	750	7950	-2425	a	Ca-SO4-HCO3	1b	infiltration/walls	7.32	1208	-45	215	4.1	15	202647	-3	811	1080	7.57	239	45.4		200	17.2	31	2.64	408	-0.05	26	-0.3		0.003	0.423	-0.008	-0.008	0.014	
750-SP2	14-Jul-01	Seep from fault in 7-80 exploration drift, northern extremity of worki	750	7950	-2425	a		1b	infiltration/walls	7.24	2230	<-99		3.9	4	211534	4	1120	1380	7.47	262		23.4	277	21.8	39.6	3.48	474		34.1				0.589		0.012	0.01	
100-SP1	27-Jan-98	Seepage from fault in drift back, close to Baker Creek.	100	-325	-350	nd	Ca-Mg-HCO3-SO4	1a,b	creek/walls	6.30	447			5.2		980077			417	7.73	114		16	55.8	11.6	17.3	3.19	60		20	-0.1	0.15	0.011			3.3		4.33
100-SP1	8-May-00	Seepage from fault in drift back, close to Baker Creek.	100	-300	-350	b?	Ca-Mg-HCO3-SO4	1a,b	creek/walls	6.74	404	135		5.4	1.2	200727	-3	226	343	7.96	78.7	18.1	12.6	50.2	10.2	11	3.54	59	-0.05	11	2.2		0.003	5.5	-0.008	1.34	0.292	
100-SP1	8-Nov-00	Seepage from fault in drift back, close to Baker Creek.	100	-300	-350	b	Ca-Mg-Na-SO4-HCO3	1a,b	creek/walls	7.41	642	95	90	5.2	1	202664	-3	378	576	7.71	108	21.2		59	17.2	30.5	4.75	132	-0.05	44	-0.3		0.005	0.064	-0.008	0.173	0.291	
250-SP2	8-May-00	Seepage through foliated rock in drift back, below B1 pit.	250	300	-350	a	Ca-Mg-SO4	2,5?	infiltration/walls/so4 (	6.89	1687	125		4.7	0.1	200729	4	1560	1880	8.15	188	39.9	4.7	311	90.6	37.6	12.7	686	-0.05	48	-3		0.003	-0.005	-0.008	0.476	0.215	
250-SP2	8-Nov-00	Seepage through foliated rock in drift back, below B1 pit.	250	300	-350	a	Ca-Mg-SO4	2,5?	infiltration/walls/so4 (	7.42	2220	310	120	3.9	0.1	202665	-3	1810	2100	7.7	142	26.8		316	101	53.1	13.3	1566	-0.05	83	-0.3		0.003	0.084	-0.008	0.042	0.173	
250-SP2	13-Jul-01	Seepage through foliated rock in drift back, below B1 pit.	250	300	-350			2	infiltration/walls/so4 (	7.52	2990	266		5.1	<2	211525	10	1430	1630	7.59	122		3.9	300	90.8	29.2	11.7	918		33.6				0.006		1.51	0.322	
575-DH1	6-Mar-98	Flowing inclined DH near A-shaft.	575	-4750	725	d	Ca-Mg-Na-SO4	2,3?	a-shaft area (souther	8.10	1788			2.0		980319			1700	8.15	183		8.5	195	78.4	114	9.8	625		122	0.5	0.15	0.011	-0.002		0.239		8.38
575-DH1	31-Mar-00	Flowing inclined DH near A-shaft.	575	-4750	700	a/b	Ca-Mg-Na-SO4	2,3?	a-shaft area (souther	8.20	1940	n/a	n/a	n/a	0.6	200556	6	1390	1780	8.05	126	30.3	5.6	174	85.6	121	7.88	666	-0.05	101	0.4		0.016	-0.005	-0.008	19.6	0.342	
575-DH1	3-May-00	Flowing inclined DH near A-shaft.	575	-4750	700	d/e	Ca-Mg-Na-SO4	2,3?	a-shaft area (souther	7.67	1523	100	127	1.7	1.5	200682	-3	1280	1710	8.13	152	33.4	6.6	181	77	113	7.41	563	-0.05	91	-3		0.014	-0.005	-0.008	16.3	0.405	
575-DH1	9-Nov-00	Flowing inclined DH near A-shaft.	575	-4750	700	a/e	Ca-Mg-SO4-HCO3	2?(1b?)	a-shaft area (souther	8.12		130	175	1.3	30	202668	-3	551	813	8.26	181	35.7		109	37.2	24.8	3.36	310	-0.05	13	-0.3		0.009	0.052	-0.008	0.297	0.266	
000-SW2	11-Mar-98	NW Tailings pond water. (Free water)	0	5150	-1850	nd	Ca-Na-SO4-Cl	3	nw tails/surf	8.30	2400			0.5		980334			2400	8.33	101		19	263	61.8	181	4.36	712		323	0.5	0.12	0.018	12.6		0.483		26.9
000-SW2	20-Sep-99	NW Tailings pond water. (Free water)	0	5150	-1850	b?	Ca-Mg-Na-SO4-Cl	3	nw tails/surf	8.10	2290			12.8		992278			2440	8.03	95		7.8	338	81.2	148	7.05	884		241		0.12		8.88		12.9		25.2
000-SW2	17-Apr-00	NW Tailings pond water. (Free water)	0	5000	-2150	d/b	Ca-Na-Cl-SO4	3	nw tails/surf	7.35	1613	295	n/a	0.6	n/a	200611	4	1370	1790	7.75	79.2	20	6.4	179	36.5	133	7.21	322	-0.05	307	3.2		0.017	2.17		9.13	3.51	
000-SW2	9-May-00	NW Tailings pond water. (Free water)	0	5000	-2150	d/b	Ca-Na-Cl-SO4	3	nw tails/surf	7.98	1440	235		5.8		200743	15	1090	1580	7.86	71.1	15.8	5.1	196	37	103	6.77	282	-0.05	240	-3		0.013	2.09	0.242	8.79	3.99	
000-SW2	16-Nov-00	NW Tailings pond water. (Free water)	0	5000	-2150	d	Ca-Na-Mg-SO4-Cl	3	nw tails/surf	7.27	1721	150		0.3		202695	-3	1120	1470	7.99	85	16.7		190	43.3	102	8.13	366	-0.05	190	-3		0.013	1.19		8.8	5.77	
000-SW2	9-Aug-01	NW Tailings pond water. (Free water)	0	5000	-2150			3	nw tails/surf	8.27	2300	171		15.9 -		212008	16	1450	1910	8.19	97		5.4	210	49.8	133	9.25	262		286				0.093	9.72	9.87		
Gold NWP	1-Aug-00	Pore water sample collected from well in NW Pond.	0			nd	Ca-Na-SO4-Cl	3	nw tails/surf										2040	7.8	127			218	52.4	148	13.3	511		291					0.74	6.44	-0.1	
250-SU1	18-Apr-00	Sump in Supercrest, collects seepage through drift back, pond influ	250	7050	-2900	d	Ca-Na-Mg-SO4-Cl	3	nw tails/ug	7.62	1951	166	n/a	3.6	n/a	200616	10	1590	2210	7.67	223	54	9	287	84.6	173	12.9	600	-0.05	229	2.3		0.019	5.13	0.068	0.476	0.157	
250-SU1	6-May-00	Sump in Supercrest, collects seepage through drift back, pond influ	250	7050	-2900	d	Ca-Na-Mg-SO4-Cl	3	nw tails/ug	7.68	2240	75		3.1	20	200716	4	1610	2240	8.12	228	50.5	12.1	249	70.8	145	14	456	-0.05	234	1.7		0.016	5.19	0.064	0.403	0.158	
250-SU1	7-Nov-00	Sump in Supercrest, collects seepage through drift back, pond influ	250	7050	-2900	d	Ca-Na-SO4-Cl-HCO3	3	nw tails/ug	7.64	2200	70	210	3.0	7	202648	-3	1440	1910	8.01	210	40.4		199	6.48	122	11.9	561	-0.05	198	-0.3		0.019	3.92	0.017	0.012	0.167	
250-SUI	14-Jul-01	Sump in Supercrest, collects seepage through drift back, pond influ	250	7050	-2900	d		3	nw tails/ug	7.66	3290	89		2.3	15-30	211533	6	1410	1960	7.74	201		12.7	202	66.3	149	13.7	472		221				5.58		0.191	0.171	
425-DH2	7-Mar-98	Inclined DH w/ valve in Supercrest drift wall.	425	6800	-2450	d	Ca-Na-Mg-SO4-Cl-HCO3	3	nw tails/ug	6.90	2140			4.0		980320			2100	7.63	290		13	244	70.4	183	13.1	640		237	-0.1	0.17	0.1	5.58		0.064		12.5
425-DH2	21-Sep-99	Inclined DH w/ valve in Supercrest drift wall.	425	6800	-2450	d	Ca-Na-Mg-SO4-Cl-HCO3	3	nw tails/ug	7.60	1240			3.2		992329			2220	8.05	289		8.3	243	76.1	159	12.9	671		230		0.14		6.59		0.038		13.3
425-DH2	2-Apr-00	Inclined DH w/ valve in Supercrest drift wall.	425	6800	-2450	d	Ca-Na-Mg-SO4-Cl-HCO3	3	nw tails/ug	7.80	2020	n/a	n/a	3.5	30 to 50	200560	29	1590	2280	7.46	256	58.2	11	230	65.1	164	14.5	621	-0.05	252	1.1		0.053	7.78	-0.008	-0.008	0.199	
425-DH2	6-May-00	Inclined DH w/ valve in Supercrest drift wall.	425	6800	-2450	d/b	Ca-Na-Mg-SO4-Cl	3	nw tails/ug	7.16	2290	110		3.8	4	200714	6	1640	2220	7.91	220	51.7	14.9	271	70.3	154	15.4	583	-0.05	242	-3		0.044	8.38	0.18	0.158	0.257	
425-DH2	14-Jul-01	Inclined DH w/ valve in Supercrest drift wall.	425	6800	-2450			3	nw tails/ug	6.92	3620	256		3.3	120	211532	4	1520	2060	7.16	127		5.9	234	63.2	158	13.9	478		256				0.268		9.76	3.25	
575-SP1	6-May-00	Seep from fault on S-425 incline in Supercrest.	575	5800	-1925	d	Ca-Na-Mg-SO4-Cl	3	nw tails/ug	7.34	1952	130	135	3.2	1.5	200713	6	1570	2090	8.07	152	35.4	7.9	251	61.9	137	16.9	393	-0.05	262	2.1		0.008	6.67	0.738	12.8	1.71	
575-SP1	7-Nov-00	Seep from fault on S-425 incline in Supercrest.	575	5800	-1925	b/d	Ca-Mg-Na-SO4-Cl	3	nw tails/ug	7.52	2640	90	145	3.3	1.3	202646	-3	1740	2270	7.84	182	35.1		243	74.2	138	15.8	835	0.17	263	-3		0.015	5.29	0.017	0.024	2.3	
575-SP1	14-Jul-01	Seep from fault on S-425 incline in Supercrest.	575	5800	-1925	c		3	nw tails/ug	7.29	2970	224		3.6	3	211531	5	1410	1920	7.59	130		5.9	234	68	137	11.5	405		258				1.15		5.34	3.1	
750-SP1	8-Mar-98	Seep through foliated rock in drift back, Supercrest area.	750	5800	-1725	d	Ca-Na-Mg-SO4	3	nw tails/ug	7.20	2460			3.5		980323			2400	7.84	207		7.5	323	76.6	177	8.52	932		208	-0.1	0.17	0.025	9.61		0.162		18.7
750-SP1	1-Apr-00	Seep through foliated rock in drift back, Supercrest area.	750	5900	-1750	d	Ca-Na-Mg-SO4-Cl	3	nw tails/ug	7.80	2620	n/a	n/a	n/a	n/a	200559	9	2250	3030	7.7	225	46.6	7.3	348	97.7	198	21.9			311	1.4		0.009			4.41	2.22	
750-SP1	3-May-00	Seep through foliated rock in drift back, Supercrest area.	750	5900	-1750	d	Ca-Na-Mg-SO4-Cl	3	nw tails/ug	7.14	3030	90	170	3.7	0.067	200678	12	2150	2890	5.48	30.2	46.5	13.2	353	95.8	192	21.5	1080	-0.05	327	-3		0.006	9.22	0.225	8.13	1.23	
750-DP1	9-Nov-00	Drain pipe from 575 level in Supercrest.	750	5700	-1650	d	Ca-Na-SO4	3	nw tails/ug	8.00		110	145	4.3		202673	9	1800	2330	8.09	170	32.2		268	69.6	144	15.7	1229	-0.05	211	-3		0.017	6.06	0.356	1.6	1.11	
575-SP2	8-May-00	Seep from foliated rock in drift back below polishing/settling pond.	575	4000	-200	d	Ca-Mg-Na-SO4-HCO3	3	polishing pond	7.39	1878	115		2.6	0.35	200730	4	1560	1990	8.21	233	49.2	7.8	262	79	101	14.1	499	-0.05	144	1.2		0.016	2.63	0.049	0.954	0.285	
575-SP2	16-Nov-00	Seep from foliated rock in drift back below polishing/settling pond.	575	4000	-200	d	Ca-Mg-Na-SO4	3	polishing pond	7.27	2240	190		3.5		202694	-3	1510	1920	7.82	208	42.1		292	82.6	108	11.4	567	-0.05	154	-3		0.011	1.64		0.876	0.296	
575-SP2	12-Jul-01	Seep from foliated rock in drift back below polishing/settling pond.	575	4000	-200	d/e		3	polishing pond	7.52	2840	276		3.0	0.2	211523	6	1610	2080	7.52	222		12.4	275	81.4	120	14.9	653		189				2.48		3.38	0.37	
2000-DH2	5-May-00	Flow from DH(?) in drift floor. (sampled from entry into ditch flow)	2000	-1425	325	f	Ca-Na-Cl	4	deep gw (brine)	6.60	55700	<-80		9.5		200711	140	47200	5440	7.05	67.4	15.7	2	7530	525	5810	31.6	766		23700	268		1.11	0.052	-0.008	6.5	2.18	
2000-DH2	20-Aug-01	Flow from DH(?) in drift floor. (sampled from point of upwelling	2000	-1425	325	f		4	deep gw (brine)	6.31	61000	--100		9.4	4	212134	325	50800	64400	6.85	63.6		1.6	8800	683	8430	74.7	110		30900				-0.005		0.008		
2000-DH1	5-May-00	Flow from DH(?) in drift floor. (flows from muck/slime pile)	2000	-1450	300	e	Ca-Na-Cl	4	deep gw (recharge)	6.96	14190	-80	67	9.8		200710	41	10800	1490	7.68	84.1	17.3	3.5	2370	70.1	1570	12.7	492	-0.05	5610	43		0.161	0.26	0.048	0.07	5.64	
2000-DH1	6-Nov-00	Flow from DH(?) in drift floor. (flows from muck/slime pile)	2000	-1450	300	e	Ca-Na-Cl	4	deep gw (recharge)	7.11	14110	100		9.7		202618	34	10600	14400	7.47	84.5	13.7		1710	67.4	1280	15.7	301	0.23	4900	-30		0.16	0.377	-0.008	-0.008	1.78	
2000-DH1	30-Jan-98	Flow from DH(?) in drift floor. (flows from muck/slime pile)	2000	-1450	300	e	Ca-Na-Cl	4	deep gw (recharge)	7.00	16730			9.8		980117			17100	6.67	81.5		2.8	1960	61.4	1200	18.5	449		5460	0.2	0.14	0.168			0.038		13.6
2000-DH1	22-Sep-99	Flow from DH(?) in drift floor. (flows from muck/slime pile)	2000	-1450	300	e	Ca-Na-Cl	4	deep gw (recharge)	7.20	12170			9.9		992316			16100	7.68	82.3		-0.2	2100	57.7	1500	19	383		5480		0.13		0.128		0.109		13
2000-DH1	19-Apr-00	Flow from DH(?) in drift floor. (flows from muck/slime pile)	2000	-1450	300	e	Ca-Na-Cl	4	deep gw (recharge)	7.00	13310	-20	n/a	9.9	n/a	200620	134	12300	1510	7.2	80.7	20	2.1	1640	62.7	1390	22.2	527	-0.05	5210	59		0.18	0.694	0.08	0.089	2.88	
2000-DH1	20-Aug-01	Flow from DH(?) in drift floor (flows up through a muck pile)	2000	-1450	300	e		4	deep gw (recharge)	7.34	"OR"	-80		9.8	2	212133	74	10400	15200	7.44	79.5		3.5	1900	68.6	1540	18	447		5440				0.104		-0.008		
250-SP1	2-May-00	Seepage through foliated rock at B/H 50.	250	-1575	-100	a/d?	As	5	chamber	6.65	2710	60	350	4.5		200659								152	144	126	14.7		-0.05		-3		0.102					
250-SP1	9-Nov-00	Seepage through foliated rock at B/H 50.	250	-1575	-100	a	As-SO4	5	chamber	6.37		150	350		10	202670	-3	7560	2610	6.94	530	7.4		241	186	98.6	14.9	1213	-0.05	150	-0.3		0.11	3.98	-0.008	-0.008	316	
250-SP1	16-Jul-01	Seepage through foliated rock at B/H 50.	250	-1575	-100	a		5	chamber	6.6	4810	<149		4.5	<0.1	211539	32	3870	2680	6.84	544		12.6	366	206	125	16.9	524		167				5.98		0.008	447	
250-SP3	15-May-00	Seepage through face of B/H 14.	250	350	100	a	As-SO4	5	chamber	5.91	2360	175	71	1.8	0.2	200773	25	6470	2370	5.93	144	-0.5	5.5	204	107	37.5	4.75	968	-0.05	41	-2		-0.002	0.633	0.061	0.445	348	
250-SP3	8-Jun-00	Seepage through face of B/H 14.	250	350	100	nd	Ca-Mg-As	5	chamber	5.75	1782	145	n/a	1.9	0.8	200978	11	4967	202000	6.13	96.2	3.1	5.5	311	121	41.6	11.4	9	-0.05	69	-0.3		0.008	0.282	-0.008	0.164	310	
250-SP3	16-Nov-00	Seepage through face of B/H 14.	250	350	100	a	Mg-As-SO4	5	chamber	6.08	3310	180		2.2	1.4	202697	16	2210	2760	6.43	328	0.58		183	231	69.2	15.4	1184	-0.05	84	-0.3		-0.002	0.883		-0.008	403	
250-SP3	12-Jul-01	Seepage through face of B/H 14.	250	350	100	a		5	chamber	6.2	4560	298		1.9	0.65	211526	32	3700	2440	6.29	233		5.3	430	176	50.3	16.1	935		53.8				0.475		-0.008	575	
425-DH1	2-May-00	Flow from inclined DH below Chamber B208.	425	250	25	a	As-SO4	5	chamber	6.14	1191	70	260	4.4	0.017	200660	36	7870	3030	5.98	228	1.5	6.6	245	147	66.2	14.4	1450	-0.05	59	-3		-0.002	-0.005	-0.008	-0.008	899	
575-DH2	28-Jan-98	Flowing inclined DH below AR-3 complex.	575	100	-50	a	Mg-Ca-SO4-As	5	chamber	6.30	4920			3.3		980106			4110	7.13	831		11	468	585	104	34.6	2882		67	0.2	0.15	0.028			-0.008		26.2
575-DH2	13-Mar-98	Flowing inclined DH below AR-3 complex.	575	100	-50	nd	As	5	chamber	6.40	4700			3.6		980344																						
575-DH2	21-Sep-99	Flowing inclined DH below AR-3 complex.	575	100	-50	a	Mg-Ca-As-SO4	5	chamber	6.60	3890			5.0		992288			4490	7.14	734		7.2	505	565	102	37.7	2490		70		0.14		2.84		-0.008		27.9
575-DH2	19-Apr-00	Flowing inclined DH below AR-3 complex.	575	100	-50	a/d?	Mg-As-SO4	5	chamber	6.54	4400	0	n/a	4.5	0.14	200618	24	10300	4660	6.81	791	183	29	235	607	106	28	2980	-0.05	60	0.6		-0.002	3.1	-0.008	-0.008	185	
575-DH2	4-May-00	Flowing inclined DH below AR-3 complex.	575	100	-50	a/d?	Mg-As-HCO3-SO4	5	chamber	6.43	5120	-20	600	4.3	0.14	200702	40	9760	4760	7.37	4170	106	8.6	216	612	109	29.9	3610	-0.05	60	-3		-0.002	2.81	-0.008	-0.008	219	
575-DH2	16-Jul-01	Flowing inclined DH below AR-3 complex.	575	100	-50			5	chamber	6.4	5850	34		4.4	0.2	211540	37	6830	4030	7.14	725		17	415	555	104	26.7	587		62.4				2.98		-0.008	261	
575-150N	12-Jul-01	DH below AR-3 complex.	575	150	-75			5	chamber	6.62	4260	126			0.5	211529																						
EBA-BH3	17-Jul-01	Groundwater well on surface near bag house	0	-15	170	nd		2	Contaminated Soils	6.66	3120	262		6	gw	211620	702	2240	2410	7.03	286		21.7	454	115	53	8.47	1060		52.4				0.012		0.232	0.58	
1250-SP1	17-Jul-01	Seep over washed out tailings, between 1400 N and 800 N, in cros	1250	1800	125	nd		2	Tailings Backfill	7.7	3370	216		7	2-5	211617	134	2710	2960	7.69	233		11.3	501	120	101	20.8	1360		90.3				0.616		10.2	0.271	
1250-SP1	21-Jan-04	Seep over washed out tailings, between 1400 N and 800 N, in cros	1250	1800	125				Tailings Backfill	6.98	3230	170		7.3	0.1	240071	8	2640	3230	7.6	232			535	103	99.1	14.5	1370		127				0.501		2.49		
950-CH2	21-Aug-01	Tailings backfill sample (chute 9-14#6)	950	1400	-150	a		2	Tailings Backfill	8.02	2820	172		6.5	-0.5	212139	7	1420	1640	8.1	190		6.5	267	58.4	46.2	5.89	733		23				0.022		10		
950-CH2	21-Jan-04	Tailings backfill sample (chute 9-14#6)	950	1400	-150				Tailings Backfill	7.08	1676	172		5.7	0.041	240072	-3	1340	1770	7.85	184			254	67	50.7	5.7	814		27.1				0.024		7.58		
950-CH3	21-Aug-01	Tailings backfill sample (chute 914)	950	1200	-160	a			Tailings Backfill	8.29	1634	172		5.8	5	212140	45	945	1050	8.32	218		5.1	136	53.1	24	5.72	355		14				-0.005		4.41		
950-CH3	21-Jan-04	Tailings backfill sample (chute 914)	950	1200	-160				Tailings Backfill	7.56	1113	105		6.4	0.33	240073	8	768	1190	8.05	233			135	53.7	31.8	6.1	358		21.5				0.021		7.14		
950-DH4	21-Aug-01	Possible Tailings backfill sample (chute 914)	950	1350	-150	a		1b	Tailings Backfill	8.02	1733	163		6.2	12	212141	8	864	1140	8.11	193		5.4	148	54.2	25.3	5.97	413		18				0.038		7.28		
950-DH4	21-Jan-04	Possible Tailings backfill sample (chute 914)	950	1350	-150				Tailings Backfill	7.17	1472	161			0.19	240074	-3	1130	1580	7.81	171			202	72.4	38.8	6.7	632		27.5				0.022		13.6		
1100-CH1	23-Jan-01	Potential backfill sample - likely has some chamber influence	1100	800	100	nd	Ca-Mg-SO4	2	Tailings Backfill with	7.60	2900	n/a	110	7.3	1	210068	3	2670	2840	7.95	139	17.3	9	441	118	70.3	8.6	829	0.05	37.9	-0.3		0.005	0.045	-0.008	138	21.8	
1100-CH1	17-Jul-01	Potential backfill sample - likely has some chamber influence	1100	800	100	a		2	Tailings Backfill with	7.95	3170	228		7.5	1	211619	10	1760	2090	8.02	155		6.3	314	112	68.8	79.9	772		29				-0.005		61.4	28.7	
1250-CH1	17-Jul-01	1450 N, chute to WR backfilled Stope	1250	1450	125	d		2	WR Backfill	8.09	3770	224		7.2	3-4	211618	10	2090	2480	8.06	146		6	384	119	101	15.3	1020		85.1				-0.005		27.4	0.734	
250-CH1	13-Jul-01	Chute, leading to open stope 2-07, may contain waste rock	250	500	-410	a		2	WR Backfill	7.66	3030	247		4.8	8	211524	-3	1490	1660	7.99	116		3.6	295	81.8	24.4	11.7	896		27.5				0.01		2.78	0.123	
575-CH1	14-Jul-01	Chute, potentially backfilled with waste rock	575	3275	-500	d		3	WR Backfill	8.17	3460	218		3.2	2.5	211535	8	1760	2210	8.09	150		5.7	260	119	149	16.5	759		197				-0.005		9.18	0.205	
950-CH1	21-Aug-01	Chute 924#1, potentially backfilled with waste rock	950	2400	0	d		2	WR Backfill	7.42	4140	179		5.5	-0.5	212138	19	2000	2370	7.73	107		10.9	314	97.3	106	12.5	1060		133				0.009		18.9		

prepared by: KSS

"Type" Samples

Location	Date(x)	As-D	As-T	Arsenate	Arsenite	Dimethyl	Monomethyl	Sb-D	Al-D	Ba-D	Be-D	Bi-D	Cd-D	Cs-D	Cr-D	Co-D	Cu-D	Fe-D	Pb-D	Li-D	Mn-D	Hg-D	Mo-D	Ni-D	Rb-D	Se-D	Ag-D	Sr-D	Tl-D	Ti-D	U-D	V-D	Zn-D
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
000-SW3	6-Nov-00	0.022							-0.03	0.0159	-0.0002	-0.005	-0.0001	-0.0001	0.0022	0.0005	0.0003	0.025	-0.0001	0.0039	0.216	-0.00001	0.0003	0.0005		-0.001	-0.0001	0.0728	-0.0001	0.0004	0.0007	0.0005	-0.01
000-SW3	9-May-00	0.028	0.031	0.02	0.03	0.003	0.037	0.0034	-0.03	0.0099	-0.0002	-0.01	-0.0001	-0.0001	-0.0003	0.0001	0.0003	0.274	0.001	0.0022	0.0578		0.0004	0.0003	0.002	-0.001	0.0001	0.0375	-0.0001	0.0004	0.0001	0.0001	-0.01
000-SW3a	11-Mar-98		0.021					0.0003	0.005	0.0167	-0.0001	-0.0001	-0.0001	-0.0001	-0.0002	-0.0001	-0.002	0.063	-0.0002	0.0033	0.0222		0.0003	0.0004		-0.001	-0.0001	0.0731	0.0001	0.0002	0.0002	0.0002	0.0013
000-SW4	9-May-00	0.14	0.178	0.1	0.01	0.004	-0.001	0.0595	-0.03	0.0096	-0.0002	-0.01	-0.0001	-0.0001	-0.0003	0.0047	0.0181	0.144	0.0022	0.0035	0.236		0.0011	0.0105	0.0021	0.001	-0.0001	0.0734	-0.0001	0.0008	0.0005	0.0003	-0.01
000-SW5	6-Nov-00	0.001						0.001	-0.03	0.0042	-0.0002	-0.005	-0.0001	-0.0001	0.0008	0.0005	0.0014	-0.03	0.0002	0.0015	0.0007	-0.00001	-0.0001	0.0006		-0.001	0.0004	0.0189	-0.0001	-0.0003	0.0002	0.0001	0.01
000-SW1	20-Sep-99	0.0085						0.0125	-0.03	0.0075	-0.0002	-0.0001	-0.0001	-0.0001	0.002	0.0031	0.0143	-0.03	0.0007	0.0022	0.0008		0.0005	0.0021		0.0038	0.0001	0.0467	-0.0001	0.0004	0.0002	0.0002	-0.01
000-SW1	17-Apr-00	0.0004	0.001	0.01	0.01	0.004	-0.001	0.0015	-0.03	0.0035	-0.0002	-0.0001	-0.0001	-0.0001	0.0006	-0.0001	0.024	-0.03	0.002	0.0015	0.0006		0.0001	0.0006		-0.001	-0.0001	0.0163	-0.0001	-0.0003	0.0002	-0.0001	-0.01
000-SW1	9-May-00	0.003	0.004	0.02	0.03	-0.001	0.001	0.0025	-0.03	0.0036	-0.0002	-0.01	-0.0001	-0.0001	-0.0003	0.0001	0.0126	0.043	0.0015	0.0015	0.002		0.0002	0.0004	0.0017	-0.001	-0.0001	0.0193	-0.0001	0.0006	0.0002	0.0002	-0.01
000-SW1	28-Jan-98	0.0325						0.0907	-0.005	0.0039	-0.0001	-0.0001	-0.0001	0.0001	0.0045	0.0007	0.0795	-0.012	0.0023	0.0021	0.0012		0.0001	0.001		-0.001	-0.0001	0.0154	-0.0001	0.0014	0.0002	-0.0001	0.0144
250-DH1	28-Jan-98	0.0414						0.005	0.0089	0.0199	-0.0001	-0.0001	-0.0001	0.0001	0.0052	0.0017	0.0011	1.90	0.0011	0.0138	0.166		0.0093	0.0021		0.001	-0.0001	0.42	-0.0001	0.0017	0.0139	0.0012	0.0235
250-DH1	21-Sep-99	0.0632						0.0122	-0.03	0.0232	-0.0002	-0.0001	-0.0001	-0.0001	0.001	0.0035	0.0019	4.94	0.0003	0.0199	0.377		0.004	0.0053		0.0011	-0.0001	0.548	-0.0001	0.0045	0.0147	0.0022	-0.01
250-DH1	18-Apr-00	0.0304	0.0242	-0.01	0.05	0.012	-0.001	0.0017	-0.03	0.0143	-0.0002	-0.0001	-0.0001	-0.0001	0.0006	0.0002	0.0003	0.23	-0.0001	0.0146	0.164		0.0022	0.0006		0.001	-0.0001	0.481	-0.0001	0.0015	0.0053	0.0008	-0.01
250-DH1	9-May-00	0.023	0.022	0.01	0.01	0.002	0.003	0.0199	-0.03	0.0261	-0.0002	-0.01	-0.0001	-0.0001	-0.0003	0.0008	0.0008	5.42	0.0036	0.0191	0.497		0.0028	0.0013	0.0018	-0.001	-0.0001	0.735	-0.0001	0.0046	0.0088	0.0003	-0.01
250-DH1	8-Nov-00	0.019						0.002	-0.03	0.0198	-0.0002	-0.005	-0.0001	-0.0001	0.0129	0.0025	0.0004	0.011	-0.0001	0.0165	0.478	-0.00001	0.0033	0.0018		-0.001	-0.0001	0.505	-0.0001	0.002	0.0099	0.0029	-0.01
250-DH1	14-Jul-01	0.0134		0.004	0.002	0.002	-0.001	0.0222	-0.03	0.0191	-0.0001	-0.005	-0.0001	-0.0001	-0.0003	0.0009	0.0004	7.59	0.0011	0.0187	0.344		0.0029	0.0019	0.0015	-0.001	0.0001	0.512	-0.0001	0.0032	0.0099	0.0013	-0.01
575-DH3	28-Jan-98	3						0.66	0.0078	0.046	-0.0001	0.0001	-0.0001	0.0001	0.003	0.0009	0.0029	0.193	0.0035	0.026	0.0789		0.004	0.0022		0.005	-0.0001	0.959	-0.0001	0.0042	0.004	-0.0001	0.0224
575-DH3	13-Mar-98		0.01					-0.01	0.0008	0.0521	-0.0001	-0.0001	-0.0001	0.0002	-0.0002	-0.0001	0.0013	0.123	-0.0002	0.101	0.102		0.0018	0.0012		0.001	-0.0001	1.43	-0.0001	0.0024	0.0022	0.0002	0.0014
575-DH3	21-Sep-99	0.0145						0.0011	-0.03	0.0471	-0.0002	0.00	-0.0001	0.0001	0.0013	0.0001	0.0007	0.1	0.0001	0.0286	0.107		0.0017	0.0027		-0.001	-0.0001	1.27	0.0	0.0025	0.0018	0.0038	-0.01
575-DH3	3-May-00	0.0188	0.0173	0.01	0.02	0.003	-0.001	0.0018	-0.03	0.0471	-0.0002	-0.01	-0.0001	-0.0001	0.0005	0.0001	0.0003	0.13	-0.0001	0.0284	0.121		0.0024	0.001	0.0025	-0.001	-0.0001	1.17	-0.0001	0.0023	0.0047	0.0005	-0.01
750-SP2	6-May-00	0.018	0.02	0.03	0.04	0.004	0.002	0.0037	-0.03	0.0458	-0.0002	-0.01	-0.0001	0.0003	0.0035	0.0042	0.0004	0.497	0.0001	0.0151	0.287		0.0048	0.0043	0.004	0.001	-0.0001	4.6	-0.0001	0.0072	0.0026	0.002	-0.01
750-SP2	7-Nov-00	0.018						0.0019	-0.03	0.0369	-0.0002	-0.005	-0.0001	0.0003	0.0047	0.0042	0.0004	0.24	0.0002	0.0095	0.179	-0.00001	0.0047	0.0016		-0.001	-0.0001	2.55	-0.0001	0.0023	0.0033	0.0021	-0.01
750-SP2	14-Jul-01	0.0148		0.007	-0.002	0.0023	-0.001	0.0791	-0.03	0.0389	-0.0001	-0.005	-0.0001	0.0003	-0.0003	0.0043	0.0012	0.382	0.0015	0.0125	0.227		0.0047	0.0035	0.0034	0.002	-0.0001	3.52	-0.0001	0.0051	0.0026	0.0023	-0.01
100-SP1	27-Jan-98	0.253						0.245	0.0033	0.0068	-0.0001	-0.0001	0.0002	-0.0001	0.0028	0.0093	0.0682	0.073	0.0002	0.0112	0.109		0.0063	0.0322		0.003	-0.0001	0.226	-0.0001	0.0006	0.0019	0.0013	0.0267
100-SP1	8-May-00	0.681	0.71	0.52	0.01	0.003	0.008	0.215	-0.03	0.0055	-0.0002	-0.01	-0.0001	-0.0001	0.0006	0.0048	0.0782	0.100	0.0008	0.0076	0.0668		0.0053	0.0158	0.0016	0.003	-0.0001	0.183	-0.0001	0.0013	0.0013	0.0009	0.0206
100-SP1	8-Nov-00	0.662						0.429	-0.03	0.0084	-0.0002	-0.005	0.0001	-0.0001	0.0033	0.0073	0.0601	-0.03	0.0003	0.011	0.0298	-0.00001	0.0137	0.0206		0.0067	-0.0001	0.469	-0.0001	0.0013	0.0035	0.0017	0.015
250-SP2	8-May-00	0.456	0.489	0.72	0	0.004	0.004	0.927	-0.03	0.0135	-0.0002	-0.01	0.0033	0.0002	0.0018	0.127	0.0065	-0.03	0.0035	0.0284	0.364		0.0333	0.178	0.0049	0.003	-0.0001	1.1	0.0003	0.0114	0.0224	0.0009	0.478
250-SP2	8-Nov-00	0.357						1.07	-0.03	0.0157	-0.0002	-0.005	0.005	0.0002	0.0039	0.151	0.0093	-0.03	0.0034	0.0235	0.294	-0.00001	0.0406	0.206		0.002	-0.0001	1.18	0.0003	0.0083	0.0269	0.0015	0.572
250-SP2	13-Jul-01	0.392		0.347	0.005	0.0054	0.0694	0.846	-0.03	0.0121	-0.0001	-0.005	0.0033	0.0001	-0.0003	0.0867	0.006	-0.03	0.0034	0.0223	0.333		0.0307	0.117	0.0036	0.003	-0.0001	0.692	0.0005	0.0085	0.0153	0.0009	0.334
575-DH1	6-Mar-98		0.724					0.38	0.0052	0.0352	-0.0001	-0.0001	-0.0001	0.0001	0.0005	0.0054	0.0107	-0.012	0.0002	0.0364	0.0068		0.0116	0.0249		0.005	-0.0001	1.4	0.0001	0.0065	0.0081	0.0018	0.0055
575-DH1	31-Mar-00	0.529	0.563	0.5	0.05	0.005	0.001	0.297	-0.03	0.0198	-0.0002	0.0001	-0.0001	-0.0001	0.0012	0.0055	0.0098	-0.03	-0.0001	0.0392	0.0025		0.0124	0.0269		0.003	-0.0001	1.41	-0.0001	0.0067	0.0041	0.0014	-0.01
575-DH1	3-May-00	0.642	0.646	0.51	0.03	0.003	0.002	0.389	-0.03	0.0181	-0.0002	-0.01	-0.0001	-0.0001	-0.0003	0.0047	0.0091	-0.03	0.0003	0.0382	0.0021		0.0102	0.0224	0.0042	0.005	-0.0001	1.31	-0.0001	0.0073	0.004	0.0009	-0.01
575-DH1	9-Nov-00	0.493							-0.03	0.0165	-0.0002	-0.01	-0.0001	-0.0001	0.001	0.0029	0.0156	-0.03	0.0001	0.015	0.0041	-0.00001	0.0038	0.0156		0.001	-0.0001	0.539	-0.0001	0.0019	0.0108	0.0024	-0.01
000-SW2	11-Mar-98		13.3					1.61	0.0774	0.0109	-0.0001	-0.0001	0.0028	0.0003	0.0004	0.199	12	0.793	0.0031	0.08	0.159		0.0566	0.798		0.027	0.0076	2.09	-0.0001	0.0074	0.0021	0.0008	2.53
000-SW2	20-Sep-99	11.4						3.29	-0.03	0.0094	-0.0002	-0.0001	0.0002	-0.0001	0.0027	0.374	0.202	-0.03	0.0003	0.0417	0.131		0.0441	0.659		0.0235	0.0009	1.67	-0.0001	0.0059	0.001	0.0012	-0.01
000-SW2	17-Apr-00	5.95	6.36	5.28	-0.01	0.069	0.065	0.381	-0.03	0.0261	-0.0002	-0.0001	0.0001	0.0005	0.0033	0.0435	0.035	-0.03	0.0013	0.0143	0.235		0.0159	0.0241		0.01	0.0003	2.6	-0.0001	0.0037	0.004	0.0007	0.0356
000-SW2	9-May-00	7.95	8.54	7.46	0.06	0.006	0.012	0.683	-0.03	0.0141	-0.0002	-0.01	0.0001	0.0001	-0.0003	0.0422	0.293	-0.03	0.0012	0.0139	0.212		0.0153	0.0395	0.0071	0.009	0.0009	2.54	-0.0001	0.0048	0.0032	0.0005	0.023
000-SW2	16-Nov-00	7.37							-0.03	0.0175	-0.0002	-0.01	0.0001	0.0002	0.0014	0.0389	0.0118	-0.03	0.0018	0.0164	0.207	-0.00001	0.0168	0.0245		0.005	0.0002	1.73	-0.0001	0.0033	0.0055	0.001	0.047
000-SW2	9-Aug-01	11.6		12.1	0.015	0.213	-0.01	1.36	-0.03	0.0162	-0.0001	0.0011	0.0001	-0.0001	0.0025	0.023	0.014	-0.03	0.0004	0.0203	0.046		0.0203	0.0205	0.0061	0.011	0.0002	2.38	-0.0001	0.0037	0.0049	0.0021	-0.01
Gold NWP	1-Aug-00	4.4						1.6	0.02	0.014	-0.001		-0.001		-0.005	0.066	0.015	0.054	-0.005		0.237	0.0014	0.027	0.011			-0.005	2.04	-0.05	-0.001		0.003	0.01
250-SU1	18-Apr-00	0.273	0.267	0.24	0.01	0.015	-0.001	0.258	-0.03	0.0582	-0.0002	-0.0001	-0.0001	0.0006	0.003	0.0766	0.0023	-0.03	0.0001	0.0246	1.1		0.0211	0.013		0.007	-0.0001	1.77	-0.0001	0.0066	0.0079	0.0012	-0.01
250-SU1	6-May-00	0.366	0.413	0.38	0.05	0.013	-0.001	0.349	-0.03	0.0558	-0.0002	-0.01	-0.0001	0.0006	0.0018	0.0757	0.0026	0.114	0.0003	0.0258	1.23		0.022	0.014	0.0119	0.008	-0.0001	1.81	-0.0001	0.0076	0.0077	0.0009	-0.01
250-SU1	7-Nov-00	0.38						0.212	-0.03	0.0558	-0.0002	-0.005	-0.0001	0.0006	0.0032	0.0715	0.0017	0.16	0.0003	0.0224	1.12	-0.00001	0.0193	0.0101		0.005	-0.0001	1.64	-0.0001	0.0051	0.0082	0.0017	-0.01
250-SUI	14-Jul-01	0.408		0.352	0.0034	0.0383	0.0014	0.288	-0.03	0.0493	-0.0001	-0.005	-0.0001	0.0005	0.0014	0.0473	0.0022	0.212	0.0016	0.0226	0.802		0.0183	0.0104	0.0097	0.01	-0.0001	1.61	-0.0001	0.0055	0.0057	0.0016	-0.01
425-DH2	7-Mar-98		1.8					0.116	0.0029	0.0614	-0.0001	-0.0001	-0.0001	-0.0001	0.0018	0.196	0.0071	0.523	0.0002	0.0245	1.66		0.022	0.0383		0.01	-0.0001	1.86	-0.0001	0.0072	0.0138	0.002	0.0042
425-DH2	21-Sep-99	0.807						0.227	-0.03	0.0941	-0.0002	-0.0001	0.0001	-0.0001	0.0059	0.183	0.0077	1.8	0.0004	0.0282	2.41		0.0217	0.0529		0.015	-0.0001	1.54	-0.0001	0.0069	0.0144	0.0039	0.0124
425-DH2	2-Apr-00	1.27	1.19					0.35	-0.03	0.0961	-0.0002	0.0004	-0.0001	-0.0001	0.003	0.147	0.0034	3.05	0.0006	0.026	2.41		0.0261	0.0398		0.01	-0.0001	1.7	-0.0001	0.0066	0.0117	0.0021	-0.01
425-DH2	6-May-00	0.736	0.712	0.42	0.09	0.024	0.002	0.89	-0.03	0.0825	-0.0002	-0.01	0.0002	-0.0001	0.0013	0.148	0.0507	0.277	0.0011	0.0268	2.06		0.031	0.0462	0.0111	0.008	0.0001	1.7	-0.0001	0.0065	0.0116	0.0018	0.026
425-DH2	14-Jul-01	6.86		7.46	0.035	0.018	0.026	1.86	-0.03	0.0351	-0.0001	-0.005	0.0003	-0.0001	0.0019	0.0598	0.0338	-0.03	0.0017	0.0202	0.638		0.0302	0.0366	0.0016	0.014	-0.0001	2.2	-0.0001	0.0052	0.0036	0.003	0.079
575-SP1	6-May-00	3.41	3.42	3.41	0.04	0.006	0.002	1.54	-0.03	0.0422	-0.0002	-0.01	0.0003	0.0001	0.0003	0.0952	0.0875	-0.03	0.0002	0.0303	0.681		0.0393	0.0381	0.0139	0.017	0.0001	1.41	-0.0001	0.0071	0.0099	0.0035	0.014
575-SP1	7-Nov-00	5						1.42	-0.03	0.0519	-0.0002	-0.005	0.0002	0.0001	0.0029	0.0739	0.0046	-0.03	0.0003	0.028	0.574	-0.00001	0.0733	0.031		0.0123	-0.0001	2.24	-0.0001	0.0064	0.0149	0.005	-0.01
575-SP1	14-Jul-01	6.66		7.29	0.036	0.024	0.028	2.05	-0.03	0.0292	-0.0001	-0.005	0.0003	-0.0001	0.0019	0.0258	0.0153	-0.03	0.0017	0.0198	0.409		0.026	0.0288	0.0049	0.014	-0.0001	1.92	0.0001	0.0045	0.0058	0.0041	-0.01
750-SP1	8-Mar-98		1.56					1.66	0.0043	0.0603	-0.0001	-0.0001	0.0002	0.0007	0.0005	0.192	1.55	0.013	0.0002	0.0293	0.414		0.0722	0.114		0.016	-0.0001	3.6	-0.0001	0.0094	0.0206	0.004	0.0035
750-SP1	1-Apr-00																																
750-SP1	3-May-00	2.2	2.2	1.64	0.01	0.002	0.037	2.5	-0.03	0.0548	-0.0002	-0.01	0.0002	0.0008	0.0043	0.0844	0.137	0.03	0.0003	0.0502	0.489		0.0427	0.0747	0.0197	0.019	-0.0001	3.08	-0.0001	0.0087	0.0197	0.0046	-0.01
750-DP1	9-Nov-00	2.25							-0.03	0.0489	-0.0002	-0.01	0.0001	0.0002	0.0019	0.129	0.0045	0.16	0.0001	0.0294	0.67	-0.00001	0.0546	0.0298		0.007	0.0002	4.7	-0.0001	0.0066	0.0137	0.0021	-0.01
575-SP2	8-May-00	0.652	0.603	0.54	0.01	0.027	0.005	0.204	-0.03	0.0263	-0.0002	-0.01	0.0001	-0.0001	0.0033	0.0692	0.0121	0.26	0.0006	0.033	0.783		0.0351	0.0255	0.0041	0.006	-0.0001	1.1	-0.0001	0.0088	0.031	0.0015	-0.01
575-SP2	16-Nov-00	0.633							-0.03	0.0262	-0.0002	-0.01	0.0001	-0.0001	0.0043	0.0541	0.0186	-0.03	0.0003	0.0327	0.57	-0.00001	0.0259	0.0265		0.006	0.0003	0.974	-0.0001	0.005	0.0405	0.0024	0.014
575-SP2	12-Jul-01	0.86		0.78	0.0052	0.0044	0.0048	0.262	-0.03	0.0253	-0.0001	-0.005	0.0001	-0.0001	-0.0003	0.0501	0.0103	-0.03	0.0008	0.03	0.754		0.0259	0.0258	0.0029	0.009	0.0002	0.906	0.0006	0.0062	0.0259	0.0024	-0.01
2000-DH2	5-May-00	1.49	2.08	0.58	0.54	0.294	0.108	0.114	-0.03	5.88	-0.0002	-0.01	0.0001	0.205	0.0035	0.0074	0.0492	4.92	0.0002	0.213	5.72		0.0014	0.0765	0.151	0.757	0.0002	215	-0.0001	0.0069	0.0002	-0.0001	-0.01
2000-DH2	20-Aug-01	0.0355		0.01	0.02	0.0185	0.0045	0.0027	-0.03	5.84	-0.0001	-0.005	-0.0001	0.239	0.0043	0.0029	0.0364	9.57	0.0001	0.0493	8.73		0.0007	0.0331	0.129	1.14	0.0002	239	-0.0001	0.0041	-0.0001	-0.0001	-0.01
2000-DH1	5-May-00	11	11	4.35	-0.01	0.029	0.012	0.055	-0.03	0.273	-0.0002	-0.01	-0.0001	0.0021	0.0062	0.0017	0.0102	0.386	0.0003	0.114	0.73		0.0069	0.0181	0.0399	0.139	0.0001	30	-0.0001	0.0064	0.0004	-0.0001	-0.01
2000-DH1	6-Nov-00	11							-0.03	0.282	-0.0002	-0.005	-0.0001	0.0028	0.0018	0.0012	0.0097	0.39	0.0002	0.109	0.689	-0.00001	0.0063	0.008		0.113	0.0001	27.4	-0.0001	0.0034	0.0005	-0.0001	-0.01
2000-DH1	30-Jan-98	14.4						0.0396	0.133	0.284	-0.0001	-0.0001	-0.0001	0.0021	0.0019	0.0018	0.0089	0.883	0.007	0.0994	0.591		0.0059	0.0166		0.162	-0.0001	23.7	-0.0001	0.0098	0.0002	-0.0001	0.0044
2000-DH1	22-Sep-99	12.5						0.0725	-0.03	0.268	-0.0002	-0.0001	-0.0001	0.0027	0.0584	0.0018	0.0174	0.38	0.0001	0.062	0.66		0.0058	0.0262		0.254	-0.0001	13.5	-0.0001	0.005	0.0004	-0.0001	-0.01
2000-DH1	19-Apr-00	8.99	13.5	3.6	2.53	0.03	0.002	0.0523	-0.03	0.244	-0.0002	-0.0001	-0.0001	0.0022	0.0305	0.0014	0.009	0.07	0.0002	0.0926	0.633		0.0064	0.0116	0.115	-0.0001	23.9	-0.0001	0.0045	0.0004	-0.0001	-0.01	6.65
2000-DH1	20-Aug-01	5.31		4.16	0.07	0.102	0.141	0.0211	-0.03	0.259	-0.0001	-0.005	-0.0001	0.002	0.002	0.001	0.0182	0.559	0.0021	0.0771	0.709		0.0054	0.0141	0.039	0.179	0.0002	23.1	-0.0001	0.0038	0.0004	-0.0001	-0.01
250-SP1	2-May-00	3540	3650	159	1350	0.861	5.61	12.7	0.036	0.0094	-0.0002	-0.01	0.0005	0.0012	0.0028	0.104	1.32	0.48	0.0044	0.254	0.748		0.0265	0.124	0.0163	0.011	0.0003	0.966	0.0002	0.0246	0.0039	0.0023	0.043
250-SP1	9-Nov-00	4210							-0.03	0.0096	-0.0002	-0.01	0.0005	0.0014	0.0046	0.104	1.2	0.51	0.0032	0.257	0.65	0.00002	0.0286	0.129		0.008	0.0003	0.89	0.0002	0.0229	0.0055	0.0041	0.057
250-SP1	16-Jul-01	4180		654	0.35	0.246	0.008	14.3	-0.03	0.0095	-0.0001	-0.005	0.0006	0.0012	0.0012	0.0625	0.221	0.683	0.005	0.164	0.509		0.0258	0.0925	0.0168	0.009	0.0003	0.992	0.0002	0.025	0.0042	0.0037	0.042
250-SP3	15-May-00	2980	3060	893	2430	9.91	94	72.1	0.035	0.0198	-0.0002	-0.01	0.0008	0.0003	0.0012	0.138	0.0008	0.347	0.0208	0.0734	0.866		0.0233	0.285	0.0129	0.004	0.0001	0.881	0.0001	0.0227	0.0013	0.0017	0.351
250-SP3	8-Jun-00	2280		631	1660	3.32	45.3	39.6	-0.03	0.0106	-0.0002	-0.01	0.0006	0.0002	0.0058	0.132	0.0052	0.18	0.009	0.0282	0.594		0.016	0.204	8.5	0.003	0.0002	0.614	0.0001	0.0108	0.001	0.003	0.419
250-SP3	16-Nov-00	3410							0.039	0.0264	-0.0002	-0.01	0.001	0.0004	0.0041	0.0479	0.0013	0.39	0.0865	0.156	1.72	0.00002	0.033	0.17	0.015	0.006	0.0003	1.87	0.0002	0.0468	0.0087	0.0035	0.153
250-SP3	12-Jul-01	2830		684	70.8	3.02	8.66	54.7	-0.03	0.019	-0.0001	-0.005	0.0007	0.0003	0.0007	0.0353	0.0008	0.31	0.0398	0.0578	0.989		0.0343	0.118	0.0132	0.006	0.0002	0.735	0.0002	0.0299	0.0036	0.0015	0.098
425-DH1	2-May-00	3510	4900	831	440	0.055	4.94	88.4	0.05	0.0313	-0.0002	-0.01	0.0004	0.0006	0.0006	0.016	0.0011	0.45	0.0259	0.097	0.9		0.0306	0.0802	0.0142	0.003	0.0002	2.07	-0.0001	0.0308	0.0032	0.002	0.012
575-DH2	28-Jan-98	2120						143	0.124	0.147	-0.0001	0.0119	0.0019	0.002	0.0015	0.0277	0.0054	0.813	0.34	0.371	1.62		0.096	0.0982		0.014	0.0001	1.94	-0.0001	0.25	0.004	0.0019	0.0195
575-DH2	13-Mar-98	3620	0					308	0.0069	0.181	-0.0001	0.0078	0.001	0.0011	0.0015	0.0158	0.0005	0.853	0.376	0.482	2.15		0.102	0.106		0.004	0.0001	2.38	-0.0001	0.272	0.0025	0.0029	0.0055
575-DH2	21-Sep-99	3960						194	-0.03	0.167	-0.0002	0.01	0.0019	0.0025	0.0025	0.0292	0.0021	0.69	0.302	0.519	2.31		0.0999	0.0871		0.0078	-0.0001	2.13	-0.0001	0.221	0.0041	0.006	0.0159
575-DH2	19-Apr-00	3530	3740	1030	1320	2.04	2.15	199	-0.03	0.14	-0.0002	0.0106	0.0018	0.002	0.0059	0.0324	0.001	0.78	0.297	0.47	2.05		0.0878	0.0986		0.007	0.0004	1.99	-0.0001	0.205	0.0041	0.0074	0.015
575-DH2	4-May-00	3460	3700	178	1.59	17.9	49.6	291	-0.03	0.138	-0.0002	-0.05	0.002	0.002	0.001	0.0262	0.001	0.73	0.35	0.466	2.5		0.101	0.105	0.0285	0.008	0.0004	2.26	-0.0001	0.236	0.0032	0.0031	0.012
575-DH2	16-Jul-01	2810		1060	97	6.28	0.028	194	-0.03	0.0863	-0.0001	-0.025	0.0019	0.0016	0.0024	0.0251	0.001	1.1	0.321	0.208	1.32		0.0849	0.0754	0.0231	0.008	0.0003	1.95	-0.0001	0.138	0.0032	0.0061	0.012
575-150N	12-Jul-01	3040																															
EBA-BH3	17-Jul-01	1.69		1.5	0.0075	0.005	0.39	0.355	-0.03	0.0428	-0.0001	-0.005	0.0008	-0.0001	0.0004	0.054	0.0141	-0.03	0.0008	0.0187	0.205		0.005	0.215	0.0012	0.003	-0.0001	0.56	-0.0001	0.0123	0.0079	0.0042	0.08
1250-SP1	17-Jul-01	0.399		0.093	0.114	0.0484	0.0811	1.35	-0.03	0.0074	-0.0001	-0.005	0.0022	0.0003	0.0003	0.274	0.0028	0.079	0.0013	0.021	1.51		0.013	0.511	0.0097	0.004	0.0002	1.24	-0.0001	0.0157	0.0018	0.0022	3.312
1250-SP1	21-Jan-04	0.091		0.062	-0.005	0.039	-0.005	0.424	0.0018	0.00776	-0.00002		0.00065	0.00026	0.0004	0.163	0.00607	0.154	0.00085	0.0261	1.74		0.00891	0.24	0.00778	0.0032	-0.0001	1.16	-0.0001	0.00033	0.00113	-0.00003	1.36
950-CH2	21-Aug-01	5.41		4.56	0.01	0.115	0.0066	0.615	-0.03	0.0042	-0.0001	-0.005	0.0009	0.0006	0.0052	0.0163	0.0051	-0.03	0.0002	0.019	0.241		0.011	0.14	0.0054	0.002	-0.0001	0.65	-0.0001	0.007	0.0068	0.0026	0.706
950-CH2	21-Jan-04	6.86		6	-0.005	0.5	-0.005	0.464	0.0051	0.00458	-0.00002		0.00144	0.00054	0.0003	0.0104	0.0076	-0.05	0.00148	0.0299	0.0796		0.00929	0.198	0.00454	0.0014	-0.0001	0.782	-0.0001	0.00042	0.0108	0.00065	1.33
950-CH3	21-Aug-01	2.03		1.62	-0.01	0.0262	0.0011	0.129	-0.03	0.0167	-0.0001	-0.005	-0.0001	0.0001	0.0088	0.0034	0.0038	-0.03	-0.0001	0.0197	0.0399		0.0083	0.0125	0.0028	-0.001	-0.0001	0.701	-0.0001	0.0039	0.0115	0.0031	0.01
950-CH3	21-Jan-04	2.55		2	-0.005	0.071	-0.005	0.146	0.0049	0.0157	-0.00002		0.00008	0.00015	0.0002	0.00435	0.00524	-0.05	0.00071	0.0238	0.0042		0.00622	0.0177	0.00289	0.001	-0.0001	0.851	-0.0001	0.00024	0.00759	0.00021	0.0274
950-DH4	21-Aug-01	6.61		5.33	-0.01	0.134	0.0018	0.403	-0.03	0.0103	-0.0001	-0.005	-0.0001	0.0004	0.007	0.0065	0.0068	-0.03	0.0001	0.0184	0.0055		0.0092	0.0242	0.0035	0.002	-0.0001	0.734	-0.0001	0.0043	0.0105	0.0035	-0.01
950-DH4	21-Jan-04	20		20	-0.005	0.6	-0.005	0.633	0.0043	0.0106	-0.00002		0.00013	0.00061	0.0002	0.0157	0.00884	-0.05	0.00083	0.0236	0.00495		0.0103	0.0537	0.00393	0.0017	-0.0001	0.956	-0.0001	0.00025	0.00717	0.00158	0.0311
1100-CH1	23-Jan-01	41.5						2.1	-0.03	0.0058	-0.0002	-0.005	0.0017	0.0007	0.0007	0.145	0.0035	0.03	0.0026	0.0139	1.04	-0.00001	0.0367	0.31	0.008	0.0035	-0.0001	1.67	0.0001	0.0089	0.0024	0.0014	1.52
1100-CH1	17-Jul-01	42.1		37.8	0.147	0.265	-0.01	2.35	-0.03	0.004	-0.0001	-0.005	0.0013	0.0004	-0.0003	0.0997	0.0034	-0.03	0.0044	0.0133	0.434		0.0279	0.195	0.0063	0.003	-0.0001	1.25	-0.0001	0.0087	0.0019	0.0025	0.961
1250-CH1	17-Jul-01	1.55		1.8	0.012	-0.005	0.0213	3.08	-0.03	0.0095	-0.0001	-0.005	0.0011	0.0007	-0.0003	0.0487	0.0033	-0.03	0.0017	0.0216	0.135		0.0258	0.133	0.0099	0.005	-0.0001	1.44	-0.0001	0.0121	0.0042	0.0018	0.337
250-CH1	13-Jul-01	0.233		0.175	0.0074	0.0029	0.0569	0.874	-0.03	0.0112	-0.0001	-0.005	0.0013	0.0001	-0.0003	0.0832	0.0056	-0.03	0.0014	0.0172	0.008		0.0198	0.12	0.0046	0.003	-0.0001	0.541	0.0005	0.0086	0.0156	0.001	0.211
575-CH1	14-Jul-01	0.353		0.212	0.0218	0.0018	0.0887	0.869	-0.03	0.0221	-0.0001	-0.005	0.0001	0.0003	0.0012	0.0276	0.0191	-0.03	0.0018	0.0404	0.008		0.0189	0.0562	0.0055	0.008	-0.0001	1.48	-0.0001	0.0077	0.0221	0.0008	0.018
950-CH1	21-Aug-01	1.63		4.16	0.01	0.0119	0.0032	0.647	-0.03	0.0249	-0.0001	-0.005	0.0004	0.0003	0.0031	0.0338	0.0209	-0.03	0.0015	0.0233	0.0703		0.0378	0.0488	0.0082	0.006	-0.0001	2.49	-0.0001	0.0091	0.0097	0.0017	0.073

prepared by: KSS

"Type" Samples

Location	Date(x)	Al-T mg/L	Sb-T mg/L	Ba-T mg/L	Be-T mg/L	Bi-T mg/L	Cd-T mg/L	Cs-T mg/L	Cr-T mg/L	Co-T mg/L	Cu-T mg/L	Fe-T mg/L	Pb-T mg/L	Li-T mg/L	Mn-T mg/L	Mo-T mg/L	Ni-T mg/L	Rb-T mg/L	Se-T mg/L	Ag-T mg/L	Sr-T mg/L	Th-T mg/L	Ti-T mg/L	U-T mg/L	V-T mg/L	Zn-T mg/L	Hg-T mg/L	Isotope	18O in H2O	2H in H2O	3H in H2O	13C in DIC	34S in SO4	18O in SO4
000-SW3	6-Nov-00																										13387	-12.84	-122.50	12	-7.47	11.35	nes
000-SW3	9-May-00	0.037	0.0016	0.011	-0.002	-0.0004	-0.0003	-0.0004	-0.003	-0.001	-0.002	0.27	0.001	-0.003	0.055	-0.001	-0.001	0.0021	-0.01	-0.0003	0.038	-0.0004	-0.003	-0.0003	-0.001	-0.01	-0.00001	6715	-14.13	-132.3	24	-5.76	8.74	-0.555
000-SW3a	11-Mar-98																											2018						
000-SW4	9-May-00	0.809	0.0454	0.014	-0.002	-0.0004	-0.0003	-0.0004	-0.003	0.005	0.025	0.82	0.007	0.004	0.207	0.001	0.012	0.0031	-0.01	-0.0003	0.079	-0.0004	0.012	0.0005	0.001	0.011	-0.00001	6724	-14.58	-136.1	16	-8.84	5.13	-2.34
000-SW5	6-Nov-00																											13406	-14.62	-133.00	30	-4.53	7.13	nes
000-SW1	20-Sep-99																												-15.2	-131.9	24			
000-SW1	17-Apr-00	-0.03	0.0005	0.004	-0.002	0.001	-0.0003	-0.0004	-0.003	-0.001	0.028	0.04	0.003	-0.003	-0.001	-0.001	-0.001		-0.01	-0.0003	0.019	-0.0004	-0.003	-0.0003	-0.001	-0.01	-0.00001	6184	-15.01	-136.71	31	-5.61	6.43	0.58
000-SW1	9-May-00																										-0.00001	6722	-15.01	-135.5	27	-6	6.09	0.42
000-SW1	28-Jan-98																											1026						
250-DH1	28-Jan-98																											1101/1020	-19.5	-155	17.5			
250-DH1	21-Sep-99																												-19.46	-148.6	16.5			
250-DH1	18-Apr-00	-0.03	0.001	0.018	-0.002	0.001	-0.0003	-0.0004	0.003	-0.001	-0.002	3.75	-0.001	0.018	0.185	0.002	0.001		0.012	-0.0003	0.539	-0.0004	-0.003	0.0059	-0.001	-0.01	-0.00001	6176	-18.24	-152.9	9	-14.07	10.11	-0.66
250-DH1	9-May-00																										-0.00001	6717	-19.01	-156	8	-11.76	6.81	-9.025
250-DH1	8-Nov-00																											13402	-18.80	-153.50	31	-112.08	3.69	-9.215
250-DH1	14-Jul-01																											25828	-18.79	-157.00	16	-12.15	4.32	-7.29
575-DH3	28-Jan-98																											1004	-19.5	-158	23.3			
575-DH3	13-Mar-98																																	
575-DH3	21-Sep-99																												-19.92	-152.2	21.4			
575-DH3	3-May-00	-0.03	0.0019	0.05	-0.002	-0.01	-0.0003	-0.0004	-0.003	-0.001	-0.002	0.14	-0.001	0.028	0.114	0.002	0.001	0.0025	-0.01	-0.0003	1.22	-0.0004	-0.003	0.0034	-0.001	-0.01	-0.00001	6738	-19.16	-155.5	18	-14.68	4.4	-7.25
750-SP2	6-May-00	-0.03	0.0056	0.046	-0.002	-0.01	-0.0003	-0.0004	-0.003	0.004	-0.002	0.52	-0.001	0.015	0.284	0.005	0.004	0.0039	-0.01	-0.0003	4.8	-0.0004	0.007	0.0025	0.002	-0.01	-0.00001	6704	-18.01	-146.6	22	-13.99	5.89	4.155
750-SP2	7-Nov-00																											13401	-18.48	-146.00	13	-13.43	5.25	1.39
750-SP2	14-Jul-01																											25826	-18.22	-154.10	19.00	-13.84	5.32	3.27
100-SP1	27-Jan-98																											1000						
100-SP1	8-May-00																										-0.00001	6703	-15.61	-140.1	9	-12.63	5.6	-3.13
100-SP1	8-Nov-00																											13391	-13.07	-128.20	13	-9.1	5.5	0.9
250-SP2	8-May-00																										-0.00001	6701	-21.45	-169.6	8	-10.16	3.64	-12.75
250-SP2	8-Nov-00																											13408	-18.91	-153.15	22	-7.95	3.19	-12.84
250-SP2	13-Jul-01																											25819	-20.24	-159.30	16.00	-7.36	3.27	-14.09
575-DH1	6-Mar-98																											1006	-16.4	-148	25			
575-DH1	31-Mar-00	-0.03	0.276	0.0187	-0.002	-0.0004	-0.0003	-0.0004	-0.003	0.0056	0.0102	-0.03	-0.001	0.0413	0.0024	0.0112	0.0279		-0.01	-0.0003	1.25	-0.0004	0.0074	0.0036	-0.001	-0.01		6188	-17.08	-150.98	14	-1.93	-6.72	-6.71
575-DH1	3-May-00	-0.03	0.374	0.018	-0.002	-0.01	-0.0003	-0.0004	-0.003	0.004	0.009	-0.03	-0.001	0.038	0.002	0.01	0.022	0.0042	-0.01	-0.0003	1.3	-0.0004	0.008	0.0039	0.001	-0.01	-0.00001	6707	-17.32	-148	25	-4.14	4.86	-6.105
575-DH1	9-Nov-00																											13398	-18.51	-152.30	20	-7.83	4.18	-7.09
000-SW2	11-Mar-98																											2019						
000-SW2	20-Sep-99																												-14.41	-128	19.4			
000-SW2	17-Apr-00	0.094	0.418	0.03	-0.002	0.0011	-0.0003	0.0005	-0.003	0.051	0.044	0.18	0.003	0.018	0.261	0.016	0.031		0.017	-0.0003	3.01	-0.0004	0.005	0.0042	-0.001	0.048	-0.00001	6185	-15.86	-140.53	17	-10.66	5.46	-0.805
000-SW2	9-May-00																										-0.00001	6723	-16.38	-141.5	17	-10.63	5.47	-2.062
000-SW2	16-Nov-00																											13394	-15.57	-140.80	20	-6.99	5.06	-3.765
000-SW2	9-Aug-01																																	
Gold NWP	1-Aug-00																																	
250-SU1	18-Apr-00	-0.03	0.261	0.064	-0.002	0.0012	-0.0003	0.0006	-0.003	0.086	0.003	0.36	-0.001	0.029	1.18	0.021	0.016		0.053	-0.0003	1.82	-0.0004	0.011	0.0086	-0.001	-0.01	-0.00001	6177	-15.94	-144.57	10	-17.18	5.93	-0.26
250-SU1	6-May-00	-0.03	0.346	0.057	-0.002	-0.01	-0.0003	0.0006	0.005	0.076	0.004	0.21	-0.001	0.026	1.24	0.022	0.014	0.0119	-0.01	-0.0003	1.83	-0.0004	0.007	0.0077	0.001	-0.01	-0.00001	6735	-16.49	-144.3	18	-16.67	6.7	0.94
250-SU1	7-Nov-00																											13400	-16.48	-145.20	17	-15.5	6.13	-0.845
250-SUI	14-Jul-01																											25825	-16.54	-145.10	17.00	-16.02	6.09	-0.89
425-DH2	7-Mar-98																											2001	-16.3	-143	27			
425-DH2	21-Sep-99																												-16.43	-138.4	40.2			
425-DH2	2-Apr-00	0.045	0.124	0.0956	-0.002	-0.0004	-0.0003	-0.0004	-0.003	0.181	0.0978	3.83	0.0016	0.0292	2.4	0.0214	0.0507		0.124	-0.0003	1.5	-0.0004	0.0075	0.0107	0.0012	0.135		6190	-15.82	-141.39	24	-19.71	6.69	-0.6
425-DH2	6-May-00	-0.03	0.91	0.085	-0.002	-0.01	-0.0003	-0.0004	0.004	0.159	0.087	0.20	0.001	0.027	2.08	0.031	0.047	0.0112	-0.01	-0.0003	1.7	-0.0004	0.006	0.0115	0.002	0.015	-0.00001	6737	-16.42	-143.9	21	-18.67	6.43	0.745
425-DH2	14-Jul-01																											25824	-15.24	-139.40	26.00	-10.48	4.68	-2.58
575-SP1	6-May-00	-0.03	1.39	0.042	-0.002	-0.01	0.0003	-0.0004	-0.003	0.094	0.091	-0.03	-0.001	0.03	0.734	0.039	0.039	0.0139	0.016	0.0003	1.58	-0.0004	0.007	0.0099	0.004	-0.01	0.00001	6734	-16.68	-144.7	23	-13.49	3.39	0.16
575-SP1	7-Nov-00																											13390	-14.69	-133.10	17	-11.87	4.95	-0.53
575-SP1	14-Jul-01																											25823	-14.80	-134.90	20.50	-8.51	4.46	-3.49
750-SP1	8-Mar-98																											2006	-16	-140	24.6			
750-SP1	1-Apr-00																											6187	-14.96	-142.5	30	-15.54	3.9	0.775
750-SP1	3-May-00	-0.03	2.48	0.056	-0.002	-0.01	-0.0003	0.0008	-0.003	0.082	0.139	-0.03	-0.001	0.049	0.485	0.042	0.076	0.0197	0.014	-0.0003	3.17	-0.0004	0.009	0.023	0.003	-0.01	-0.00001	6709	-15.67	-140.6	24	-15.15	5.08	-0.81
750-DP1	9-Nov-00																											13409	-16.40	-139.15	34	-12.09	5.00	-2.62
575-SP2	8-May-00																										-0.00001	6702	-17.16	-149.6	28	-15.67	5.75	-0.76
575-SP2	16-Nov-00																											13399	-16.75	-145.30	9	-13.95	5.32	1.095
575-SP2	12-Jul-01																											25817	-16.34	-146.50	19.00	-14.49	4.77	-1.23
2000-DH2	5-May-00	0.032	0.147	6.11	-0.002	-0.01	-0.0003	0.194	0.003	0.01	0.049	4.98	0.002	0.213	5.52	0.002	0.08	0.141	0.78	-0.0003	200	-0.0004	0.01	0.0003	-0.001	-0.01	-0.00001	6713	-20.92	-152.2	9	-12.47	17.58	0.15
2000-DH2	20-Aug-01																											28105	-21.76	-150.66	1.80	-13.97	27.72	8.07
2000-DH1	5-May-00	0.042	0.073	0.271	-0.002	-0.01	-0.0003	0.0024	-0.003	0.002	0.012	0.56	0.001	0.117	0.745	0.008	0.021	0.0442	0.154	-0.0003	25.6	-0.0004	0.007	0.0004	-0.001	-0.01	-0.00001	6714	-19.87	-155.3	19	-15.65	22.47	2.12
2000-DH1	6-Nov-00																											13405	-19.89	-156.85	14	-14.93	22.37	2.04
2000-DH1	30-Jan-98																											1033	-20.3	-158	21.5			
2000-DH1	22-Sep-99																												-20.21	-152.6	23.8			
2000-DH1	19-Apr-00	0.146	0.313	-0.002	0.006	-0.0003	0.0028	-0.003	0.007	0.037	15.3	0.046	0.13	0.875	0.006	0.031	0.0417	0.152	0.0014	27.3	0.0033	0.117	0.0003	0.02	0.049	0.00004		6178	-19.55	-155.42	10	-18.54	22.41	1.975
2000-DH1	20-Aug-01																											28104	-20.05	-155.06	14.70	-15.60	22.21	3.80
250-SP1	2-May-00	0.033	14.4	0.009	-0.002	-0.01	0.0005	0.0012	-0.003	0.107	1.34	0.44	0.004	0.27	0.758	0.026	0.134	0.0165	0.012	0.0003	0.975	-0.0004	0.026	0.0039	0.003	0.036		6729	-17.79	-157.1	7	-1.62	5.58	-2.275
250-SP1	9-Nov-00																											13386	-17.15	-151.95	-6.0	1.42	5.77	-2.68
250-SP1	16-Jul-01																											25831	-17.83	-155.90	8.00	1.68	5.27	-1.10
250-SP3	15-May-00																										0.00004	6705	-21.68	-168.8	-6	-2.3	3.645	-7.6
250-SP3	8-Jun-00																										0.00013							
250-SP3	16-Nov-00																											13404	-18.81	-157.15	11	-1.44	4.37	-3.45
250-SP3	12-Jul-01																											25820	-19.86	-158.90	15.00	-0.44	3.97	-7.83
425-DH1	2-May-00	0.062	70.3	0.053	-0.002	0.0012	0.0004	0.0009	0.008	0.026	-0.002	0.44	0.029	0.119	1.29	0.04	0.103	0.0177	-0.01	-0.0003	2.47	-0.0004	0.042	0.0043	0.002	0.014	-0.00001	6718	-20.62	-163.9	17	-9.88	5.93	-8.03
575-DH2	28-Jan-98																											1002	-19	-153	15.7			
575-DH2	13-Mar-98																																	
575-DH2	21-Sep-99																												-19.4	-152	15.8			
575-DH2	19-Apr-00	-0.03	155	0.117	-0.002	0.0027	0.002	0.0021	-0.003	0.036	-0.002	0.65	0.142	0.545	2.42	0.09	0.111		0.015	-0.0003	2.38	-0.0004	0.097	0.0008	0.002	0.013	-0.00001	6180	-17.01	-156.22	13	-2.51	4.78	2.225
575-DH2	4-May-00	-0.03	281	0.142	-0.002	-0.05	0.002	0.002	0.004	0.026	-0.002	0.76	0.374	0.523	2.29	0.107	0.12	0.0288	-0.01	0.0005	2.18	-0.0004	0.258	0.0032	0.004	0.01	n/a	6732	-17.68	-156.3	12	-1.88	4.48	3.75
575-DH2	16-Jul-01																											25832	-16.75	-155.30	14.00	-3.70	4.43	2.88
575-150N	12-Jul-01																																	
EBA-BH3	17-Jul-01																																	
1250-SP1	17-Jul-01																																	
1250-SP1	21-Jan-04																																	
950-CH2	21-Aug-01																											28101	-18.49	-150.86	14.60	-0.69	4.23	-10.876
950-CH2	21-Jan-04																																	
950-CH3	21-Aug-01																											28102	-18.84	-154.54	15.30	-8.07	3.23	-10.55
950-CH3	21-Jan-04																																	
950-DH4	21-Aug-01																											28103	-18.31	-152.41	15.15	-5.72	3.85	-8.81
950-DH4	21-Jan-04																																	
1100-CH1	23-Jan-01																																	
1100-CH1	17-Jul-01																											25834	-18.45	-154.20	-6.00	1.67	3.12	-10.01
1250-CH1	17-Jul-01																											25833	-16.42	-146.40	31.00	-2.57	3.18	-6.83
250-CH1	13-Jul-01																											25818	-20.15	-162.00	15.00	-4.51	2.80	-14.47
575-CH1	14-Jul-01																											25827	-16.06	-141.80	13.00	-6.68	7.56	0.77
950-CH1	21-Aug-01																											28100	-16.94	-142.11	16.70	-6.51	4.29	-8.25

prepared by: KSS

Attachment A - Seep Survey Results

checked by: DBM

Mixed or Diluted Seeps

Location	Date(x)	Site Description	Level	N	E	Isotope	Geochem	Geochem(srk	Water Type		pH	Cond	ORP	Alk	Temp	Flow	Lab Tag	TSS	TDS	EC	pH	Alk	DIC	DOC	Ca	Mg	Na	K	SO4	Sulphide	Cl	Bromide	F	I	NH3-N	NO3-N	NO3-N+NO2-N	Ortho P	Si
												uS/cm	mV	ppm CaCC	(°C)	(l/min)		mg/L	mg/L	uS/cm	pH	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
100-DH1	8-May-00	Horizontal drill hole just below chamber 14.	100	-940	-475	**a/e**	Ca-HCO3-As	5			7.02	1115	80		2.6	0.5	200728	3	1190	1160	8.09	1790	34.9	6.6	190	66.9	21.8	6.11	316	-0.05	9	-3		0.006	0.333	-0.008	-0.008	68.6	
100-DH1	16-Nov-00	Horizontal drill hole just below chamber 14.	100	-940	-475	**a**	Ca-Mg-AS-SO4	5			6.64	1633	170		2.4		202698	7	2300	1420	7.17	374	17.2		242	89.5	17.2	6.04	352	-0.05	7	-3		0.004	0.398		-0.008	168	
100-DH1	17-Jul-01	Horizontal drill hole just below chamber 14.	100	-940	-475			5			6.56	2470	106		2.6	1-3	na																						
100-DH2	2-May-00	Vertical drill hole beneath C-1 pit.	100	-1925	25	**a/e**	Ca-Mg	**nd**			6.23	1545	100	110	4.2		200661								307	86.6	29.1	6.55				-3		0.002					
100-DH2b	16-Jul-01	Vertical drill hole beneath C-1 pit. (20' from original stn)	100	-1925	25						7.59	1900	225		4.3	<0.2	211538	8	935	1240	7.86	112		8.8	163	47.1	51.2	6.15	375		102				0.006		1.73	0.175	
100-SP1	21-Sep-99	Seepage from fault in drift back, close to Baker Creek.	100	-325	-350	**b**	Ca-Na-Mg-SO4-Cl	3?, 1?			7.30	1888			5.4		992292			1910	7.64	77.2		6.8	284	53.8	102	4.27	633		166		0.1		2.94		15.6		15.4
425-DH3	8-May-00	Flow from horiz DH, in west wall of drift.	425	-800	50	**a/e**	Ca-HCO3-As-SO4	5			7.21	1206	-10		2.4	1.6	200731	6	1290	1250	8.17	1730	41.5	6.6	168	66.7	42.8	5.8	352	-0.05	29	-3		0.011	0.386	-0.008	-0.008	140	
425-DH3	6-Nov-00	Flow from horiz DH, in west wall of drift.	425	-800	50	**a**	Ca-Mg-SO4-HCO3	5?			7.23	1276		250	2.9	2.4	202615	-3	1030	1180	7.35	323	43.5		161	73.2	33.6	5.64	433	-0.05	26	-0.3		8	0.523	-0.008	-0.008	55.1	
425-DH3	12-Jul-01	Flow from horiz DH, in west wall of drift.	425	-800	50			5?			7.17	1891	101		2.8	1	211528	10	1100	1140	7.33	344		6.3	172	70.7	39	6.12	331		18.8				0.315		-0.008	120	
425-RB1	1-Apr-00	Dripping rock bolt in foliated rock in drift back.	425	-400	50	**a**	Ca-Mg-As-SO4-HCO3	5			7.20	1720	n/a	n/a	n/a	<0.1	200558	9	2140	1910	7.08	315			222	103	94.6	7.72	630		109				0.362		-0.008	255	
425-RB1	2-May-00	Dripping rock bolt in foliated rock in drift back.	425	-400	50	**a**	Ca-Mg-SO4-As-HCO3	5			7.10	1711	25	275	3.7	0.034	200657	-3	1220	1930	7.15	310	14.6	6.9	223	106	93.6	7.63	720	-0.05	95	-3		0.041	0.578	-0.008	-0.008	228	
425-RB1	6-Nov-00	Dripping rock bolt in foliated rock in drift back.	425	-400	50	**a**	Ca-Mg-SO4-As-HCO3	5			7.28	1981		350	3.9	0.05	202619	6	2040	1950	7.3	387	21.5		256	103	95.6	8.09	740	-0.05	88	-0.3		0.029	0.641	-0.008	-0.008	177	
425-RB1	12-Jul-01	Dripping rock bolt in foliated rock in drift back.	425	-400	50			5			7.29	3440	87		3.6	-0.1	211527	20	2160	1920	7.1	358		6.3	250	123	108	8.7	641		85.5				0.602		-0.008	325	
425-DH1	1-Apr-00	Flow from inclined DH below Chamber B208.	425	250	25	**a**	Sr-Li-As	**nd**			n/a	n/a	n/a	n/a	n/a	n/a	200557																						
425-SP1	13-Apr-00	Seepage through foliated rock in drift back, below Chamber C212.	425	-1550	50	**a**	Na-Ca-Mg-Cl-HCO3				7.26	1727	185	n/a	4.5	0.017	200608	3	1350	1940	8.23		47	3.7	155	59.5	195	6.8	201	-0.05	336	2.6		0.01				2.68	
425-SP1	2-May-00	Seepage through foliated rock in drift back, below Chamber C212.	425	-1550	50	**a**	Na-Ca-Mg-Cl-SO4				7.60	1713	-20	165	4.7	0.017	200656	-3	2230	1950	8.16	203	42.7	7	147	62.6	246	6.42	373	-0.05	304	-3		0.058	0.85	-0.008	0.049	4.57	
425-SP2	13-Apr-00	Seepage through foliated rock in drift back, below Chamber C212.	425	-1450	50		As	5			n/a	n/a	n/a	n/a	n/a	<0.017	200607																						

QA/QC Samples

Location	Date(x)	Site Description	Level	N	E	Isotope	Geochem	Geochem(srk	Water Type		pH	Cond	ORP	Alk	Temp	Flow	Lab Tag	TSS	TDS	EC	pH	Alk	DIC	DOC	Ca	Mg	Na	K	SO4	Sulphide	Cl	Bromide	F	I	NH3-N	NO3-N	NO3-N+NO2-N	Ortho P	Si
												uS/cm	mV	ppm CaCC	(°C)	(l/min)		mg/L	mg/L	uS/cm	pH	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
000-DU3	9-May-00	QC Duplicate of Baker Creek upstream.	0	2100	-2300												200745	3	84	96.7	7.47	32.9	7.7	13.6	11.4	3.95	2.57	1.19	44	-0.05	3	-3		0.002	0.082	-0.008	0.067	0.011	
000-DU5	16-Nov-00	QC duplicate of 000-SW2.	0	5000	-2150						7.27	1721	150		0.3		202693	-3	1070	1480	7.96	82	16.7		192	42.6	101	8.04	338	-0.05	180	-3		0.012	1.23		8.53	5.02	
000-EX2	9-May-00	QC external check of Baker Creek upstream	0	2100	-2300												L10428-2								10.3	3.6													
100-DU4	16-Nov-00	QC duplicate of 100-DH1.	100	-940	-475						6.64	1633	170		2.4		202696	6	7710	1430	7.03	377	11		240	86.7	17.2	6.05	383	-0.05	7	-0.3		0.004	0.402		-0.008	182	
250-DU2	9-May-00	QC duplicate of 250-DH1	250	600	-1950												200741	18	767	1090	7.79	266	64.1	4.9	174	63	28.3	4.13	295	-0.05	15	-3		0.008	0.095	-0.008	0.068	0.005	
250-EX1	9-May-00	QC external check of 250-DH1	250	600	-1950												L10428-1								143	50													
425-DU1	6-May-00	QC duplicate of 425-DH2.	425	6800	-2450												200715	4	1620	2210	7.96	220	51.8	15.3	253	73	169	15.4	552	-0.05	245	-3		0.047	8.43	0.141	0.148	0.257	
750-DU8	14-Jul-01	Duplicate of 750-SP2	750	7950	-2425						-	-	-		-	-	211537	11	1100	1380	7.52	261		20.9	258	22.4	39.9	3.5	484		31.7				0.649		0.012	0.009	
950-DU4	20-Aug-01	Duplicate of 950-CH3	950	1200	-160												212142	30	784	1050	8.32	217		5.6	137	52.8	23.6	5.71	351		14				0.011		4.35		
1250-BL1	17-Jul-01	Blank	0	0	0						-	-	-		-	-	211616																						
950-CH3A	21-Jan-04	Duplicate of 950-CH3	950	1200	-160				Tailings Backfill	✖							240075	-3	766	1190	8.08	233			134	53.6	31.1	6	356		21.5				0.025		7.3		

prepared by: KSS
checked by: DBM

checked by: DBM

Mixed or Diluted See

Location	Date(x)	As-D mg/L	As-T mg/L	Arsenate mg/L	Arsenite mg/L	Dimethyl A mg/L	Monomethyl A mg/L	Sb-D mg/L	Al-D mg/L	Ba-D mg/L	Be-D mg/L	Bi-D mg/L	Cd-D mg/L	Cs-D mg/L	Cr-D mg/L	Co-D mg/L	Cu-D mg/L	Fe-D mg/L	Pb-D mg/L	Li-D mg/L	Mn-D mg/L	Hg-D	Mo-D mg/L	Ni-D mg/L	Rb-D mg/L	Se-D mg/L	Ag-D mg/L	Sr-D mg/L	Tl-D mg/L	Ti-D mg/L	U-D mg/L	V-D mg/L	Zn-D mg/L
100-DH1	8-May-00	285	277	37	2.25	0.053	0.033	0.272	-0.03	0.0359	-0.0002	-0.01	-0.0001	0.0001	0.0047	0.0019	0.0003	0.077	0.0005	0.0346	0.223		0.0155	0.005	0.0031	0.001	-0.0001	1.12	-0.0001	0.0048	0.0096	0.0019	-0.01
100-DH1	16-Nov-00	789							-0.03	0.0371	-0.0002	-0.01	-0.0001	0.0001	0.0071	0.0068	0.0027	0.0001	0.0004	0.0364	0.246	-0.00001	0.0146	0.015	0.0028	0.002	0.0001	1.02	-0.0001	0.0036	0.0187	0.0046	-0.01
100-DH1	17-Jul-01																															
100-DH2	2-May-00	0.431	0.476	0.29	0.02	0.044	0.05	0.148	0.068	0.018	-0.0002	-0.01	0.0002	-0.0001	-0.0003	0.0436	0.0132	-0.03	0.0006	0.0167	0.114		0.0064	0.0817	0.0019	0.003	-0.0001	0.569	-0.0001	0.0115	0.0203	0.0011	-0.01
100-DH2b	16-Jul-01	0.338		0.346	0.0024	0.003	0.0032	0.142	-0.03	0.064	-0.0001	-0.005	-0.0001	-0.0001	0.0003	0.0337	0.01	-0.03	0.0008	0.0149	0.0655		0.0089	0.0371	0.0015	0.005	-0.0001	0.547	-0.0001	0.0045	0.0085	0.0014	-0.01
100-SP1	21-Sep-99	0.368						0.501	-0.03	0.0373	-0.0002	-0.0001	0.0006	0.0002	0.003	0.183	0.0329	0.04	0.0005	0.0313	0.203		0.0175	0.0735		0.0174	-0.0001	1.12	-0.0001	0.0066	0.0028	0.0013	0.0561
425-DH3	8-May-00	298	296	35.4	0.01	0.031	0.107	0.215	-0.03	0.028	-0.0002	-0.005	-0.0001	0.0002	-0.0003	0.001	0.0002	0.161	0.0005	0.0457	0.185		0.0172	0.0029	0.0034	0.002	-0.0001	1.55	-0.0001	0.0064	0.0072	0.0005	-0.01
425-DH3	6-Nov-00	100						0.159	-0.03	0.0328	-0.0002	-0.005	-0.0001	0.0002	0.0082	0.002	0.0007	0.26	-0.0001	0.0376	0.148	-0.00001	0.0206	0.0062		-0.001	-0.0001	1.34	-0.0001	0.0034	0.0211	0.0025	-0.01
425-DH3	12-Jul-01	211		146	0.06	2.46	0.028	0.597	-0.03	0.0242	-0.0001	-0.005	-0.0001	0.0002	0.0005	0.0012	0.0004	0.214	0.0014	0.0365	0.12		0.0118	0.0041	0.003	-0.001	-0.0001	1.15	-0.0001	0.0032	0.0098	0.0016	-0.01
425-RB1	1-Apr-00	515						1.71	-0.03	0.0264	-0.0002	0.0014	0.0004	0.0002	0.002	0.0132	0.0012	0.16	0.0192	0.0774	0.956		0.0174	0.0312		0.005	-0.0001	1.51	-0.0001	0.0216	0.0061	0.0019	0.0463
425-RB1	2-May-00	495	500	224	282	0.362	0.799	16.3	-0.03	0.0254	-0.0002	-0.01	0.0002	0.0002	0.0041	0.0113	0.001	0.15	0.0232	0.102	0.977		0.0154	0.0287	0.0059	0.005	-0.0001	1.48	-0.0001	0.0247	0.006	0.0007	0.022
425-RB1	6-Nov-00	375						13.5	-0.03	0.024	-0.0002	-0.005	0.0002	0.0002	0.0076	0.0224	0.0011	0.19	0.0119	0.0819	1.11	-0.00001	0.0164	0.0404		0.003	-0.0001	1.58	-0.0001	0.0139	0.0061	0.0032	0.032
425-RB1	12-Jul-01	549		400	0.75	2.27	0.156	17.4	-0.03	0.0234	-0.0001	-0.005	0.0003	0.0002	0.0009	0.0121	0.0009	0.245	0.0214	0.0731	0.963		0.0171	0.0282	0.0054	0.004	-0.0001	1.65	-0.0001	0.0219	0.0064	0.0025	0.025
425-DH1	1-Apr-00	2.49	2					1.69	-0.03	0.0607	-0.0002	0.0002	0.0002	0.0009	0.0035	0.0753	0.139	-0.03	-0.0001	0.0444	0.526		0.0606	0.075		0.016	-0.0001	3.14	-0.0001	0.0098	0.0284	0.0043	-0.01
425-SP1	13-Apr-00	6.13	8.59	4.56	1.33	0.014	-0.001	0.0773	-0.03	0.0171	-0.0002	-0.0001	-0.0001	0.0008	0.0036	0.0003	0.0013	-0.03	-0.0001	0.0445	0.173		0.0073	0.0021		0.007	-0.0001	1.67	-0.0001	0.0036	0.0036	0.0007	-0.01
425-SP1	2-May-00	13	14	3.58	6.22	0.054	0.006	0.203	-0.03	0.0183	-0.0002	-0.01	-0.0001	0.0008	-0.0003	0.0003	0.0018	0.122	-0.0001	0.0489	0.196		0.0077	0.0026	0.0053	0.013	-0.0001	1.76	-0.0001	0.005	0.0037	0.0003	0.01
425-SP2	13-Apr-00	1130		678	428	0.053	0.075																									

QA/QC Samples

000-DU3	9-May-00	0.036	0.025	0.02	0.02	0.002	0.001	0.0032	-0.03	0.01	-0.0002	-0.01	-0.0001	-0.0001	0.0003	0.0001	0.0002	0.185	0.0005	0.0022	0.057		0.0002	0.0002	0.0019	-0.001	-0.0001	0.0374	-0.0001	0.0004	0.0001	0.0002	-0.01
000-DU5	16-Nov-00	7.87							-0.03	0.0177	-0.0002	-0.01	0.0002	0.0002	0.0013	0.0383	0.0119	0.03	0.0018	0.016	0.216	-0.00001	0.0167	0.0247		0.006	0.0005	1.73	-0.0001	0.003	0.0055	0.001	0.021
000-EX2	9-May-00	0.0253	0.0259	0.023	-0.004			0.036	0.02	0.0101	-0.0005	-0.00005	-0.0001		-0.0004	0.0003	0.0011	-0.01	0.0003		0.0477		0.0004	0.0003		-0.0004	-0.0002	0.037	-0.00005	0.0003	0.0002		0.003
100-DU4	16-Nov-00	796							-0.03	0.0378	-0.0002	-0.01	-0.0001	0.0001	0.0051	0.0062	0.0023	0.11	0.0005	0.0349	0.245	-0.00001	0.0144	0.0144		0.002	0.0001	0.976	-0.0001	0.0035	0.0184	0.0038	-0.01
250-DU2	9-May-00	0.02	0.02	0.01	0.03	0.003	-0.001	0.01	-0.03	0.0256	-0.0002	-0.01	-0.0001	-0.0001	-0.0003	0.0008	0.0002	5.44	0.0006	0.0194	0.0019		0.0027	0.0013	0.0018	0.001	-0.0001	0.738	-0.0001	0.0044	0.0087	0.0003	-0.01
250-EX1	9-May-00	0.0018	0.0204	0.018	-0.004			0.001	-0.01	0.025	-0.0005	-0.00005	-0.0001	-0.001	-0.0004	0.0008	0.0009	-0.01	-0.0001		0.369		0.0026	0.0021	-0.05	-0.0004	-0.0002	0.671	-0.00005	-0.0003	0.0098		-0.002
425-DU1	6-May-00	0.696	0.661	0.6	0.08	0.024	-0.001	0.886	-0.03	0.0815	-0.0002	-0.01	0.0002	-0.0001	0.0024	0.153	0.0482	0.222	0.0005	0.0264	2.02		0.0308	0.0469	0.0112	0.009	0.0001	1.7	-0.0001	0.0071	0.0096	0.002	0.016
750-DU8	14-Jul-01	0.0102						0.0541	-0.03	0.0399	-0.0001	-0.005	-0.0001	0.0003	-0.0003	0.0041	0.0004	0.378	0.0018	0.0123	0.233		0.0046	0.0036	0.0036	0.001	-0.0001	3.71	-0.0001	0.0049	0.0026	0.0019	-0.01
950-DU4	20-Aug-01	2.02						0.129	-0.03	0.0159	-0.0001	-0.005	-0.0001	-0.0001	0.0077	0.0032	0.0036	-0.03	-0.0001	0.0189	0.0393		0.0079	0.0118	0.0026	0.001	-0.0001	0.692	-0.0001	0.0034	0.011	0.003	-0.01
1250-BL1	17-Jul-01	-0.001						0.0192	-0.03	0.0002	-0.0001	-0.005	-0.0001	-0.0001	-0.0003	-0.0001	0.0003	-0.03	0.0011	-0.0003	0.0001		-0.0001	0.0001	-0.0001	-0.001	-0.0001	-0.0001	-0.0001	-0.0003	-0.0001	-0.0001	-0.01
950-CH3A	21-Jan-04	2.55		2	-0.005	0.076	-0.005	0.147	0.0128	0.016	-0.00002		0.00007	0.00015	0.0003	0.00464	0.00573	-0.05	0.00102	0.0238	0.00881		0.00616	0.018	0.00286	0.0011	-0.0001	0.859	-0.0001	0.00027	0.00769	0.0002	0.0269

prepared by: KSS
checked by: DBM

checked by: DBM

Mixed or Diluted See

Location	Date(x)	Al-T mg/L	Sb-T mg/L	Ba-T mg/L	Be-T mg/L	Bi-T mg/L	Cd-T mg/L	Cs-T mg/L	Cr-T mg/L	Co-T mg/L	Cu-T mg/L	Fe-T mg/L	Pb-T mg/L	Li-T mg/L	Mn-T mg/L	Mo-T mg/L	Ni-T mg/L	Rb-T mg/L	Se-T mg/L	Ag-T mg/L	Sr-T mg/L	Th-T mg/L	Ti-T mg/L	U-T mg/L	V-T mg/L	Zn-T mg/L	Hg-T mg/L	Isotope	18O in H2O	2H in H2O	3H in H2O	13C in DIC	34S in SO4	18O in SO4
100-DH1	8-May-00																									-0.00001	6700	-18.81	-152.4	21	-14.38	4.04	-6.6
100-DH1	16-Nov-00																										13397	-18.35	-147.75	21	4.54	3.17	-8.615
100-DH1	17-Jul-01																																
100-DH2	2-May-00	0.068	0.0827	0.02	-0.002	0.001	-0.0003	-0.0004	-0.003	0.044	0.014	0.05	0.001	0.017	0.109	0.007	0.08	0.0019	-0.01	-0.0003	0.552	-0.0004	0.013	0.023	-0.001	-0.01		6720	-19.49	-159.3	21	-15.4	2.27	-9.79
100-DH2b	16-Jul-01																										25830	-14.76	-135.40	16.50	-11.32	3.12	-5.04
100-SP1	21-Sep-99																											-14.03	-124.4	22.8			
425-DH3	8-May-00																									-0.00001	6699	-19.14	-152.2	22	-14.46	5.08	-5.38
425-DH3	6-Nov-00																										13388	-18.65	-153.90	10	-13.2	3.34	-7.8
425-DH3	12-Jul-01																										25822	-18.82	-156.10	19.00	-13.49	3.89	-7.77
425-RB1	1-Apr-00																										6193	-19.14	-156.69	8	-5.24	6.32	-3.12
425-RB1	2-May-00	-0.03	16.7	0.025	-0.002	-0.01	-0.0003	-0.0004	0.006	0.011	-0.002	0.13	0.023	0.096	1.22	0.016	0.027	0.0059	-0.01	-0.0003	1.53	-0.0004	0.025	0.0061	-0.001	0.02	-0.00001	6731	-19.17	-158.9	12	-5.73	6.58	-2.74
425-RB1	6-Nov-00																										13396	-18.88	-154.95	-6	-3.27	5.67	-4.485
425-RB1	12-Jul-01																										25821	-18.75	-158.40	16.00	-5.33	5.61	-3.75
425-DH1	1-Apr-00	-0.03	0.884	0.0563	-0.002	-0.0004	-0.0003	0.0007	-0.003	0.0976	0.125	-0.03	-0.001	0.0489	0.52	0.053	0.0781		0.036	-0.0003	3.39	-0.0004	0.0117	0.0241	0.0036	-0.01		6186	-19.48	-159.54	6	-19.2	5.3	-4.63
425-SP1	13-Apr-00	0.18	0.0854	0.021	-0.002	0.0014	-0.0003	0.0009	-0.003	-0.001	-0.002	0.15	-0.001	0.054	0.19	0.007	0.003		0.014	-0.0003	1.77	-0.0004	0.005	0.0038	-0.001	-0.01	-0.00001	6183	-19.2	-163.63	7	-12.83	11.3	-4.575
425-SP1	2-May-00	1.12	0.12	0.02	-0.002	0.0008	-0.0003	0.0009	-0.003	-0.001	0.004	1.82	0.002	0.053	0.211	0.008	0.004	0.0054	-0.01	-0.0003	1.61	-0.0004	0.058	0.0039	0.005	0.026	-0.00001	6719	-19.47	-161.2	7	-12.59	11.42	-4.79
425-SP2	13-Apr-00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a							

QA/QC Samples

000-DU3	9-May-00	0.674	0.0076	0.013	-0.002	-0.0004	-0.0003	-0.0004	-0.003	-0.001	-0.002	0.27	-0.001	-0.003	0.056	-0.001	-0.001	0.003	-0.01	-0.0003	0.038	-0.0004	0.006	-0.0003	0.002	-0.01	-0.00001	6721	-14.14	-132.6	20	-5.62	7.98	-0.65
000-DU5	16-Nov-00																										13411	-15.79	-141.10	29	-7.17	4.63	-3.62
000-EX2	9-May-00																																
100-DU4	16-Nov-00																										13392	-18.28	-151.80	-6	-12.46	2.99	-9.475
250-DU2	9-May-00																									-0.00001	6715	-19.13	-155.2	15	-11.03	6.02	-7.54
250-EX1	9-May-00																																
425-DU1	6-May-00	-0.03	0.92	0.083	-0.002	-0.01	-0.0003	-0.0004	0.011	0.158	0.088	0.23	0.001	0.028	1.96	0.033	0.05	0.012	0.011	-0.0003	1.71	-0.0004	0.007	0.0101	0.002	0.017	0.00001	6736	-16.35	-142.1	20	-18.71	6.32	0.605
750-DU8	14-Jul-01																										25829	-18.27	-153.40	29.00	-13.85	5.24	2.96
950-DU4	20-Aug-01																																
1250-BL1	17-Jul-01																																
950-CH3A	21-Jan-04																																

prepared by: KSS
checked by: DBM

Appendix B

Reconnaissance Survey Results

MEMORANDUM

To: Kelly Sexsmith, P.Geo.
SRK Consulting

From: John Brodie, P.Eng
BCL.

SUBJECT: Giant Mine, Underground Arsenic Sampling - Mapping of Main Flows

This memo presents a description of an underground arsenic sampling program which was conducted in July 2001.

BACKGROUND

The distribution of arsenic in the water of the Giant Mine had previously been sampled by FracFlow Consultants, DIAND personnel and SRK Consulting. Samples had been collected at a number of locations over a several years. SRK Consulting Ltd. prepared a simplified arsenic mass balance based on the results of the sampling. Some problems were noted with the mass balance, which suggested the need for a more detailed assessment of the distribution of arsenic in the mine waters.

Characterization of the arsenic distribution and concentration in the mine will aid in the prediction of water management/treatment requirements for the various closure alternatives under consideration.

Previous sampling has shown that the water emanating from several of the chambers is very high in dissolved arsenic. However, it is not clear whether the arsenic chambers are the only significant source of arsenic from within the mine.

OBJECTIVES

1. characterize the distribution of dissolved arsenic in the water in various areas of the mine,
2. sample water draining from tailings and/or waste rock backfilled stopes to characterize the arsenic load associated with these sources
3. estimate flows to show relative importance of samples in the mass balance calculations.

Brodie Consulting Ltd.
572 St. Andrews Place, West Vancouver, B.C., V7S 1V8
604-922-2034 fax-922-9520 Email: brodies@direct.ca

METHODOLOGY

The sampling was conducted over a five day period from July 19 to July 24, 2001. Sampling commenced on 100 level and progressed downward through the mine.

Filtered samples were collected for determination of dissolved arsenic concentration only. All samples were analysed at Taiga Laboratory in Yellowknife.

Flow measurements were made in several ways, including: time to fill a calibrated jug, velocity measurements in measured cross-sections of ditches, and visual estimates. Initially, some measurements in the ditches were made using an impeller flow-meter device. This instrument was found to have a mechanical problem and the results associated with it are believed to be misleading.

In the week preceding the sampling work the Giant Mine was subjected to extremely high inflows due to a severe precipitation event. This, coupled with a high spring freshet runoff, resulted in excessive flows into the mine via the pits and infiltration. The 2000 level of the mine was completely flooded. Many parts of the mine, particularly south of C shaft, had been flooded by temporary dams. Mud from the floor of the pits and tailings from backfilled stopes could be seen on the floor of many drifts in the mine.

The volume of water flowing through mine was decreasing daily during the time of the sampling work. Measurements are not available to determine the rate of flow reduction.

RESULTS AND DISCUSSION

A total of 77 samples were collected. The results and comments on the sampling are presented in the attached table of sample locations and lab results. The results are also shown in Figure 1..

Key observations resulting from the sampling results are as follows:

- Samples that can be seen to be directly influenced by the arsenic chambers have a arsenic concentrations ranging from 100 to several thousand mg/l.
- Dilution appears to be reducing the influence of the arsenic chambers with depth.
- Background groundwater as seen in exploration drifts appears to range around 1 mg/l.
- The arsenic concentrations from stopes not influenced by the arsenic chambers or northwest tailings appear to be in the range of 2 – 3 mg/l.
- The arsenic concentrations from stopes which contain backfill tailings and not influenced by arsenic chambers or northwest tailings appear to be in the range of 5 mg/l.

- In areas not influenced by the arsenic chambers or northwest tailings, there may be a slight increase in the arsenic concentration with depth, possibly due to increased contact time with arsenic bearing minerals in ore and/or backfill.

Based on review of the data the following sampling results are considered anomalous due to inconsistencies between nearby samples or the probable source water for the given sample. These should be confirmed by re-sampling.

Sample 16 (0.903mg/l), drillhole very near to B212/213/214 chamber, seems low
Sample 17 (7.1 mg/l), drillhole, away from ore and chambers, seems high
Sample 39 too high, result is 30% higher than either of the two flows which make up this sample
Sample 44, too low, lower than the sources which make up this sample
Sample 50, too low, lower than the sources which make up this sample
Sample 70, too low, lowest sample in the data base

RECOMMENDATIONS

Some sample locations were inaccessible or, based on review of the results to date, have the potential to supplement or confirm our understanding of the arsenic distribution. These locations are:

- Lolor, chutes/ore passes on 1250 or 1500 level
- 950L, drainage from south end of mine just south of C shaft
- LAW chute/ore pass on 1500 level

Further sampling in these areas should be considered.

GIANT MINE UNDERGROUND ARSENIC SOURCE SAMPLING

Sampled July 19,20,21,23,24, 2001 sampled by Brodie

Sample #	Conc.	flow, lpm	northing	easting	LOCATON DESCRIPTION
100 Level					
1	9.5	<5 - p	400S	500W	1-18 sump, possibly poor sample due to poor mixing in sump
2	10.4	<5 - p	60N	450W	1-18 Sump discharge at end of pipe in 1-01 E.X.C. by B Shaft
3	1.32	3	4400N	1700W	drillholes in 1-26N Dr. @ 4400N
4	1.9	~10	4050N	1350W	ditch flow, 1-25 W.X.C., @ 1150W
250 Level					
5	2590	10 - p	300N	370W	pipe discharge in 2-02 N Dr. from sump located by #15 bulkhead
6	1.37	<10	4650N	1450W	ditch flow, b3/2-38 N Dr.
425 Level					
7	0.538	0.2	1800S	225E	ditch flow, 3-18 stope extn. Dr. @ 1800 S
8	0.572	1	2000S	50E	drainage from chute in 3-05S Dr. @ 2000S
9	0.625	5	2550S	150E	ditch flow , 3-25 ramp @ 2500 S
10	0.336	0.1	2500S	50E	ditch flow, 3-05 S Dr. by 4-70 vent raise
11	140	0.1	450S	240E	sump at bottom of 5-08 decline @ 400 s
12	0.804	<10	950N	560W	B ramp at 425 level at 3-03 W XC, before it flows down raise in stope
13	2070	<1	625N	30E	pool at south end of 3-12b decline at 600 N, north side
14	1860	<1	550N	30E	pool at south end of 3-12b decline at 600 N, south side
15	2270	0.13	450N	0E	ditch flow, 3-02 N Dr. @ 450 N
16	0.903	0.1	690N	30W	drillholes in stope 3-02N Dr at 600 N
17	7.1	<.1	1520N	600W	drillhole, in 3-16N Dr., south of O/P at
18	0.754	1	1500N	600W	ditch flow, 3-16 N Dr at 1450 N
18A	224	2.8	1000S	30E	ditch flow, 3-12B N Dr. @ 1000 S
575 Level					
19	3.5	20	1525S	280E	ditch flow, 4-03 S Dr. @ 1550 S
20	723	2.8	1400S	250E	ditch flow, 4-02 N Dr. @1500 S
21	749	0.1	1225S	80E	ditch flow, 4-02 N Dr. @1200 S
22	784	0.7	810S	90E	ditch flow, 4-02 N Dr. @1500 S
23	827	0.2	40S	30W	ditch flow, 4-02 N Dr. @50 S
24	624	0.1	1610N	140W	ditch flow, into 4-02 N Dr. @600 N from east Xcut
25	859	0.1	1640N	170W	ditch flow, 4-02 N Dr. @650N
26	186	?	0N	500W	dripping water in B Shaft
27	2.04	4	1050N	250W	flow into O/P in 4-03 N Dr @ 1100 N
28	0.432	2	2050N	580W	ditch flow, 4-03N Dr @ 2000 N
29	0.18	0.1	2750N	580W	flow from fault/fracture in roof, 4-03 N Dr @ 2800 N
30	1.76	40	3450N	440W	flow from O/P into drift 4-03 N Dr. @ 3700 N
31	1.16	0.2	3950N	300W	ditch flow, 4-02 N Dr. @ 3950 N (just upstream of 4-21 Xcut)
32	2.02	2	3950N	340W	ditch flow, 4-21 W Xcut @ 150 E
33	2.46	2	4850N	480W	ditch flow , 4-22 N Dr. @ 4900 by scoop shop
34	3.3	120	5625N	1850W	sump overflow, 4-22 N Dr. @ 5600 N
35	4.2	50	5625N	1820W	ditch flow, S425 incline @ 5600 N
750 Level					
36	0.687	10	2450S	140E	ditch flow, 7-26 ramp @ 2300 S
37	4.2	60	1500S	250E	X cut leading to C shaft @ 150 W
38	3.7	80	1200S	90E	ditch flow, 7-04 N Dr. @ 1200 S
39	207	5	100S	10W	ditch flow into Alimak raise in 7-11 W Xcut @ 50W
40	142	3	25N	410W	flow from O/P into 7-11 W X cut @ 450 W by B shaft
41	177	2	O	520W	dripping water in B shaft
42	2930	0.1	160N	20E	dripping zone 7-04 N Dr. @ 150 N
43	5.9	6	11250N	230W	drillhole, 7-04 N Dr @ 1200 N, high pressure

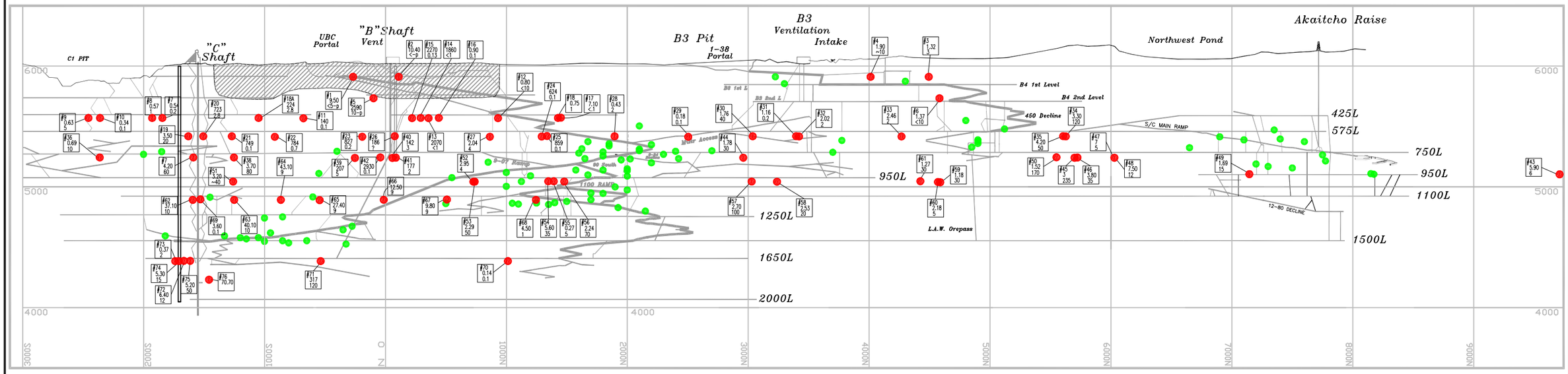
GIANT MINE UNDERGROUND ARSENIC SOURCE SAMPLING

Sampled July 19,20,21,23,24, 2001 sampled by Brodie

Sample #	Conc.	flow, lpm	northing	easting	LOCATON DESCRIPTION
44	1.78	30	3450N	280W	discharge from raise to 7-35 decline, 7-04 N Dr @ 3500 N+F92
45	3	235	5820N	1660W	ditch flow, 7-72 S Dr. @ 5750 N
46	3.8	35	5850N	1660W	ditch flow, 7-04 N Dr. @ 5800N
47	7	5	6120N	1800W	ditch flow, form 7-62 stope into 7-04 N Dr @ 6150 N
48	7.5	12	6110N	1820W	drillhole, 7-04 N Dr @ 6150N
49	1.69	15	7120N	2250W	ditch flow, 7-04 N Dr @ 7200 N
50	1.52	170	5660N	1640W	pipe discharge from lower L.A.W. into 7-72 S Dr. @ 5700 N
950 Level					
51	3.2	~40	1180S	130E	south sump overflow towards C shaft, 9-02S Dr @ 1200S
52	2.95	4	1150N	180E	ditch flow, 9-02 N Dr @ 1150 N
53	2.29	50	1130N	150E	ditch flow in W Xcut flowing into 9-02 N Dr. @ 1100 N
54	5.6	35	1600N	260W	drillhole from 9-14 stope into top of 9-14 ramp at about 1550 N
55	0.269	5	1500N	530W	ditch flow, 9-02 W Xcut ? (Xcut at 1600 N) sampled at 350 W
56	2.24	70	1650N	440W	ditch flow , 9-29 N Dr @ 1600 N
57	2.7	100	3520N	300W	discharge from O/P inot 9-29 N Dr @ 3500 N
58	2.53	20	3800N	240W	drillhole 9-33 stope, @ 3900 N
59	1.18	30	4700N	1370W	drilhole in stope, bottom L.A.W. decline @ 4750 N
60	2.18	5	4750N	1250W	bottom L.A.W. decline, flow from north to ramp sump @ 4800 N
61	1.27	30	4600N	1220W	flow into sump from 575 level down L.A.W. decline at 4700 N
1100 Level					
62	37.1	10	1470S	300E	flow into C shaft area
63	40.1	10	1130S	200E	ditch flow in main drift at 1250 S
64	43.1	9	700S	180E	ditch flow in main drift at 600 S
65	27.4	9	300S	230E	ditch flow in main drift @ 250S
66	12.5	9	280N	170E	ditch flow in main drift @ 225 N
67	9.8	9	830N	80E	ditch flow in main drift @ 800N, 5 m upstream of 1100-CH1
68	4.5	1	1780N	250E	ditch flow, 11-02 decline at 1800 N & 300 W
69	3.6	0.1	1450S	210E	chute discharging into main drift @1500 S
1650 Level					
70	0.14	0.1	1410N	80E	ditch flow 16-02 N Dr. @ 1400 N
71	317	120	250S	300E	overflow from sump at bottom of Alimak raise @ 200 S
72	6.4	12	1400S	560E	drillhole in 16-02 N Dr @ 800 S
73	0.369	2	1430S	650E	ditch flow, 16-03 E Xcut @ 600 E
74	5.3	15	1430S	610E	drillhole in 16-07 N Dr, from sump on 1500
75	5.2	50	1410S	430E	ditch flow @450E, 1400S from 16 level incline to 1500 level
1800 Level					
76	70.7		1250S	410E	overflow from sump in 1650 decline below powder & cap magazines plus water from shaft bottom, flow rate unknown

NOTE; flow rates are based on measurements using a small jug, visual estimates and sum and/or difference from inflows/outflows in a given area

flow marked with "- p" are pumped discharge, pumps cycle on and off, volume estimated average



LEGEND

Arsenic Trioxide Storage Chamber Area

Backfilled Tailings Stope

Arsenic Source Sampling

#71
317
120

Sample Number
Arsenic Concentration
Flow, lpm

0 250 500 750 1000 1250 FEET
SCALE

SRK Consulting
Engineers and Scientists

Indian and Northern Affairs Canada

GIANT MINE

ARSENIC SAMPLING DATA

PROJECT NO.	DATE	APPROVED	FIGURE
1CI001. 07	OCT. 2001		1

File Ref: Water_Flow_Network.dwg

Appendix C

Monthly Sampling Results

Location	Date	Notes	pH	Cond	ORP	Temp	Flow***	Taiga	Turbidity	TSS	TDS	EC	pH	Alk	DIC	DOC	Hard	Ca	Mg	Na	K	SO4	Cl	NH3-N	NO3-N+NO2-N	As-D	As-T	Arsenate	Arsenite	Dimethylar	Monometh	As Load
			s.u	uS/cm	mV	C	L/min	#	NTU	mg/L	mg/L	uS/cm	s.u.	mg/L	mg/L	mg/L	mg $CaCO_3$/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	(kg/day)
950 SUMP	31-Aug-01	grey/green (silty); almost a must/cabbage-like odour	7.62	4620	249	5.9	820	212327	59.5	100	1350	1840	7.97	155		7.1	891	230	76.9	96.4	11.1	627	139	3.08	8.99	7.3	7.4					8.6
8" Surface	31-Aug-01		7.45	4080	223	11	1230	212329	85.9	183	1340	1960	7.89	170		7.3	817	216	67.4	91.3	11	635	139	1.73	9.36	9.7	10.2					17.2
8" Surface	2-Oct-01	little to no flow from 575/950 level; line will be drained for the winter						n/a																							
10" Surface	31-Aug-01		7.4	5050	214	13.4	1330	212328	276	827	1980	2490	7.65	114		6.7	903	277	51.3	176	8.64	501	508	0.064	10.1	24.6	34					47.1
10" Surface	2-Oct-01	water quite cloudy	7.19	7470	202	9.2	1770	212740	54.9	64	2440	3030	7.51	139		7.7	1180	338	81.5	213	11.1	629	602	2.01	14.8	59.4	74.1					151.4
10" Surface	1-Nov-01						2040	213017	124	139	1870	2290	7.8	186		7.3	1980	299	82.7	166	11.7	650	348	2.25	12	52.7	50.8	57.5	2.74	na	na	154.8
1300 SUMP	31-Aug-01	grey/green (silty)	7.05	9750	245	9.7	1330	212326	18.1	27	2510	4330	7.54	119		7.1	1550	471	89.8	333	13.3	757	650	1.41	16.1	56.7	57.5					108.6
1300 SUMP	1-Nov-01						1080	213016	85.1	93	1560	1920	8.04	196		7.8	1660	251	74.3	102	11.8	635	211	2.53	9.69	22	24.4	23	0.46	na	na	34.2
1300 SUMP	4-Dec-01		7.21	1936	2.19	6.7	480	213100	54.1	49	1800	2350	7.79	195		7.7	1000	281	73	146	12	743	289	4.3	11.4	17.6	17.3	11.5	8.39	0.0385	-0.01	12.2
1300 SUMP	8-Jan-02		7.43	4350	na	8.7	1050	220122	41.8	67	3460	4780	7.51	158		7.9	1610	495	89.9	413	14.7	762	1390	3.27	317	50.2	58	44.4	0.71	-0.01	-0.01	75.9
1300-SU1	4-Feb-02						1490	220254		67				159				261	78.6	130	13.6	627	204	2.53	9.43	21.2		14	0.03	0.398	0.094	45.5
1300 SUMP	8-Mar-01		7.49	4650	na	10.7		220841		25	3240	3300	7.66	161		7.2	1580	480	93.8	378	15.8	809	1020	3.83	16.1	28.3		23.7	<0.01			0.0
1300 Sump	5-Apr-02	slightly cloudy, light grey particles	7.45	2710	167	7.1	1932	221110		31	2040	2600	7.47	165	31	8.1	417	29.9	83.2	175	15.3	794	343	3.82	12	21.3	21.9	18	0.12			59.3
1300 PUMP	4-Dec-01		7.26	7240	2.68	7.9	480	213101	51.5	56	2050	2410	7.78	195		7.4	1030	289	73.7	156	13.4	738	305	4.35	13.2	29.3	28.6	14.88	1.03	-0.01	-0.01	20.3
1300 PUMP	8-Jan-02		7.96	5140	na	7.9	1050	220123	41.5	43	3220	4130	7.61	160		7.7	1580	490	86.7	361	15	769	1170	3.48	305	49.2	49.9	37.8	0.56	-0.01	-0.01	74.4
1300 PUMP	8-Mar-01		7.17	5820	na	11.1		220842		35	3920	5340	7.66	156		7.1	2050	648	105	570	16.6	808	1340	3.76	19.2	37		31.4	0.24			
1300 Pump	5-Apr-02	clear, some grey particulate	6.88	5980	210	8.6	1932	221111		23	4140	5800	7.22	133	19.5	7.2	1860	568	107	529	16.2	794	1570	0.322	18.8	18.1	18	17.6	<0.01			50.4
1300-PM	2-May-02		7.46	4740	172	7.4	1693	221370		58	4150	5400	7.72	147	23.9	7.2	1680	512	98.7	466	16.4	729	1320	2.55	20.4	21.9	21.6	20	0.125			53.4
SNP 43-17	12-Dec-01	Miramar Sample					1440																				16.99					35.2
SNP 43-17	08-Jan-02		7.53	3160	na	9	1736	220124	38.7	50	1990	2530	7.78	145		7.5	785	204	67	12.5	178	640	470	3.08	232	30.5	30.9	36.7	0.25	-0.01	-0.01	76.3
SNP 43-17	8-Jan-02	Miramar Sample				9	1736			33.8			7.53											2.9			29.17					72.9
000-SW6-1	04-Feb-02	Mass Balance Sample	7.33	2010		6.1	2283	220246		74				143				270	70.1	118	12	557	156	2.57	8.65	22		16.7	0.04	1.16	0.0316	72.3
000-SW6-2	04-Feb-02	Mass Balance Sample	7.43	1452		2.9	1962	220247		30				91.3				147	43.5	70.3	7.03	346	82.7	1.55	5.48	12.5		10.2	0.02	0.374	0.011	35.3
000-SW6-3	05-Feb-02	Mass Balance Sample	7.34	4410		5.5	2461	220248		56				141				458	99.7	445	15.3	964	924	2.66	16.4	30.4		22.8	0.12	0.674	0.425	107.7
000-SW6-4	05-Feb-02	Mass Balance Sample	7.44	1866		4.9	1831	220249		70				162				289	78.5	173	14.6	807	232	3.15	11.5	19.5		14.9	0.03	0.511	0.0431	51.4
000-SW6-5	06-Feb-02	Mass Balance Sample	7.3	1820		5.2	1645	220302		35				122	25.6			214	58.4	115	9.6	370	201	2.02	8.4	17.5						41.4
SNP 43-17	6-Feb-02	Miramar Sample				9				27			7.4											2.3		24.21						
SNP 43-17	12-Feb-02	Miramar Sample				9	2618			17.4			7.31											<1.0			11.94					45.0
SNP 43-17	19-Feb-02	Miramar Sample				8	1879			-			7.4											-			18.86					51.0
SNP 43-17	27-Feb-02	Miramar Sample				9	1593			-			7.54											-			17.98					41.2
SNP 43-17	5-Mar-02	Miramar Sample				8	2203			9.2			7.57											3.7			19.3					61.2
SNP 43-17	08-Mar-02		7.16	2850	na	8.5	1578	220843		18	2010	3000	7.7	154		6.9	1420	432	83.5	328	14.8	578	597	1.95	10.3	26		18	0.19			59.1
SNP 43-17	11-Mar-02	Miramar Sample				7	1578			-			7.32											-			16.26					36.9
SNP 43-17	19-Mar-02	Miramar Sample				8.5	1920			-			7.45											-			11.95					33.0
SNP 43-17	26-Mar-02	Miramar Sample				9	1506			-			7.54											-			23.13					50.2
SNP 43-17	2-Apr-02	Miramar Sample				9	2136			23.6			7.44											2.2			20.15					62.0
SNP 43-17	05-Apr-02	cloudy and difficult to filter, brown particulates	7.51	2340	163	6.3	1932	221112		22	1370	1900	8.09	130	18	7.6	825	228	62.1	134	11.9	527	242	0.325	8.44	18.5	14.4	16.7	0.19			51.5
SNP 43-17	9-Apr-02	Miramar Sample				8	1802			-			7.46											-			14.66					38.0
SNP 43-17	16-Apr-02	Miramar Sample				9	1735			-			7.47											-			21.1					52.7
SNP 43-17	23-Apr-02	Miramar Sample				9	1935			-			7.71											-			13.73					38.3
SNP 43-17	30-Apr-02	Miramar Sample				10	2119			-			7.81											-			10.62					32.4
SNP 43-17	02-May-02		7.39	4260	155	7.6	1870	221371		52	3670	4800	7.63	147	20.5	7.1	1530	465	89.6	412	15.1	678	1180	2.29	18.3	19	18.6	17.6	0.145			51.2
SNP 43-17	7-May-02	Miramar Sample				8.5	3361			133			7.68											3.65			10.26					49.7
SNP 43-17	14-May-02	Miramar Sample				-	3444			-			-											-			32.18					159.6
SNP 43-17	21-May-02	Miramar Sample				-	2851			-			-											-			8.66					35.5
SNP 43-17	28-May-02	Miramar Sample				-	1566			-			-											-			11.86					26.8
SNP 43-17	4-Jun-02	Miramar Sample				9	3258			95.6			7.6											<1.0			10.32					48.4
SNP 43-17	30-Jul-02	Water is cloudy looking but basically colourless	7.39	2290	176	9.4	1997	222158	36	23	2210	2480	7.94	124	30	8.5	984	281	68.6	157	11.5	644	343	0.917	12.3	15.4	15.6	14.1	1.94			44.3
SNP 43-17	3-Sep-02	Water is cloudy and has yellow tint, particulate	7.26	3730	204	9.3	1699	222636	41.3	30	3250	4020	7.61	126	31	6.4	1360	405	83.9	349	12.7	651	886	0.911	14.9	20.57	20.1	16.6	0.0088			50.3
SNP 43-17	2-Oct-02	Water is very clear, filters easily	7.08	4150	785	9.3	1509	223583	18.8	32	2950	4060	7.59	130	34	7.2		397	80.6	326	13.6	676	951	1.2	17.6	9.9	9.4	8.5	0.0096			21.5
SNP 43-17	4-Nov-02	Water is cloudy and hard to filter	7.8	2270	122	4.6	1282	224214	25.8	32	1780	2270	8.04	138	37	6.6	1030	290	75.1	24.4	12.4	709	254	1.31	13.6	23.1	24.3	19.9	0.0002			42.6
SNP 43-17	10-Dec-02	Water is cloudy and hard to filter, NW Tailings	6.95	2060	158	5.7	1002	224448	4.1	28	1710	2100	7.31	124		6	845	224	69.5	129	11.6	658	243	1.17	10.3	22.5	23.1	18.4	0.0002			32.5
SNP 43-17	7-Jan-03	Miramar Sample	7.25			7.3	1,461			36														1.81			16.7					35.1
SNP 43-17	4-Feb-03	Miramar Sample	7.07			6.7	1,465			120														1.33			10.4					21.9
SNP 43-17	5-Feb-03	Water is both dirty and cloudy, particulate has	7.26	4130	162	5.6	1603	230201	17.62	84	2977	4280	7.68	135	27.82	15.08	1544.254	475	87	378	11.6	570	1041	1.5	14.839	8.8	8.8	5.535	0.105			20.3
SNP 43-17	4-Mar-03	Miramar Sample	7.03			5.9	1,566			48														2.82			15.5					35.0
SNP 43-17	5-Mar-03	Water is cloudy but colourless, with yellow part	7.12	2430	145	3.1	1864	230313	12.14	56	2078	2630	7.79	153	30.8	15.91	1122.1575	317.5	80	167	13.4	636	402.6	1.99	13.028	16.2	21.7	16.96	2.195			43.4
SNP 43-17	1-Apr-03	Miramar Sample	7.31			7.7	1,767			30														1.83			50.6					128.7
SNP 43-17	2-Apr-03		7.51	2560	172	2.7	1184	230588	11.99	26	1964	2530	7.63	145	30.2	15.07	1005.371	276.5	76.5	160.2	13.9	876.97	366.4	3.35	12.795	14.6	14.6	14.53	0.00095			24.9
SNP 43-17	6-May-03	Miramar Sample	7.28			7.1	2,496			18														1.33			53.6					192.7
SNP 43-17	7-May-03	Black particulate, difficult to filter	7.53	3430	81	8.2	1089	230776			2642	3052	7.79	126.8		12.2		36.1	77.3	193	12.4	620.33	701.5	1.486	11.17	9.4		8.44	LO			14.7
000-SW6-1	15-May-03	Mass Balance Sample	7.46	1803		7.4	1795	230873		46	1290	1760	7.49	108	22			202	35.5	112	9.38	520	224	1.22	8.29	6		5.86	-0.005			15.5
000-SW6-2	16-May-03	Mass Balance Sample	7.51	3140		6.8	2595	230926		54	1980	2490	7.52	112	29			265	57.9	187		510	511	0.729	8.18	5		4.45	0.0329			18.7
000-SW6-3	30-May-03	Mass Balance Sample	7.45	3350		11.3	2707	231163		34	2220	2860	7.62	116	32			345	64	22		816	583	0.625	11.6	22		22.8	-0.005			85.8
000-SW6-4	31-May-03	Mass Balance Sample	7.37	3180		8.9	2665	231159		18	1940	2620	7.49	115	30			31.6	6.3	189		16	455	0.426	12.2	17		18.9	-0.005			65.2
000-SW6-5	31-May-03	Mass Balance Sample	7.45	3250		9.7	2655	231160		26	2240	2850	7.49	120	32			34.2	6.7	237		18	551	0.406	12.2	24		22.5	-0.005			91.8
SNP 43-17	11-Jun-03	Miramar Sample	7.3			6.9	1,689			-														1.12			15.3					37.2
SNP 43-17	2-Jul-03	Miramar Sample	7.3			8.4	819			38														0.8			6.4					7.6
SNP 43-17	2-Jul-03	Miramar Sample	7.3			8.4	819			32														0.8			6.3					7.4
SNP 43-17	7-Jul-03	Yellow but filters easily, little particulate	7.14	4712	98	10.5	489	231864		16	3300	4280	7.56	113	29	10.9	1350	424	71.3	348	12.8	644	858	1.13	19.2	5.49	5.5	4.48	-0.005			3.9
SNP 43-17	14-Jul-03	Miramar Sample	-			-	819			-														-	12.24293539	11.4	13.116	12.2146	1.0091			13.4

Location	Date	Notes	pH	Cond	ORP	Temp	Flow***	Taiga	Turbidity	TSS	TDS	EC	pH	Alk	DIC	DOC	Hard	Ca	Mg	Na	K	SO4	Cl	NH3-N	NO3-N+NO2-N	As-D	As-T	Arsenate	Arsenite	Dimethylar	Monometh	As Load
			s.u	uS/cm	mV	C	L/min	#	NTU	mg/L	mg/L	uS/cm	s.u.	mg/L	mg/L	mg/L	mg $CaCO_3$/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	(kg/day)
SNP 43-17	15-Jul-03	Miramar Sample	-			-	819			-														-			5					5.9
SNP 43-17	21-Jul-03	Miramar Sample	-			-	819			-														-			5					5.9
SNP 43-17	6-Aug-03	Miramar Sample	7.8			-	1,127			31														1.05			28.2					45.8
SNP 43-17	7-Aug-03	Water is a little cloudy, green-grey particulate	7.45	6560	155	15.4	960	232604		24	5240	6380	7.52	142		9.1	2170	691	108	551	15	680	1650	0.756	17.2	0.061	0.07	72.2	0.0006			
SNP 43-17	2-Sep-03	Miramar Sample	7.4			11.2	1,449			48														0.17			48					100.2
SNP 43-17	2-Sep-03	Miramar Sample	7.4			11.2	1,449			48														0.17			48					100.2
SNP 43-17	5-Sep-03	Water is cloudy but colourless, new flowmeter	7.41	2120	80	11.6	1151	233708		16	3360	4370	7.5	150		9.2	1640	506	92	291	13	635	903	0.65	8.58	83	84	90.7	0			137.6
SNP 43-17	7-Oct-03	Miramar Sample	7.2			8.7	1,777			10														1.65			65.9					168.6
SNP 43-17	9-Oct-03		7.26	7070	73	8.7	1784	234319		40	2950	4120	7.6	126	32	13.2	1280	378	81.6	284	13.7	663	758	3.32	16.4	8.47	9.76	8.92	0.03			21.8
SNP 43-17	4-Nov-03	Miramar Sample	7			9.4	1,529			82.5														3.78			9.9					21.8
SNP 43-16	7-Nov-03	Water is cloudy and grey coloured, fine black p	7.57	2600	167	7.3	1606	234484		102	1760	2560	7.45	134	33	14.9	1000	272	79	155	13.6	741	319	2.74	12.4	10.4	12.2	11.5	0.01			24.0
SNP 43-17	2-Dec-03	Miramar Sample	7.1			7.2	1,499			188														3.24			17.7					38.2
SNP 43-17	10-Dec-03	Water is a little cloudy	7.46	2900	157	3.2	992	234596		44	1890	3090	7.49	136	34	15	1090	298	83.5	175	13.8	700	392	3.64	15.9	20.5	21.6	22.3	0.009			29.3
SNP 43-17	6-Jan-04	Miramar Sample	7.3			5.9	1392			85.8														3.56			20.7					41.5
SNP 43-17	9-Jan-04	Water is grey and cloudy, with dark particulate	7.55	4540	158	6.2	2096	240019		74	2670	4270	7.88	144	35	15.1	1290	395	74.4	309	15.2	718	817	3.06	17.7	14	14.2	15.6	0.002			42.3
SNP 43-17	4-Feb-04	Miramar Sample	7.2			6.9	1142			31.5														1.74			50.2					82.6
SNP 43-17	6-Feb-04	Pump is running nearly constantly, water colou	7.42	3670	155	6.6	1349	240130		72	2220	3070	7.71	136		29.5	1140	336	73.4	234	13.7	723	570	3.7	13.9	4.16	4.55	4.48	0.002			8.1
SNP 43-17	2-Mar-04	Miramar Sample	7.3			5.3	1305			277														2.13			17.3					32.5
SNP 43-17	11-Mar-04	Baker Ck overflowing to underground at 3rd le	6.89	1665	209	6	2763	240236		21400	1060	1640	7.67	153	24	28.6	616	179	41.2	114	7.41	340	268	2	10	4.27	4.64	4.6	0.026			17.0
SNP 43-17	12-Mar-04	Water clearer than previous day, light brown a	7.86	1421	219	6.6	1893	240246		633	933	1360	7.94	103	22	4.2	515	147	36	86.5	6.51	300	186	0.776	8.8	5.79	6.52	7.07	0.018			15.8
SNP 43-17	8-Apr-04	MGML is cleaning the 1300 sump - pumping to	7.54	4320	92	10.1	403	240439		54	3080	4540	7.69	125		23		449	79.1	363	14.8	750	990	2.27	21.5	13.7	14.3	13.8	0.01			8.0
SNP 43-17	13-Apr-04	Miramar Sample	7.2			5.9	1227			47.7														3.22			12					21.2
SNP 43-17	4-May-04	Miramar Sample	7.5			8.2	1301			51.4														5.21			15.4					28.8
SNP 43-17	13-May-04	Water is cloudy but colourless, very little partic	7.98	4250	63	10.1	980	240724		62	2860	4120	7.59	136				456	98.5	339	16.3	780	815	1.64	19.1	12.9	14.5	13.4	0.002			18.2
SNP 43-17	7-Jun-04	First cycle had black ppt, second cycle was cle	7.44	3110	-34	10.2	1869	240957		35	2030	2870	7.42	116		22.6		324	69.3	203	11.1			1.52	13	11.9	12.8	12.7	-0.005			32.0
SNP 43-17	17-Jun-04	Miramar Sample	7.4			7.8	1961			197														2.59			9.6					27.1
SNP 43-17	6-Jul-04	Miramar Sample	7.6			9.1	1084			50.6														2.08			14.6					22.8
SNP 43-17	15-Jul-04	Water cloudy, difficult to filter, yellow tint	7.5	1870	na	13.6	624	241653		52	2830	3580	7.57	124	21.1	9.2		350	80.8	221	10.3	678	692		15.8	10.3	9.66	9.97	0.005			9.3
SNP 43-17	9-Aug-04		7.11	1820	not stat	11.7	1936	242102		3040	22	3740	7.55	139	26.5			435	96.8	298	13.8	803	750	0.384		19.3	20.5	18	0.007			53.8
SNP 43-18	23-Jul-02	Miramar Sample	7.9			10	955			25														1.66			29.8					41.0
SNP 43-18	6-Aug-02	Miramar Sample	7.6			9	955			76														1.53			27.8					38.2
SNP 43-18	3-Sep-02	Miramar Sample	pH meter lost			11	955			24														1.51			25.9					35.6
SNP 43-18	1-Oct-02	Miramar Sample	7.7			5.8	955			54														1.73			39					53.6
SNP 43-18	1-Oct-02	Miramar Sample	7.7			5.8	955			62														3.04			37.9					52.1
SNP 43-18	17-Jun-03	Miramar Sample	7.9			6.2	787			338														3.22			8.8					10.0
SNP 43-18	17-Jun-03	Miramar Sample	7.9			6.2	787		-															3.25			8.5					9.6
SNP 43-18	2-Jul-03	Miramar Sample	7.7			6.7	787			58														2.19			9					10.2
SNP 43-18	2-Jul-03	Miramar Sample	7.7			6.7	787			46														2.15			8.8					10.0
South Pond Discharge	7-Jul-03		7.92	2170	86	9.8	787	231865		28	1580	1990	8.06	138	34	15.4	794	222	58.4	112	10.7	609	237	2.25	7.59	9.07	9.73	8.13	-0.005			10.3
SNP 43-18	14-Jul-03	Miramar Sample	-		-		787		-														-				6					6.8
SNP 43-18	15-Jul-03	Miramar Sample	-		-		787		-														-				10					11.3
SNP 43-18	21-Jul-03	Miramar Sample	-		-		787		-														-				9					10.2
SNP 43-18	5-Aug-03	Miramar Sample	8.2			6.6	787			25														1.97			10.5					11.9
South Pond Discharge	7-Aug-03	Water is cloudy; dark grey particulate in filter	7.89	2.45	86	16.3	787	232603		78	1690	2210	7.95	146	-	16.4	956	261	74	112	12	641	253	1.93	8.07	0.011	0.011	9.92	-			0.0
SNP 43-18	2-Sep-03	Miramar Sample	8.1			8	787			30														1.68			9.8					11.1
South Pond Discharge	5-Sep-03	Abundant green particulate	7.79	2.36	48	11.9	787	233709		70	1690	2230	7.97	151	-	18	933	260	69	115	12.1	620	250	3.11	13.5	11	11	12.2	-			12.5
SNP 43-18	6-Jul-04	Miramar Sample	7.4			9.9				688														3			7.16					0.0
1300 SUMP -F	4-Dec-01						#N/A	213102		73	6.07	10.5				0.38	0.12	0.02	-0.02	-0.03	-0.3	0.1				-0.001					
1300 Sump FB	31-Aug-01	Field blank	na	na	na	na	#N/A	212331		226	7.99	58.4				64.1	16.5	5.57	3.27	1.04	14	6.4									
Giant	5-Apr-02	Field blank						221113																							
Giant SNP	2-Oct-02	Field blank						223584									-5E-04	-0.00001	-5E-04	-1E-04						-0.0004					
Giant SNP	5-Feb-03	Field blank						230202																		0.00306					
SNP 43-00	11-Mar-04							240237																			-0.001				
SNP 43-01	11-Mar-04							240238																			-0.001				
SNP 43-02	11-Mar-04							240239																		-0.001					

*** Prior to April, 2002 this was estimated based on the monthly readings at surface flow meters. Does not take daily variations into account
Also note, the flow is not always the underground flow, but is the flow actually measured at the meter, including whatever dilution there is to the sample

* yellow highlight indicates there may be a problem with the result

Location	Date	Al-D mg/L	Sb-D mg/L	Ba-D mg/L	Be-D mg/L	Bi-D mg/L	Cd-D mg/L	Cs-D mg/L	Cr-D mg/L	Co-D mg/L	Cu-D mg/L	Fe-D mg/L	Pb-D mg/L	Li-D mg/L	Mn-D mg/L	Mo-D mg/L	Ni-D mg/L	Rb-D mg/L	Se-D mg/L	Ag-D mg/L	Sr-D mg/L	Tl-D mg/L	Ti-D mg/L	U-D mg/L	V-D mg/L	Zn-D mg/L
950 SUMP	31-Aug-01	-0.03	0.709	0.0277	-0.0001	0.0002	0.0002	0.0003	0.0003	0.0507	0.0121	0.042	0.0015	0.0216	0.394	0.0242	0.0352	0.0078	0.005	-0.0001	1.87	-0.0001	0.0075	0.0107	0.0012	0.043
8" Surface	31-Aug-01	-0.03	0.712	0.0288	-0.0001	-0.0002	0.0007	0.0003	0.0005	0.0523	0.0149	0.044	0.0006	0.0232	0.394	0.0293	0.0389	0.0082	0.007	-0.0001	1.8	-0.0001	0.0073	0.0113	0.0011	0.05
8" Surface	2-Oct-01																									
10" Surface	31-Aug-01	-0.03	0.695	0.0418	-0.0001	0.0002	0.0004	0.0006	0.0005	0.0224	0.0181	-0.03	0.0031	0.0176	0.187	0.0123	0.0287	0.0081	0.016	-0.0001	3.62	-0.0001	0.0045	0.0038	0.0006	0.047
10" Surface	2-Oct-01	0.031	1.34	0.0448	-0.0001	0.0004	0.0003	0.0006	-0.0003	0.0548	0.0276	0.303	0.0035	0.0351	0.447	0.0259	0.0487	0.0101	0.013	0.0001	4.32	-0.0001	0.0075	0.0087	0.0012	0.124
10" Surface	1-Nov-01	-0.03	-0.0001	0.0392	-0.0001	0.0007	0.0003	0.0005	0.0005	0.0502	0.0088	0.067	0.002	0.0281	0.425	0.0259	0.042	0.0093	0.012	0.0003	3.73	-0.0001	0.0071	0.0086	0.001	0.085
1300 SUMP	31-Aug-01	-0.03	1.5	0.0753	-0.0001	0.0016	0.0005	0.0013	0.0006	0.0543	0.0113	0.062	0.002	0.0283	0.43	0.022	0.0603	0.0152	0.036	0.0002	7.48	0.0001	0.0088	0.0073	0.0009	0.11
1300 SUMP	1-Nov-01	-0.03	-0.0001	0.0285	-0.0001	0.0018	0.0002	0.0003	0.0017	0.0502	0.0092	0.062	0.0012	0.0242	0.398	0.0222	0.0408	0.0072	0.005	0.0003	2.37	-0.0001	0.0074	0.0088	0.0016	0.079
1300 SUMP	4-Dec-01	-0.03	0.816	0.04	-0.0001	0.0003	0.0003	0.0007	0.0031	0.0663	0.0104	-0.03	0.0008	0.0285	0.428	0.0339	0.0411	0.012	0.009	-0.0001	0.32	-0.0001	0.0073	0.0096	0.0012	0.088
1300 SUMP	8-Jan-02	-0.03	0.898	0.0791	-0.0002	0.0006	0.0003	0.0011	0.0024	0.0642	0.0133	0.042	0.0053	0.035	0.576	0.0319	0.0416	0.0154	0.036	-0.0001	8.39	-0.0001	0.0079	0.0085	0.0015	0.068
1300-SU1	4-Feb-02	-0.03	0.735	0.0352	-0.0001	-0.0002	0.0003	0.0003	0.0005	0.06	0.011	-0.03	0.0004	0.0251	0.534	0.0309	0.0422	0.0084	0.008	-0.0001	2.57	-0.0001	0.0059	0.0093	0.0011	0.067
1300 SUMP	8-Mar-01	<0.03	0.837	0.0751	<0.0002		0.0004	0.001	<0.0003	0.0714	0.0099	0.061	0.0882	0.0351	0.563	0.0357	0.0452	0.0161	0.041	0.0001	8.38	<0.0001	0.0079	0.009	0.001	0.078
1300 Sump	5-Apr-02	<0.03	0.886	0.046	<0.0002	0.0002	0.0003	0.0005	<0.0003	0.076	0.0073	0.068	0.0008	0.0291	0.528	0.0385	0.0474	0.0122	0.014	<0.0001	3.75	<0.0001	0.0089	0.0098	0.0012	0.088
1300 PUMP	4-Dec-01	-0.03	0.968	0.0467	-0.0001	0.0003	0.0003	0.0009	0.0052	0.0661	0.0119	0.04	0.0013	0.0317	0.444	0.0338	0.0437	0.0136	0.014	-0.0001	0.409	-0.0001	0.0083	0.0094	0.0018	0.088
1300 PUMP	8-Jan-02	-0.03	0.944	0.0813	-0.0002	0.0003	0.0004	0.0012	0.0025	0.0621	0.0094	0.145	0.0013	0.0355	0.57	0.0308	0.0405	0.0158	0.038	-0.0001	9.47	-0.0001	0.0077	0.0074	0.0013	0.066
1300 PUMP	8-Mar-01	<0.03	0.825	0.101	<0.0002		0.0004	0.0015	0.0003	0.0654	0.0105	0.062	0.0014	0.0388	0.572	0.0336	0.043	0.0202	0.06	<0.0001	13.5	<0.0001	0.0081	0.0075	0.0007	0.06
1300 Pump	5-Apr-02	<0.03	0.767	0.0883	<0.0002	0.0003	0.0004	0.0011	0.0004	0.0638	0.0319	0.11	0.0013	0.0359	0.694	0.0337	0.0476	0.0169	0.054	<0.0001	11.8	<0.0001	0.0082	0.0072	0.0002	0.062
1300-PM	2-May-02	<0.03	0.889	0.0895	<0.0002		0.0004	0.0014	0.0019	0.0703	0.0087	0.045	0.0011	0.0388	0.555	0.0393	0.0409	0.0195	0.052	0.0002	10.3	<0.0001	0.0093	0.0082	0.0017	0.046
SNP 43-17	12-Dec-01																									
SNP 43-17	08-Jan-02	-0.03	0.801	0.051	-0.0002	0.0013	0.0003	0.0006	0.0015	0.0698	0.0085	0.058	0.001	0.0277	0.497	0.0306	0.0454	0.0108	0.02	0.0002	5.38	-0.0001	0.0082	0.0085	0.0011	0.077
SNP 43-17	8-Jan-02										<0.05		<0.05				0.07									0.14
000-SW6-1	04-Feb-02	0.0348	-0.03	0.727	-0.0001	0.0006	0.0003	0.0003	-0.0003	0.0567	0.0093	0.07	0.0006	0.0213	0.439	0.0282	0.0464	0.0081	0.008	0.0002	2.6	-0.0001	0.0059	0.0087	0.0009	0.071
000-SW6-2	04-Feb-02	0.0232	-0.03	0.483	-0.0001	0.0003	0.0002	0.0002	0.0007	0.0393	0.0087	-0.03	0.0041	0.0154	0.301	0.0187	0.0308	0.0058	0.006	-0.0001	1.66	-0.0001	0.0038	0.0056	0.0005	0.07
000-SW6-3	05-Feb-02	0.0786	-0.03	0.671	-0.0001	0.0003	0.0004	0.0012	-0.0003	0.0563	0.0109	-0.03	0.0012	0.0276	0.512	0.0284	0.0413	0.015	0.046	-0.0001	8.47	-0.0001	0.0061	0.007	0.0005	0.059
000-SW6-4	05-Feb-02	0.0433	-0.03	0.776	-0.0001	-0.0002	0.0003	0.0005	-0.0003	0.0652	0.0092	0.072	0.0009	0.0221	0.487	0.0337	0.0485	0.0102	0.011	-0.0001	3.28	-0.0001	0.0068	0.0093	0.001	
000-SW6-5	06-Feb-02	-0.03	0.788	0.0387	-0.0001	-0.0002	0.0003	0.0004	-0.0003	0.0566	0.01	0.052	0.0006	0.0168	0.469	0.0257	0.0436	0.0083	0.01	-0.0001	2.99	-0.0001	0.0061	0.0071	0.0009	0.105
SNP 43-17	6-Feb-02																									
SNP 43-17	12-Feb-02																									
SNP 43-17	19-Feb-02																									
SNP 43-17	27-Feb-02																									
SNP 43-17	5-Mar-02																									
SNP 43-17	08-Mar-02	<0.03	0.818	0.0656	<0.0002		0.0004	0.0009	<0.0003	0.0687	0.0099	0.095	0.0013	0.0328	0.534	0.0342	0.0443	0.0144	0.032	<0.0001	7.26	<0.0001	0.0084	0.0087	0.001	0.084
SNP 43-17	11-Mar-02																									
SNP 43-17	19-Mar-02																									
SNP 43-17	26-Mar-02																									
SNP 43-17	2-Apr-02																									
SNP 43-17	05-Apr-02	<0.03	0.782	0.039	<0.0002	<0.0002	0.0002	0.0005	<0.0003	0.0667	0.0071	0.311	0.0007	0.025	0.5	0.0325	0.0442	0.0107	0.012	<0.0001	3.3	<0.0001	0.0082	0.008	0.001	0.127
SNP 43-17	9-Apr-02																									
SNP 43-17	16-Apr-02																									
SNP 43-17	23-Apr-02																									
SNP 43-17	30-Apr-02																									
SNP 43-17	02-May-02	<0.03	0.782	0.0778	<0.0002		0.0004	0.0012	0.0005	0.0663	0.0068	0.061	0.001	0.036	0.534	0.0368	0.039	0.0177	0.048	<0.0001	8.94	<0.0001	0.0083	0.0073	0.0014	0.071
SNP 43-17	7-May-02																									
SNP 43-17	14-May-02																									
SNP 43-17	21-May-02																									
SNP 43-17	28-May-02																									
SNP 43-17	4-Jun-02																									
SNP 43-17	30-Jul-02	-0.03	0.84	0.0373	-0.0002		0.0001	0.0007	-0.0003	0.0444	0.0139	0.102	0.0022	0.0251	0.343	0.0217	0.0393	0.0091	0.004	-0.0001	3.29	0.0001	-0.0003	0.0087	0.0015	0.094
SNP 43-17	3-Sep-02	-0.01	0.908	0.0669	-0.0005	-0.00005	0.0004		0.0023	0.0526	0.0136	0.078	0.0012		0.481	0.0268	0.0453		0.0196	-0.0002	7.25		-0.0003	0.0078	0.0071	0.13
SNP 43-17	2-Oct-02	-0.01	0.0847	0.0652	-0.0005	-0.00005	0.0004		0.0022	0.0577	0.0154	0.062	0.0034		0.526	0.0284	0.0497		0.0269	-0.0002	7.15		-0.0003	0.0081	0.0098	0.136
SNP 43-17	4-Nov-02	0.03	0.753	0.0382	0.0002		0.0002	0.0005	0.0003	0.0484	0.0156	0.034	0.0016	0.0259	0.467	0.0304	0.0408	0.0093	0.003	0.0001	2.93	0.0001	0.0005	0.0093	0.001	0.075
SNP 43-17	10-Dec-02	0.03	0.731	0.0331	0.0002		0.0002	0.0004	0.0003	0.0471	0.0146	0.062	0.0041	0.0256	0.433	0.0254	0.0357	0.0086	0.003	0.0001	2.86	0.0001	0.0005	0.0085	0.001	0.075
SNP 43-17	7-Jan-03																									
SNP 43-17	4-Feb-03																									
SNP 43-17	5-Feb-03	0.009096	0.474	0.07623	-0.00002		0.0002685	0.001001	0.0003685	0.04563	0.02033	0.062	0.002458	0.03331	0.422	0.0231	0.02965	0.01273	0.006635415	-0.000006	0.791	-0.0001	0.0005446	0.007268	0.0009277	0.05689
SNP 43-17	4-Mar-03																									
SNP 43-17	5-Mar-03	0.005984	0.6419	0.04706	<0.000000995		0.0001635	0.0005205	0.005454	0.05547	0.01105	0.055	0.0004295	0.03226	0.492	0.02992	0.03858	0.01085	0.003746	<0.000233	3.923	<0.00006587	0.0003404	0.009336	0.002797	0.06926
SNP 43-17	1-Apr-03																									
SNP 43-17	2-Apr-03	0.006253	0.6206	0.04044	<0.00013		0.0001854	0.0006055	0.001713	0.05989	0.0117794	0.07	0.0006645	0.03065	0.5022	0.0296083	0.03779	0.01109	0.003747	<0.0000462	3.332872	<0.0000253	0.0003068	0.008496	0.0011433	0.07444
SNP 43-17	6-May-03																									
SNP 43-17	7-May-03	-0.01831	0.5291	0.05421	-0.000009782		0.0003084	0.0006392	-0.0003805	0.05042	0.02033	0.055	0.0005475	0.03183	0.4766	0.03722	0.03231	0.0118	0.005047	-0.00001181	6.039	-0.0001483	-0.0002621	0.008195	0.002455	0.2193
000-SW6-1	15-May-03	-0.03	0.466	0.0293	-0.0002		-0.0001	0.0004	0.0005	0.038	0.0124	0.037	0.0017	0.0228	0.332	0.0197	0.0305	0.0074	0.004	-0.0001	2.49	-0.0001	-0.0003	0.0061	0.0011	0.049
000-SW6-2	16-May-03	-0.03	0.411	0.0439	-0.0001		0.0001	0.0007	0.0007	0.0294	0.0172	0.037	0.0008	0.0241	0.271	0.015	0.0254	0.0078	0.008	-0.0001	4.44	-0.0001	0.0003	0.0052	0.0011	0.034
000-SW6-3	30-May-03	0.0118	0.677	0.0423	-0.00002		0.00034	0.00106	-0.0001	0.0417	0.0185	0.109	0.0013	0.0247	0.361	0.0196	0.0424	0.00963	0.0112	-0.000006	4.76	-0.0001	0.0005	0.00491	0.00156	0.0797
000-SW6-4	31-May-03	0.0056	0.618	0.0357	-0.00002		0.00032	0.000859	0.0006	0.0403	0.0155	0.127	0.00095	0.0229	0.339	0.0183	0.0407	0.00891	0.009	-0.000006	3.84	-0.0001	0.00044	0.00513	0.0014	0.0688
000-SW6-5	31-May-03	0.0071	0.745	0.0431	-0.00002		0.0005	0.0011	0.0005	0.0468	0.0546	0.13	0.003	0.0275	0.398	0.0196	0.0485	0.0102	0.0119	-0.000006	4.99	-0.0001	0.00059	0.00534	0.00152	0.108
SNP 43-17	11-Jun-03																									
SNP 43-17	2-Jul-03																									
SNP 43-17	2-Jul-03																									
SNP 43-17	7-Jul-03	0.0047	0.647	0.07	-0.00002		0.00034	0.00131	0.0009	0.051	0.0234	0.063	0.00282	0.0326	0.476	0.0245	0.0437	0.014	0.0064	-0.000006	8.18	-0.0001	0.00021	0.00572	0.0017	0.144
SNP 43-17	14-Jul-03																									

Location	Date	Al-D mg/L	Sb-D mg/L	Ba-D mg/L	Be-D mg/L	Bi-D mg/L	Cd-D mg/L	Cs-D mg/L	Cr-D mg/L	Co-D mg/L	Cu-D mg/L	Fe-D mg/L	Pb-D mg/L	Li-D mg/L	Mn-D mg/L	Mo-D mg/L	Ni-D mg/L	Rb-D mg/L	Se-D mg/L	Ag-D mg/L	Sr-D mg/L	Tl-D mg/L	Ti-D mg/L	U-D mg/L	V-D mg/L	Zn-D mg/L
SNP 43-17	15-Jul-03																									
SNP 43-17	21-Jul-03																									
SNP 43-17	6-Aug-03																									
SNP 43-17	7-Aug-03	0.0064	1.32	0.109	-0.00002		0.00045	0.00215	0.0012	0.0555	0.0344	0.151	0.00309	0.0405	0.556	0.0255	0.057	0.0179	0.0163	0.000036	12.1	-0.0001	0.00071	0.00619	0.00207	0.118
SNP 43-17	2-Sep-03																									
SNP 43-17	2-Sep-03																									
SNP 43-17	5-Sep-03	0.0084	1.51	0.0683	-0.00002		0.00036	0.00148	0.0005	0.043	0.0208	0.086	0.00873	0.0341	0.472	0.0236	0.0479	0.0133	0.0095	0.000019	6.96	-0.0001	0.00059	0.00626	0.00335	0.103
SNP 43-17	7-Oct-03																									
SNP 43-17	9-Oct-03	0.0078	0.537	0.0644	-0.00002		0.00023	0.00084	-0.0001	0.0476	0.0212	0.375	0.00186	0.0346	0.437	0.0288	0.0369	0.0131	0.0097	-0.000006	6.07	-0.0001	0.00043	0.00857	0.00077	0.0848
SNP 43-17	4-Nov-03																									
SNP 43-16	7-Nov-03	0.0072	0.549	0.0381	-0.00002		0.00009	0.000436	0.0005	0.0514	0.00977	0.065	0.0006	0.0309	0.459	0.0321	0.0325	0.0105	0.0046	0.00228	3.05	-0.0001	0.00038	0.00896	0.00101	0.0904
SNP 43-17	2-Dec-03																									
SNP 43-17	10-Dec-03	0.0199	0.63	0.0446	-0.00002		0.00016	0.000737	0.0013	0.0534	0.0142	0.081	0.00158	0.0353	0.441	0.0299	0.0366	0.0117	0.004	0.000756	3.66	-0.0001	0.00067	0.00876	0.00268	0.121
SNP 43-17	6-Jan-04																									
SNP 43-17	9-Jan-04	0.0074	0.541	0.056	-0.00002		0.00017	0.000919	0.0016	0.0533	0.0172	0.082	0.00175	0.0378	0.466	0.0271	0.0365	0.0126	0.0081	0.00126	5.99	-0.0001	0.00043	0.0081	0.00083	0.106
SNP 43-17	4-Feb-04																									
SNP 43-17	6-Feb-04	0.0068	0.562	0.0534	-0.00002		0.00019	0.000764	0.0007	0.0556	0.0183	0.067	0.00117	0.0304	0.472	0.0312	0.0376	0.0123	0.0061	0.000057	4.94	-0.0001	0.00036	0.00795	0.00091	0.0853
SNP 43-17	2-Mar-04																									
SNP 43-17	11-Mar-04	1.06	0.28	0.0925	0.0001		0.0002	0.0002	0.0017	0.0224	0.0261	16.5	0.011	0.0183	0.303	0.0112	0.0194	0.007	0.0024	0.0002	1.76	-0.0001	0.0168	0.00568	0.0037	0.0366
SNP 43-17	12-Mar-04	0.026	0.28	0.0361	-0.0001		0.0001	0.0002	0.0002	0.0197	0.0132	0.084	0.0006	0.0142	0.194	0.0101	0.0215	0.0059	0.0019	-0.0001	1.53	-0.0001	0.0011	0.00366	0.0009	0.0332
SNP 43-17	8-Apr-04	0.0019	0.549	0.0764	-0.0001		0.00018	0.00128	0.0008	0.0499	0.025	0.49	0.0006	0.0376	0.448	0.0273	0.0414	0.0155	0.0101	-0.0001	7.26	-0.0001	0.0003	0.00797	0.0012	0.101
SNP 43-17	13-Apr-04																									
SNP 43-17	4-May-04																									
SNP 43-17	13-May-04	0.0045	0.652	0.0612	-0.0001		0.0002	0.0012	0.001	0.0546	0.0236	0.072	0.0022	0.0369	0.497	0.0307	0.0391	0.0144	0.0075	-0.0001	6.24	-0.0001	0.0004	0.00865	0.0011	0.0971
SNP 43-17	7-Jun-04	0.0036	0.567	0.0401	-0.0001		0.00018	0.0007	0.0022	0.0409	0.0155	0.138	0.0018	0.0258	0.349	0.021	0.0387	0.0094	0.0051	-0.0001	4	-0.0001	0.0003	0.00719	0.0015	0.0755
SNP 43-17	17-Jun-04																									
SNP 43-17	6-Jul-04																									
SNP 43-17	15-Jul-04	0.0027	0.662	0.0595	-0.0001		0.00024	0.0006	0.0007	0.0487	0.0178	-0.05	0.0015	0.0281	0.402	0.0226	0.0486	0.0093	0.0073	-0.0001	5.21	0.0003	0.0003	0.008	0.0012	0.117
SNP 43-17	9-Aug-04	0.0057	0.841	0.0657	-0.0001		0.00028	0.001	-0.0001	0.0577	0.0211	0.082	0.001	0.0306	0.468	0.0314	0.0478	0.0126	0.0086	-0.0001	6.33	-0.0001	0.0003	0.0079	0.0013	0.121
SNP 43-18	23-Jul-02																									
SNP 43-18	6-Aug-02																									
SNP 43-18	3-Sep-02																									
SNP 43-18	1-Oct-02																									
SNP 43-18	1-Oct-02																									
SNP 43-18	17-Jun-03																									
SNP 43-18	17-Jun-03																									
SNP 43-18	2-Jul-03																									
SNP 43-18	2-Jul-03																									
South Pond Discharge	7-Jul-03	0.0198	0.589	0.0308	-0.00002		0.00017	0.000254	0.0002	0.042	0.0134	0.081	0.00139	0.0248	0.37	0.0231	0.0282	0.00707	0.0023	-0.000006	2.37	-0.0001	0.00006	0.00704	0.00199	0.0454
SNP 43-18	14-Jul-03																									
SNP 43-18	15-Jul-03																									
SNP 43-18	21-Jul-03																									
SNP 43-18	5-Aug-03																									
South Pond Discharge	7-Aug-03	0.0116	0.598	0.0358	-0.00002		0.00016	0.00029	0.0005	0.0382	0.0149	0.056	0.00045	0.0267	0.337	0.0246	0.032	0.00736	0.0035	0.000036	2.66	-0.0001	0.00045	0.0103	0.00126	0.0373
SNP 43-18	2-Sep-03																									
South Pond Discharge	5-Sep-03	1.49	0.564	0.0363	-0.00002		0.00018	0.000381	0.0048	0.043	0.0131	-0.03	0.00219	0.0284	0.439	0.0278	0.0347	0.00846	0.0039	0.000017	2.49	-0.0001	0.0073	0.0112	0.00087	0.0383
SNP 43-18	6-Jul-04																									
1300 SUMP -F	4-Dec-01																									
1300 Sump FB	31-Aug-01																									
Giant	5-Apr-02	-0.03	0.0009	-0.0001	-0.0002		-0.0001	-0.0001	-0.0003	0.0003	0.0005	-0.03	0.0012	-0.0003	0.0001	-0.0001	-0.0001	-0.0001	-0.001	-0.0001	-0.0001	-0.0001	-0.0003	-0.0001	-0.0001	-0.01
Giant SNP	2-Oct-02	-0.01	0.0006	0.0001	-0.0005	0.00056	-0.0001		-0.0004	-0.0001	-0.0006	0.006	0.0001		-0.001	0.0001	0.0001		-0.0004	0.003	0.0002		-0.0003	-0.0001	-0.0001	0.002
Giant SNP	5-Feb-03	-0.03	0.0016	0.0004344	-0.00002		-0.00002	-0.000008	0.0002269	0.0001553	0.0005764	-0.03	0.001115	-0.0002	0.0007934	0.0001424	0.0001117	0.00003938	-0.0003	-0.000006	0.004286	-0.0001	0.0001103	-0.000008	-0.000032	0.007331
SNP 43-00	11-Mar-04																									
SNP 43-01	11-Mar-04																									
SNP 43-02	11-Mar-04	0.0017	0.0003	0.0004	-0.0001		-0.00005	-0.0001	0.0002	-0.0001	-0.0003	-0.05	0.001	-0.0002	-0.0001	-0.0001	-0.0001	-0.0001	-0.0003	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001	0.0037

Location	Date	Al-T mg/L	Sb-T mg/L	Ba-T mg/L	Be-T mg/L	Bi-T mg/L	Cd-T mg/L	Cs-T mg/L	Cr-T mg/L	Co-T mg/L	Cu-T mg/L	Fe-T mg/L	Pb-T mg/L	Li-T mg/L	Mn-T mg/L	Mo-T mg/L	Ni-T mg/L	Rb-T mg/L	Se-T mg/L	Ag-T mg/L	Sr-T mg/L	Th-T mg/L	Ti-T mg/L	U-T mg/L	V-T mg/L	Zn-T mg/L
950 SUMP	31-Aug-01	2.02	0.698	0.03	-0.002	0.0011	-0.0003	-0.0004	0.01	0.053	0.024	4.21	0.01	0.028	0.415	0.028	0.042	0.0079	0.015	-0.0003	1.86	-0.0004	0.045	0.0104	0.009	0.078
8" Surface	31-Aug-01	2.54	0.699	0.035	-0.002	0.0011	-0.0003	0.0004	0.011	0.053	0.026	4.55	0.011	0.029	0.412	0.027	0.042	0.0091	0.024	-0.0003	1.91	-0.0004	0.062	0.0106	0.009	0.088
8" Surface	2-Oct-01																									
10" Surface	31-Aug-01	6.43	0.959	0.056	-0.002	0.0011	0.0012	0.0008	0.024	0.037	0.112	19.2	0.215	0.029	0.725	0.015	0.054	0.0113	0.031	0.0009	3.66	-0.0004	0.053	0.0045	0.023	0.267
10" Surface	2-Oct-01	2.66	1.39	0.068	-0.002	-0.005	-0.0003	0.0009	-0.003	0.052	0.039	3.77	0.01	0.033	0.442	0.026	0.05	0.0152	0.069	0.0007	0.018	-0.0004	0.142	0.0079	0.009	0.128
10" Surface	1-Nov-01	4.38	1.25	0.047	-0.002	-0.0004	0.0005	0.0007	0.013	0.056	0.033	10.1	0.025	0.034	0.513	0.025	0.054	0.0112	0.039	0.0014	3.51	-0.0004	0.164	0.0088	0.021	0.141
1300 SUMP	31-Aug-01	0.321	1.66	0.071	-0.002	0.0019	0.0005	0.0014	0.017	0.056	0.016	0.858	0.008	0.037	0.396	0.024	0.064	0.0151	0.045	-0.0003	6.71	-0.0004	0.013	0.007	0.003	0.151
1300 SUMP	1-Nov-01	2.97	0.904	0.036	-0.002	-0.0004	0.0004	0.0005	0.007	0.054	0.025	6.42	0.017	0.03	0.427	0.024	0.05	0.009	0.013	0.0003	2.4	-0.0004	0.121	0.009	0.014	0.117
1300 SUMP	4-Dec-01	0.578	0.755	0.045	-0.002	-0.0004	0.0003	0.0008	0.008	0.069	0.018	1.53	0.011	0.03	0.477	0.033	0.05	0.0127	0.026	0.0025	0.66	-0.0004	0.021	0.0097	0.005	0.129
1300 SUMP	8-Jan-02	0.418	0.933	0.094	-0.002	0.002	-0.0003	0.0015	0.015	0.068	0.018	1.28	0.006	0.042	0.713	0.032	0.051	0.0163	0.126	0.0016	11.4	-0.0004	0.014	0.0082	0.002	0.105
1300-SU1	4-Feb-02																									
1300 SUMP	8-Mar-01																									
1300 Sump	5-Apr-02	0.367	0.902	0.046	<0.002	<0.0004	0.0003	0.0005	<0.003	0.074	0.01	0.641	0.004	0.028	0.559	0.039	0.047	0.0125	0.015	<0.0003	3.83	<0.0004	0.011	0.0098	0.003	0.094
1300 PUMP	4-Dec-01	0.404	0.817	0.045	-0.002	-0.0004	0.0004	0.0008	0.008	0.07	0.022	1.47	0.012	0.031	0.483	0.034	0.05	0.0132	0.028	0.0027	0.703	-0.0004	0.017	0.0094	0.004	0.123
1300 PUMP	8-Jan-02	1.37	0.857	0.09	-0.002	0.0014	0.0003	0.0014	0.022	0.071	0.141	2.76	0.017	0.04	0.707	0.031	0.05	0.0161	0.123	0.0004	10.1	-0.0004	0.029	0.0088	0.005	0.109
1300 PUMP	8-Mar-01																									
1300 Pump	5-Apr-02	0.07	0.771	0.088	<0.002	0.0007	0.0004	0.0011	<0.003	0.063	0.035	0.298	0.002	0.036	0.702	0.034	0.047	0.0167	0.055	<0.0003	11.5	<0.0004	0.009	0.0073	<0.001	0.063
1300-PM	2-May-02	1.09	0.769	0.085	<0.002		0.0004	0.0014	<0.003	0.07	0.019	2.63	0.008	0.038	0.716	0.035	0.044	0.0176	0.087	0.0006	11.1	<0.0004	0.045	0.0078	0.005	0.074
SNP 43-17	12-Dec-01																									
SNP 43-17	08-Jan-02	0.487	0.746	0.063	-0.002	0.0008	-0.0003	0.0009	0.013	0.07	0.021	1.51	0.008	0.034	0.62	0.033	0.073	0.0129	0.121	-0.0003	6.17	-0.0004	0.012	0.0094	0.003	0.128
SNP 43-17	8-Jan-02																									
000-SW6-1	04-Feb-02																									
000-SW6-2	04-Feb-02																									
000-SW6-3	05-Feb-02																									
000-SW6-4	05-Feb-02																									
000-SW6-5	06-Feb-02																									
SNP 43-17	6-Feb-02										<0.05		<0.05				0.06									0.14
SNP 43-17	12-Feb-02										<0.05		<0.05				<0.05									0.08
SNP 43-17	19-Feb-02										<0.05		<0.05				0.06									0.14
SNP 43-17	27-Feb-02										<0.05		<0.05				0.19									0.19
SNP 43-17	5-Mar-02										<0.05		<0.05				0.06									0.14
SNP 43-17	08-Mar-02																									
SNP 43-17	11-Mar-02										<0.05		<0.05				0.07									0.15
SNP 43-17	19-Mar-02										<0.05		<0.05				0.05									0.26
SNP 43-17	26-Mar-02										<0.05		<0.05				0.05									0.1
SNP 43-17	2-Apr-02										<0.05		<0.05				0.05									0.1
SNP 43-17	05-Apr-02	0.228	0.609	0.032	<0.002	<0.0004	<0.0003	<0.0004	<0.003	0.054	0.014	0.761	0.003	0.02	0.478	0.025	0.037	0.0089	<0.01	<0.0003	2.47	<0.0004	0.009	0.0062	0.002	0.133
SNP 43-17	9-Apr-02										<0.05		<0.05				<0.05									0.11
SNP 43-17	16-Apr-02										<0.05		<0.05				0.05									0.12
SNP 43-17	23-Apr-02										<0.05		<0.05				0.06									0.15
SNP 43-17	30-Apr-02										<0.05		<0.05				0.05									0.14
SNP 43-17	02-May-02	0.734	0.652	0.077	<0.002		0.0003	0.0013	<0.003	0.066	0.019	2.37	0.007	0.034	0.559	0.031	0.043	0.0159	0.1	<0.0003	9.02	<0.0004	0.031	0.0073	0.005	0.119
SNP 43-17	7-May-02										<0.05		<0.05				<0.05									0.15
SNP 43-17	14-May-02										<0.05		<0.05				<0.05									0.08
SNP 43-17	21-May-02										-		-				-									-
SNP 43-17	28-May-02										-		-				-									-
SNP 43-17	4-Jun-02										<0.05		<0.05				<0.05									0.08
SNP 43-17	30-Jul-02	1.39	0.79	0.042	-0.002		-0.0003	0.0008	0.007	0.045	0.02	22.8	0.014	0.016	0.389	0.022	0.04	0.0097	-0.01	-0.0003	3.33	-0.0004	0.02	0.0097	0.005	0.109
SNP 43-17	3-Sep-02	2.24	0.913	0.0797	-0.001	-0.0001	0.0004		0.0054	0.0527	0.018	1.96	0.0067		0.465	0.0302	0.0467		0.0237	-0.0004	7.14	-0.0001	0.06	0.0078	0.0134	0.141
SNP 43-17	2-Oct-02	1	0.0831	0.0628	-0.001	-0.0001	0.0005		0.0047	0.0551	0.018	1.83	0.0116		0.482	0.0307	0.0492		0.0282	-0.0004	6.75	-0.0001	0.015	0.008	0.0155	0.144
SNP 43-17	4-Nov-02	1.67	0.773	0.04	0.002		0.0003	0.0006	0.006	0.051	0.025	3.27	0.02	0.029	0.523	0.031	0.046	0.0095	0.01	0.0003	3.1	0.0004	0.009	0.0095	0.006	0.101
SNP 43-17	10-Dec-02	0.869	0.727	0.034	0.002		0.0003	0.0004	0.004	0.048	0.026	1.9	0.008	0.025	0.461	0.026	0.038	0.0086	0.01	0.0003	2.85	0.0004	0.006	0.0085	0.004	0.096
SNP 43-17	7-Jan-03										0.031		0.009				0.035									0.147
SNP 43-17	4-Feb-03										0.0207		0.0171				0.0342									0.088
SNP 43-17	5-Feb-03	3.875	0.4924	0.09245	-0.0001		0.0003221	0.001375	0.01655	0.04912	0.03472	3.12	0.02011	0.03827	0.5173	0.02329	0.03858	0.01556	0.006354555	-0.0001	0.8176	-0.0001	0.08066	0.007796	0.01313	0.09004
SNP 43-17	4-Mar-03										0.0159		0.0064				0.0344									0.071
SNP 43-17	5-Mar-03	0.9236	0.6443	0.04538	<0.00013		<0.00029	0.0006443	0.002662	0.06157	0.01693	1.07	0.009206	0.03315	0.5413	0.02966	0.04183	0.01109	0.00404	<0.0002	3.864	<0.00007402	0.006516	0.008238	0.004716	0.09265
SNP 43-17	1-Apr-03										0.0184		0.0039				0.0452									0.073
SNP 43-17	2-Apr-03	0.3046	0.6049	0.04116	<0.00013		0.0002878	0.0006411	0.001713	0.06006	0.0172494		0.004279	0.03158	0.5207	0.0309183	0.03946	0.01118	0.002839	<0.000046	3.501872	<0.000025	0.003153	0.008567	0.0024163	0.08508
SNP 43-17	6-May-03										t/f		t/f				t/f									t/f
SNP 43-17	7-May-03																									
000-SW6-1	15-May-03	0.759	0.259	25.2	0.0554	-0.0001	0.0004	0.0011	0.0014	0.0433	0.0306	1.671	0.0184	0.0268	0.39	0.021	0.0451	0.0099	0.012	-0.0001	4.95	-0.0001	0.0051	0.005	0.0028	0.105
000-SW6-2	16-May-03																									
000-SW6-3	30-May-03																									
000-SW6-4	31-May-03																									
000-SW6-5	31-May-03																									
SNP 43-17	11-Jun-03										0.02		0.087				0.06									0.221
SNP 43-17	2-Jul-03										0.01		0.012				0.05									0.116
SNP 43-17	2-Jul-03										0.01		0.013				0.05									0.116
SNP 43-17	7-Jul-03	0.476	0.694	0.0744	-0.0001		0.0004	0.0014	0.0064	0.0521	0.0258	0.952	0.0053	0.0329	0.499	0.026	0.0476	0.0143	0.003	-0.0001	8.03	-0.0001	0.0047	0.0061	0.0033	0.173
SNP 43-17	14-Jul-03										-		-				-									-

Location	Date	Al-T mg/L	Sb-T mg/L	Ba-T mg/L	Be-T mg/L	Bi-T mg/L	Cd-T mg/L	Cs-T mg/L	Cr-T mg/L	Co-T mg/L	Cu-T mg/L	Fe-T mg/L	Pb-T mg/L	Li-T mg/L	Mn-T mg/L	Mo-T mg/L	Ni-T mg/L	Rb-T mg/L	Se-T mg/L	Ag-T mg/L	Sr-T mg/L	Th-T mg/L	Ti-T mg/L	U-T mg/L	V-T mg/L	Zn-T mg/L
SNP 43-17	15-Jul-03										-		-				-									-
SNP 43-17	21-Jul-03										-		-				-									-
SNP 43-17	6-Aug-03										0.01		<0.03				0.066									0.103
SNP 43-17	7-Aug-03	0.219	1.35	0.112	-0.0001		0.0007	0.0022	0.0054	0.0582	0.0395	0.715	0.0094	0.0399	0.586	0.0265	0.0606	0.0184	0.014	-0.0001	12.2	-0.0001	0.0022	0.0063	0.0029	0.149
SNP 43-17	2-Sep-03										<0.01		0.008				0.04									0.082
SNP 43-17	2-Sep-03										<0.01		0.008				0.04									0.082
SNP 43-17	5-Sep-03	0.556	1.48	0.0682	-0.0001		0.0004	0.0015	0.0057	0.0457	0.0255	0.807	0.0081	0.0349	0.475	0.023	0.0521	0.0134	0.01	-0.0001	6.92	-0.0001	0.0023	0.0056	0.0043	0.109
SNP 43-17	7-Oct-03										0.02		0.007				0.04									0.071
SNP 43-17	9-Oct-03	1.14	0.526	0.0642	-0.0001		0.0002	0.0009	0.0029	0.0475	0.0296	3.579	0.0092	0.0366	0.473	0.0285	0.0391	0.0131	0.01	-0.0001	6.1	-0.0001	0.0043	0.0087	0.0051	0.118
SNP 43-17	4-Nov-03										0.025		0.042				0.041									0.18
SNP 43-16	7-Nov-03	1.08	0.559	0.0416	-0.0001		0.0001	0.0005	0.0032	0.0528	0.0185	7.505	0.0122	0.0338	0.527	0.0327	0.0355	0.0107	0.005	-0.0001	3.08	-0.0001	0.0058	0.0092	0.005	0.115
SNP 43-17	2-Dec-03										0.025		0.0247				0.05									0.136
SNP 43-17	10-Dec-03	1.53	0.616	0.0459	-0.0001		0.0003	0.0008	0.0134	0.0548	0.0265	0.984	0.0101	0.0365	0.491	0.0297	0.0412	0.0118	0.004	0.003	3.63	-0.0001	0.0104	0.009	0.0075	0.151
SNP 43-17	6-Jan-04										0.014		0.009				0.046									0.101
SNP 43-17	9-Jan-04	2.8	0.545	0.0585	-0.0001		0.0002	0.001	0.0161	0.0554	0.0312	7.205	0.0164	0.0397	0.543	0.0279	0.0428	0.013	0.004	0.0021	6.05	-0.0001	0.0226	0.0084	0.0119	0.138
SNP 43-17	4-Feb-04										0.02		0.0078				0.043									0.0995
SNP 43-17	6-Feb-04	2.4	0.62	0.055	-0.0001		0.0002	0.0009	0.0068	0.062	0.017	4.661	0.014	0.026	0.53	0.033	0.044	0.012	0.0002	0.0001	5	-0.0001	1.4	0.0082	0.011	0.089
SNP 43-17	2-Mar-04										0.04		0.0113				0.044									0.127
SNP 43-17	11-Mar-04	12	0.25	0.174	0.0004		0.0003	0.0015	0.0275	0.029	0.0369	16.7	0.0166	0.037	0.437	0.0124	0.0371	0.0262	0.003	0.0005	1.89	-0.0001	0.477	0.0065	0.0283	0.066
SNP 43-17	12-Mar-04	11.8	0.186	0.117	0.0004		0.0002	0.0015	0.0307	0.0317	0.0424	19.3	0.0201	0.0349	0.406	0.0095	0.0467	0.0243	0.002	0.0002	1.61	-0.0001	0.459	0.005	0.0299	0.127
SNP 43-17	8-Apr-04	0.621	0.542	0.0778	-0.0001		0.0002	0.0013	0.0028	0.0512	0.0351	2.163	0.0067	0.038	0.486	0.0273	0.047	0.0155	0.01	-0.0001	7.24	-0.0001	0.0065	0.0081	0.0038	0.166
SNP 43-17	13-Apr-04										0.026		0.0092				0.047									0.318
SNP 43-17	4-May-04										0.026		0.0068				0.038									0.122
SNP 43-17	13-May-04	1.48	0.698	0.0662	-0.0001		0.0003	0.0013	0.0044	0.0583	0.0285	2.956	0.014	0.0412	0.552	0.0331	0.0443	0.0156	0.008	-0.0001	6.68	-0.0001	0.0107	0.0094	0.0067	0.117
SNP 43-17	7-Jun-04	1.36	0.566	0.0473	-0.0001		0.0002	0.0008	0.0047	0.0424	0.0251	3.43	0.0071	0.0275	0.392	0.0214	0.043	0.0103	0.004	-0.0001	4.08	-0.0001	0.0226	0.0075	0.0062	0.135
SNP 43-17	17-Jun-04										0.028		0.011				0.051									0.099
SNP 43-17	6-Jul-04									<0.010		<0.020					0.05									0.104
SNP 43-17	15-Jul-04	1.96	0.666	0.0788	-0.0001		0.0003	0.0009	0.0045	0.0516	0.0248	3.23	0.0071	0.0334	0.452	0.0238	0.0541	0.012	0.008	-0.0001	5.43	0.0004	0.0697	0.0087	0.0062	0.149
SNP 43-17	9-Aug-04	0.247	0.833	0.0648	-0.0001		0.0003	0.0009	0.0005	0.0585	0.0239	1.02	0.004	0.0314	0.486	0.0313	0.0495	0.0125	0.008	-0.0001	6.19	-0.0001	0.0029	0.0078	0.0021	0.129
SNP 43-18	23-Jul-02										0.022		0.007				0.042									0.083
SNP 43-18	6-Aug-02										0.023		0.005				0.035									0.068
SNP 43-18	3-Sep-02										0.342		0.023				0.518									0.376
SNP 43-18	1-Oct-02										0.021		0.005				0.035									0.055
SNP 43-18	1-Oct-02										0.019		0.004				0.033									0.052
SNP 43-18	17-Jun-03										0.02		0.004				0.03									0.043
SNP 43-18	17-Jun-03										0.01		0.003				0.03									0.042
SNP 43-18	2-Jul-03									<0.01			0.007				0.03									0.041
SNP 43-18	2-Jul-03									<0.01			0.006				0.03									0.039
South Pond Discharge	7-Jul-03	0.905	0.589	0.0338	-0.0001		0.0002	0.0003	0.0078	0.0418	0.0177	1.596	0.0072	0.0257	0.394	0.0234	0.0311	0.0074	0.002	-0.0001	2.48	-0.0001	0.0161	0.0072	0.0053	0.073
SNP 43-18	14-Jul-03									-		-				-									-	
SNP 43-18	15-Jul-03									-		-				-									-	
SNP 43-18	21-Jul-03									-		-				-									-	
SNP 43-18	5-Aug-03										0.02		<0.03				0.041									0.057
South Pond Discharge	7-Aug-03	3.27	0.632	0.0392	-0.0001		0.0002	0.0003	0.0112	0.0419	0.0238	7.34	0.0298	0.0303	0.429	0.0254	0.0391	0.0074	0.003	0.0001	2.52	-0.0001	0.0206	0.0105	0.0159	0.072
SNP 43-18	2-Sep-03										0.02		0.006				0.04									0.056
South Pond Discharge	5-Sep-03	2.37	0.559	0.0361	-0.0001		0.0003	0.0004	0.0089	0.0466	0.0208	3.181	0.0117	0.0312	0.457	0.0281	0.0392	0.0091	0.004	-0.0001	2.56	-0.0001	0.0091	0.0103	0.0094	0.06
SNP 43-18	6-Jul-04										0.014		<0.020				0.04									0.095
1300 SUMP -F	4-Dec-01	-0.03	0.0005	-0.001	-0.002	0.0004	-0.0003	-0.0004	-0.003	-0.001	-0.002	-0.03	-0.001	-0.003	-0.001	-0.001	-0.001	-0.0005	-0.01	-0.0003	-0.001	-0.0004	-0.003	-0.0003	-0.001	-0.01
1300 Sump FB	31-Aug-01																									
Giant	5-Apr-02																									
Giant SNP	2-Oct-02																									
Giant SNP	5-Feb-03																									
SNP 43-00	11-Mar-04	-0.03	-0.0001	-0.0001	-0.0001		-0.0001	-0.0001	-0.0003	-0.0001	-0.0003	-0.05	0.0012	-0.0003	-0.0001	-0.0001	-0.0001	-0.0001	-0.001	-0.0001	0.0002	-0.0001	-0.0001	-0.0001	-0.0001	-0.01
SNP 43-01	11-Mar-04	-0.03	-0.0001	-0.0001	-0.0001		-0.0001	-0.0001	-0.0003	-0.0001	-0.0003	-0.05	0.0005	-0.0003	-0.0001	-0.0001	-0.0001	-0.0001	-0.001	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001	-0.01
SNP 43-02	11-Mar-04																									

Appendix D

Ditch and Dump Sampling Results

Attachment D - Ditch and Sump Sampling Results

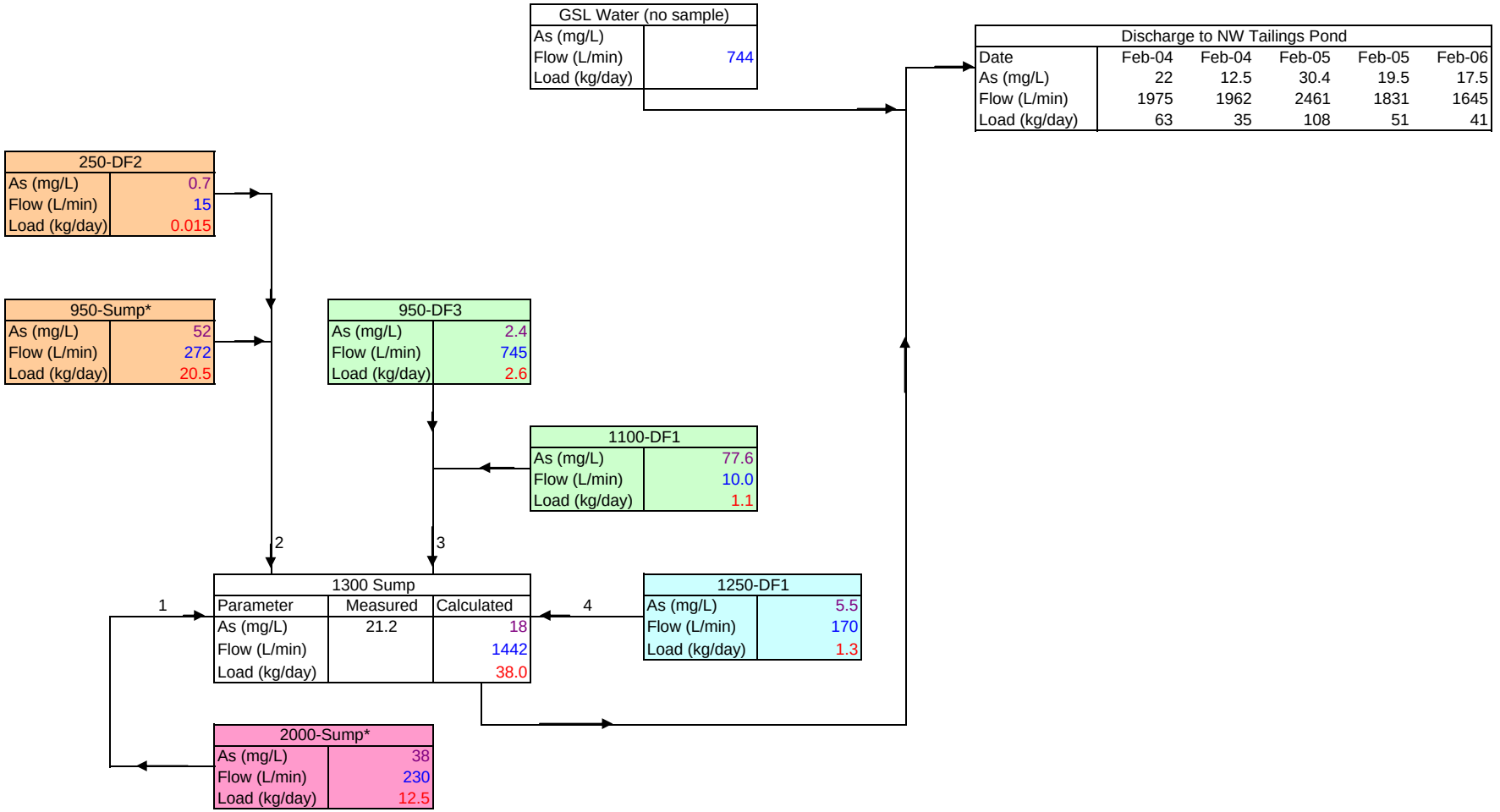
Location	Date	Site Description	Easting	Northing	Field Readings pH	Cond	Temp	Flow (L/min)	Lab ID	TSS	TDS	pH	EC	Alk	DIC	Ca	Mg	Na	K	SO4	Cl	NH3-N	NO3-N +NO2-N	As-D	As	Arsenate	Arsenite	Dimethylarsenic acid	Monomethylarsenic acid
Client Sample I	Date					µS/cm			Taiga San	mg/L	mg/L	µS/cm		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	kg/day	mg/L	mg/L	mg/L	mg/L
000-SW6-1	04-Feb-02	Discharge to NW Pond			7.33	2010	6.1	n/a	220246	74				143		270	70.1	118	12	557	156	2.57	8.65	22		16.7	0.04	1.16	0.0316
000-SW6-2	04-Feb-02	Discharge to NW Pond			7.43	1452	2.9	1962	220247	30				91.3		147	43.5	70.3	7.03	346	82.7	1.55	5.48	12.5	35.311	10.2	0.02	0.374	0.011
000-SW6-3	05-Feb-02	Discharge to NW Pond			7.34	4410	5.5	2461	220248	56				141		458	99.7	445	15.3	964	924	2.66	16.4	30.4	107.717	22.8	0.12	0.674	0.425
000-SW6-4	05-Feb-02	Discharge to NW Pond			7.44	1866	4.9	1831	220249	70				162		289	78.5	173	14.6	807	232	3.15	11.5	19.5	51.417	14.9	0.03	0.511	0.0431
000-SW6-5	06-Feb-02	Discharge to NW Pond			7.30	1820	5.2	1645	220302	35				122	25.6	214	58.4	115	9.6	55	201	2.02	8.4	17.5	41.445				
250-DF2	04-Feb-02	Ditch flow in 2-01 cross-cut downstream of Bulkhead 50	140E	1580S	7.82	702	4.9	15	220253	37				196		88.2	30	27.3	3.92	163	23.5	0.022	0.341	0.7	0.015	0.39	0.01	0.0089	0.0021
250-DF3	06-Feb-02	Water accumulated in workings around AR-3 lower bulkheads	370W	295N				#N/A	220304	650				308		2390	341	58.5	22.1	239	37.1	1.42	-0.008	3420		2970	112	7.45	10.3
575-DF1	04-Feb-02	Ditch flow from south of C-shaft at 1510S	190E	1510S	7.69	633	3.9	194	220255	833				107		84.1	21.5	204	3.05	282	13.9	0.042	1.6	8.1	2.263	4.72	0.02	0.0718	0.0159
575-DF4	04-Feb-02	Ditch flow from north of C-shaft at 1490S	190E	1490S	6.03	2700	4.6	4	220256	1540				241		503	176	96.8	12.7	1340	67	0.176	35.2	1120	6.451	741	1.5	4.22	0.018
575-DF5	04-Feb-02	Ditch flow from south of C-shaft at 1680S	155E	1680S	7.83	1281	3.3	69	220257	1680				126		194	58.9	42.2	5.59	585	22.3	0.036	4.76	0.554	0.055	0.41	0.01	0.0465	0.0034
575-DF6	04-Feb-02	Ditch flow from north at 1100N	260W	1100N	7.75	991	4.5	75	220250	12				256		132	62.1	28.6	5.67	70	14	0.005	3.9	0.778	0.084	0.3	0.36	0.0249	0.0442
575-DRAIN	04-Feb-02	Drain hole from 575L near C-shaft - flows from N & S (sampled on 750L)	230E	1500S	No field readings			198	220268															33.4	9.523				
750-DF1	04-Feb-02	Ditch flow from north at 1300S	75E	1300S	7.17	1736	4.7	74	220251	6				226		218	90.7	83.5	11.8	627	87.1	0.07	6.72	103	10.976	72.4	0.12	1.42	0.139
950-DF3	05-Feb-02	Ditch flow from N & S of C-shaft (combined behind new dam)	270E	1500S	7.47	2230	4.4	745	220258	27				177		251	78.6	134	13.6	623	166	9.3	9.84	2.38	2.553	2.13	0.01	0.193	0.0079
1100-DF1	05-Feb-02	Ditch flow from north of C-shaft	210E	1370S	7.27	2100	6.8	10	220259	20				176		321	115	97.9	12.3	1010	81.5	0.07	23.2	77.6	1.117	55.2	0.12	1.12	0.0408
1100-DF2	19-Apr-02	At pond in drift @1200N	50E	1200N	7.93	1939	5.9	9	221218	10				179	35.9	272	98.6	108	11.5	803	117	0.007	11.8	8.7	0.113	10.6	0.19		
1250-DF1	05-Feb-02	Ditch flow from north of C-shaft	200E	1350S	na	3690	6.9	170	220260	167				184		472	93.4	281	16.5	1010	852	6.16	18	5.5	1.346	3.82	0.02	0.115	0.012
1250-DF1	19-Apr-02	Ditch flow from north of C-shaft (flow only)	200E	1350S				156																	0.000				
1250-DF2	19-Apr-02	Ditch flow 1500 north	120E	1500N	7.63	3870	6.2	117	221217	8				141	26	438	86.8	326	14.6	765	830	2.87	23.3	1.24	0.209	1.37	-0.01		
1300-SU1	04-Feb-02	1300L sump discharge	300E	1550S	7.44	1991	6.6		220254	67				159		261	78.6	130	13.6	627	204	2.53	9.43	21.2	0.000	14	0.03	0.398	0.0939
1500-DF1	05-Feb-02	Ditch flow from north of C-shaft (sampled from drainhole on 1650L)	620E	1430S	7.36	8550	7.5	10	220262	25				154		861	134	883	18.8	690	2340	5.61	45.9	5.9	0.085	3.34	0.01	0.141	0.163
1650-DF2	05-Feb-02	Ditch flow from north at 1000 S (goes to sump in 1650 Decline)	550E	1000S				10	220267															526	7.574				
1650-DF3	05-Feb-02	Ice at base of Alimak Raise (not previously frozen in winter)	320E	270S	7.41	11050	6.6	frozen	220266															405					
1650-RM1	05-Feb-02	Flow down 1650 Decline towards sump	410E	1230S	No field readings			100	220261	163				127		1110	152	1220	19.5	729	3250	3.53	28.3	7.1	1.022	4.77	0.02	0.398	0.105
1650-RS	19-Apr-02	Alimak Raise now flowing	320E	270S	6.85	1311	6.8	10	221216	104				192	3.6	223	69.6	31.8	6.33	437	30.7	0.123	2.39	320	4.608	307	0.05		
1650-SU2	05-Feb-02	Water pumped from "sump" in 1650 Decline (sampled at 2000L Sump)	500E	1050S	6.87	9950	7.1	120	220263	40				140		1010	144	1080	20.4	757	2980	2.66	36.5	50.1	8.657	30	0.1	1.36	0.097
2000-DF1	05-Feb-02	Ditch flow from north of C-shaft (not all flow!)	470E	1550S	7.17	9010	8.6	30	220265	165				197		838	122	946	16.3	605	2560	0.641	9.69	13.6	0.588	8.72	0.01	0.964	0.0045
2000-SB1	05-Feb-02	Water pumped from bottom of C-shaft	360E	1550S	7.08	8210	8.8	80	220264	76				167		791	120	898	17.7	626	2410	0.953	20.7	28	3.226	17.3	0.05	0.585	0.0066
000-SW6-1	15-May-03				7.46	1803	7.4	1795	230873	46	1290	7.49	1760	108	22	202	35.5	112	9.38	520	224	1.22	8.29	6	15.508	5.86	-0.005		
000-SW6-2	16-May-03				7.51	3140	6.8	2595	230926	54	1980	7.52	2490	112	29	265	57.9	187		510	511	0.729	8.18	5	18.684	4.45	0.0329		
000-SW6-3	30-May-03				7.45	3350	11.3	2651	231163	34	2220	7.62	2860	116	32	345	64	22		816	583	0.625	11.6	22	83.999	22.8	-0.005		
000-SW6-4	31-May-03				7.37	3180	8.9	2678	231159	18	1940	7.49	2620	115	30	31.6	6.3	189		16	455	0.426	12.2	17	65.552	18.9	-0.005		
000-SW6-5	31-May-03				7.45	3250	9.7	2632	231160	26	2240	7.49	2850	120	32	34.2	6.7	237		18	551	0.406	12.2	24	90.958	22.5	-0.005		
100-SU1	31-May-03				7.36	1200	4.0	41	231161	148	836	7.28	1090	322	30	177	44.2	10.4		526	8.5	0.08	1.12	41	2.438	33.8	10		
250-BH1	31-May-03	renamed from 250-DF3			6.02	3930	3.7	3.5	231162	997	6690	6.56	3260	467	122	592	298	59.5		1530	67.1	1.38	-0.008	5000	25.200	847	3900		
575-DF1	15-May-03				7.98	926	3.2	149	230874	86	642	8.03	863	109	27	108	31.8	22.2	3.67	354	16.1	-0.005	2.21	5	1.072	5.02	-0.005		
575-DF1	30-May-03	visual estimate						194																					
575-DF4	15-May-03				6.16	2980	4.7	2.9	230875	22	3510	6.25	2600	178	43	394	212	91.8	10.2	1120	63.9	0.158	27.4	814	3.388	849	0.0053		
575-DF4	30-May-03	visual estimate						5.1																					
575-DRAIN	16-May-03				7.74	882	3.0	740	230927	344	574	7.93	811	112	27	108	35.4	20.4		335	13.1	0.007	2.05	7	7.459	7.32	0.0058		
575-DRAIN	31-May-03	(on 750 L)			7.63	990	3.7	446	231155	4	640	8.07	933	115	29	122	34.4	20.2		319	17.1	0.016	1.22	12	7.707	12.6	0.006		
750-DFI	16-May-03				7.82	2170	4.6	91	230928	38	1520	8.05	1900	173	42	230	81.4	99		723	145	0.154	6.64	6	0.787	6.21	-0.005		
750-DF1	31-May-03	no flow from south			7.93	2220	4.4	155	231156	20	1470	8.2	1960	173	44	245	74	92.6		709	144	0.084	5.98	6	1.342	5.2	-0.005		
750-DF2	31-May-03				8.02	2410	3.4	161	231157	32	1600	8.04	2030	165	41	269	7.8	108		1060	171	0.162	5.75	1	0.232	0.895	-0.005		
950-DF3	15-May-03				8.01	2390	4.4	1388	230876	24	1610	8.01	2150	146	36	219	65	138	11.6	672	272	4.12	7.52	2	3.998	2.37	0.0134		
950-DF3	30-May-03				7.87	2500	4.5	1052	231164	18	1540	8.04	2120	139	36	24.7	62	145		624	299	3.7	8.02	4	6.060	3.08	-0.005		
950-DF4	31-May-03				8.01	2950	4.3	1149	231158	60	1820	7.99	2490	154	39	30.3	7.7	169		1030	350	4.7	10.3	3	4.962	3.37	0.006		
1250-DF1	15-May-03				7.76	4990	6.5	113	230877	82	3860	7.92	4740	149	36	555	100	361	15.8	1060	971	6.31	36.1	6	0.977	5.95	-0.005		
1300-SU1	15-May-03				7.98	2320	6.5	2477	230878	56	1500	7.99	2040	134	33	225	68	125	9.9	621	250	3.31	9.66	6	21.405	6.48	-0.005		
1300-SU1	30-May-03				7.52	3600	8.0	2513	231165	102	2440	7.68	3060	132	36	38	69	233		859	569	1.42	11.4	26	94.087	27.4	0.0007		
1650-RM1	30-May-03							111																					
1650-RM2	15-May-03				7.98	13240	7.3	60	230879	40	10200	7.91	12500	116	29	1160	163	1260	19	717	4290	5.19	28.8	4	0.346	4.4	0.0136		
1650-RSI	16-May-03	Water does not make it to raise down to 16-02 . Backed up due to slimes.			7.39	1105	6.2	256	230953	12	886				26	168	44.6			455	12.4	0.348	3.68	69	25.396	68	-0.005		
1650-RS1	30-May-03				5.57	1576	8.2	101	231166	4	1890	4.69	1470	5.1	8	231	83	25.2		580	28.6	0.347	1.01	498	72.085	462	42.2		
1650-SU2	16-May-03				6.95	2360	6.8		230930	22	1990	7.28	2040	209	52	329	86.4	92.5		700	157	0.008	14.4	233	0.000	220	-0.005		
1650-SU2	30-May-03				7.21	3260	2.9	155	231167	12	2420	7.45	2810	169	45	418	85	159		1060	353	0.706	17.2	927	206.906	914	0.0202		
2000-DF2	16-May-03	Flow from north of 2000 waste pass (flow from brine inflow)			7.27	11430	8.4	10	230931	34	9400	7.66	11100	119	30	1150	97.6	1110		646	3690	0.185	5.06	20	0.288	22.1	0.0317		
2000-SB1	30-May-03	scooped from inside shaft			7.26	5560	8.7		231169	82	4060	7.66	5190	135	37	505	79	473		568	1300	0.253	10.6	10	0.000	10.4	0.0163		
2000-SU1	30-May-03				7.21	5170	8.9	719	231168	14	3850	7.62	4820	144	39	524	89	389		1070	1100	0.979	17.6	51	52.803	54	0.0263		

Attachment D - Ditch and Sump Sampling Results

Location	Date	Sb-D	Al-D	Ba-D	Be-D	Bi-D	Cd-D	Cs-D	Cr-D	Co-D	Cu-D	Fe-D	Pb-D	Li-D	Mn-D	Mo-D	Ni-D	Rb-D	Se-D	Ag-D	Sr-D	Tl-D	Ti-D	U-D	V-D	Zn-D	Anions	Cations	Neutrality
Client Sample I	Date	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L			%
000-SW6-1	04-Feb-02	0.727	-0.03	0.0348	-0.0001	0.0006	0.0003	0.0003	-0.0003	0.0567	0.0093	0.07	0.0006	0.0213	0.439	0.0282	0.0464	0.0081	0.008	0.0002	2.6	-0.0001	0.0059	0.0087	0.0009	0.071	-19.04	25.7	14.85
000-SW6-2	04-Feb-02	0.483	-0.03	0.0232	-0.0001	0.0003	0.0002	0.0002	0.0007	0.0393	0.0087	-0.03	0.0041	0.0154	0.301	0.0187	0.0308	0.0058	0.006	-0.0001	1.66	-0.0001	0.0038	0.0056	0.0005	0.07	-11.47	15.2	13.82
000-SW6-3	05-Feb-02	0.671	-0.03	0.0786	-0.0001	0.0003	0.0004	0.0012	-0.0003	0.0563	0.0109	-0.03	0.0012	0.0276	0.512	0.0284	0.0413	0.015	0.046	-0.0001	8.47	-0.0001	0.0061	0.007	0.0005	0.059	-49.15	51.8	2.64
000-SW6-4	05-Feb-02	0.776	-0.03	0.0433	-0.0001	-0.0002	0.0003	0.0005	-0.0003	0.0652	0.0092	0.072	0.0009	0.0221	0.487	0.0337	0.0485	0.0102	0.011	-0.0001	3.28	-0.0001	0.0068	0.0093	0.001		-26.81	29.8	5.25
000-SW6-5	06-Feb-02	0.788	-0.03	0.0387	-0.0001	-0.0002	0.0003	0.0004	-0.0003	0.0566	0.01	0.052	0.0006	0.0168	0.469	0.0257	0.0436	0.0083	0.01	-0.0001	2.99	-0.0001	0.0061	0.0071	0.0009	0.105	-9.40	21.7	39.62
250-DF2	04-Feb-02	0.0819	-0.03	0.0226	-0.0001	-0.0002	-0.0001	0.0001	0.0008	0.0015	0.0078	-0.03	0.0002	0.015	0.0068	0.0037	0.0068	0.0016	-0.001	-0.0001	0.432	-0.0001	0.0019	0.0036	0.0008	-0.01	-7.98	9.2	6.89
250-DF3	06-Feb-02	68.8	0.09	0.0492	-0.0001	0.0026	0.0005	0.0005	-0.0003	0.0325	0.0006	1.11	0.033	0.294	2.01	0.0356	0.167	0.0299	0.002	0.0003	1.05	-0.0001	0.0907	0.0013	0.0029	0.099	-12.28	151.5	85.00
575-DF1	04-Feb-02	0.12	-0.03	0.0176	-0.0001	-0.0002	-0.0001	0.0001	0.0013	0.0024	0.0064	-0.03	0.0039	0.0099	0.0303	0.0035	0.0083	0.0016	-0.001	-0.0001	0.283	-0.0001	0.002	0.0046	0.0008	-0.01	-8.41	15.9	30.88
575-DF4	04-Feb-02	15.4	-0.03	0.0191	-0.0001	0.0009	0.0011	0.001	0.0007	0.0366	0.0048	0.172	0.0254	0.0685	1.24	0.0315	0.068	0.0105	0.003	-0.0001	2.05	-0.0001	0.0113	0.0032	0.0037	0.046	-34.62	45.1	13.17
575-DF5	04-Feb-02	0.247	-0.03	0.0176	-0.0001	-0.0002	0.0001	0.0001	0.0006	0.0037	0.0053	-0.03	0.0004	0.0195	0.0466	0.0087	0.0148	0.0027	0.001	-0.0001	0.647	-0.0001	0.0055	0.013	0.0008	-0.01	-15.33	17.5	6.62
575-DF6	04-Feb-02	0.109	-0.03	0.016	-0.0001	-0.0002	0.0001	0.0002	-0.0003	0.0027	0.004	-0.03	0.0023	0.0216	0.0065	0.0065	0.013	0.0026	-0.001	-0.0001	0.843	-0.0001	0.003	0.0093	0.0002	0.02	-6.97	14.1	33.78
575-DRAIN	04-Feb-02																										0.00	1.0	100.00
750-DF1	04-Feb-02	0.955	-0.03	0.0214	-0.0001	-0.0002	0.0002	0.0004	-0.0003	0.0265	0.0096	0.069	0.0013	0.0357	0.273	0.0217	0.0268	0.0062	0.004	-0.0001	1.61	-0.0001	0.006	0.0142	0.001	0.036	-20.04	23.3	7.48
950-DF3	05-Feb-02	0.806	0.04	0.0309	-0.0001	-0.0002	0.0003	0.0003	0.0006	0.0672	0.0563	0.051	0.0011	0.0243	0.496	0.0315	0.0512	0.0078	0.007	0.0006	2.47	-0.0001	0.0074	0.0084	0.0012	0.139	-21.86	26.2	8.98
1100-DF1	05-Feb-02	3.11	-0.03	0.0118	-0.0001	0.0009	0.0004	0.0008	0.0006	0.0424	0.0122	0.036	0.0017	0.0305	0.246	0.0253	0.105	0.0088	0.005	0.0001	1.61	-0.0001	0.0081	0.0071	0.0016	0.202	-26.85	31.1	7.26
1100-DF2	19-Apr-02	1.4	-0.03	0.0156	-0.0002		0.0003	0.0007	0.0007	0.0521	0.007	-0.03	0.0002	0.0284	0.088	0.0204	0.0995	0.008	0.003	-0.0001	1.83	-0.0001	0.0101	0.0078	0.0013	0.071	-23.60	27.7	7.95
1250-DF1	05-Feb-02	0.753	-0.03	0.112	-0.0001	0.0006	0.0004	0.0014	-0.0003	0.0688	0.007	-0.03	0.0004	0.0313	0.529	0.0345	0.0673	0.0179	0.027	0.0001	62.7	-0.0001	0.0079	0.0105	0.0013	0.212	-49.18	44.9	
1250-DF1	19-Apr-02																										0.00	1.0	
1250-DF2	19-Apr-02	0.49	-0.03	0.129	-0.0002		0.0003	0.0017	0.001	0.0607	0.0073	-0.03	0.0005	0.0287	0.482	0.0381	0.0375	0.0214	0.027	0.0003	8.36	-0.0001	0.0089	0.0111	0.0019	0.052	-42.37	44.6	2.52
1300-SU1	04-Feb-02	0.735	-0.03	0.0352	-0.0001	-0.0002	0.0003	0.0003	0.0005	0.06	0.011	-0.03	0.0004	0.0251	0.534	0.0309	0.0422	0.0084	0.008	-0.0001	2.57	-0.0001	0.0059	0.0093	0.0011	0.067	-22.17	26.5	8.89
1500-DF1	05-Feb-02	0.448	-0.03	0.147	-0.0001	0.0003	0.0002	0.0021	0.0009	0.0517	0.027	-0.03	0.0005	0.0344	0.509	0.0337	0.0302	0.0283	0.104	-0.0001	17.1	-0.0001	0.0074	0.0048	0.0001	0.012	-83.86	93.9	5.64
1650-DF2	05-Feb-02																										0.00	1.0	
1650-DF3	05-Feb-02																										0.00	1.0	
1650-RM1	05-Feb-02	0.367	0.04	0.209	-0.0001	0.0006	0.0004	0.0023	-0.0003	0.0649	0.0672	0.076	0.0008	0.0424	0.706	0.031	0.0315	0.0299	0.127	0.0001	25.2	-0.0001	0.0087	0.0051	-0.0001	0.013	-109.65	122.5	
1650-RS	19-Apr-02	2.25	-0.03	0.0089	-0.0002		0.0002	0.0004	0.0007	0.0093	0.0056	0.07	0.0012	0.0292	0.314	0.0131	0.019	0.0049	-0.001	-0.0001	0.79	-0.0001	0.0051	0.0017	0.003	0.015	-13.81	19.4	16.83
1650-SU2	05-Feb-02	0.635	-0.03	0.185	-0.0001	0.0002	0.0004	0.0025	-0.0003	0.0624	0.0177	-0.03	0.0012	0.0394	0.678	0.0323	0.0393	0.0297	0.102	-0.0001	20.9	-0.0001	0.0076	0.0051	-0.0001	0.02	-102.81	110.7	3.71
2000-DF1	05-Feb-02	0.281	-0.03	0.177	-0.0001	-0.0002	0.0003	0.0073	-0.0003	0.0364	0.0077	0.053	0.0031	0.0316	0.839	0.0116	0.0198	0.0178	0.08	-0.0001	14.7	-0.0001	0.0055	0.0054	-0.0001	-0.01	-88.80	94.4	3.07
2000-SB1	05-Feb-02	0.617	-0.03	0.21	-0.0001	0.0002	0.0007	0.0071	-0.0003	0.0602	0.0208	-0.03	0.0046	0.0428	0.747	0.0262	0.0388	0.0285	0.081	-0.0001	14.5	-0.0001	0.0082	0.0079	0.0003	0.029	-84.42	89.9	3.12
000-SW6-1	15-May-03	0.466	-0.03	0.0293	-0.0002		-0.0001	0.0004	0.0005	0.038	0.0124	0.037	0.0017	0.0228	0.332	0.0197	0.0305	0.0074	0.004	-0.0001	2.49	-0.0001	-0.0003	0.0061	0.0011	0.049	-19.39	18.1	-3.41
000-SW6-2	16-May-03	0.411	-0.03	0.0439	-0.0001		0.0001	0.0007	0.0007	0.0294	0.0172	0.037	0.0008	0.0241	0.271	0.015	0.0254	0.0078	0.008	-0.0001	4.44	-0.0001	0.0003	0.0052	0.0011	0.034	-27.33	26.1	
000-SW6-3	30-May-03	0.677	0.0118	0.0423	-0.00002		0.00034	0.00106	-0.0001	0.0417	0.0185	0.109	0.0013	0.0247	0.361	0.0196	0.0424	0.00963	0.0112	-0.000006	4.76	-0.0001	0.0005	0.00491	0.00156	0.0797	-35.80	23.4	
000-SW6-4	31-May-03	0.618	0.0056	0.0357	-0.00002		0.00032	0.000859	0.0006	0.0403	0.0155	0.127	0.00095	0.0229	0.339	0.0183	0.0407	0.00891	0.009	-0.000006	3.84	-0.0001	0.00044	0.00513	0.0014	0.0688	-15.50	10.3	-20.04
000-SW6-5	31-May-03	0.745	0.0071	0.0431	-0.00002		0.0005	0.0011	0.0005	0.0468	0.0546	0.13	0.003	0.0275	0.398	0.0196	0.0485	0.0102	0.0119	-0.000006	4.99	-0.0001	0.00059	0.00534	0.00152	0.108	-18.35	12.6	-18.67
100-SU1	31-May-03	0.253	0.0111	0.0208	-0.00002		0.00005	0.000042	-0.0001	0.0071	0.00697	1.12	0.00017	0.0133	0.109	0.0101	0.0185	0.00233	0.0018	-0.000006	0.423	-0.0001	0.00043	0.00761	0.00156	0.0073	-18.18	13.0	-16.69
250-BH1	31-May-03	107	0.0909	0.0168	-0.00002		0.00102	0.000499	0.0008	0.0504	0.00294	1.13	0.159	0.218	1.38	0.0539	0.236	0.0262	0.0051	0.000138	0.894	0.0002	0.0998	0.00247	0.0038	0.15	-109.85	56.7	-31.91
575-DF1	15-May-03	0.108	-0.03	0.0155	-0.0002		-0.0001	-0.0001	-0.0003	0.0032	0.0104	-0.03	0.0008	0.014	0.0089	0.0046	0.0165	0.0018	0.001	-0.0001	0.438	-0.0001	-0.0003	0.0039	0.0011	0.012	-10.00	9.1	-4.92
575-DF1	30-May-03																												
575-DF4	15-May-03	24	-0.03	0.0149	-0.0002		0.0005	0.0009	-0.0003	0.0275	0.0081	0.229	0.0303	0.105	0.865	0.0296	0.0554	0.0095	0.003	-0.0001	2.02	-0.0001	0.0084	0.0029	0.0041	0.035	-28.69	41.4	18.09
575-DF4	30-May-03																												
575-DRAIN	16-May-03	0.248	-0.03	0.0144	-0.0001		-0.0001	-0.0001	0.0004	0.0029	0.011	-0.03	0.0005	0.0136	0.0141	0.0043	0.0162	0.0017	0.001	-0.0001	0.422	-0.0001	0.0004	0.0038	0.0011	-0.01	-9.58	9.2	-2.10
575-DRAIN	31-May-03	0.43	0.0051	0.013	-0.00002		0.00007	0.000037	-0.0001	0.00408	0.00992	0.092	0.00054	0.0142	0.0217	0.005	0.0207	0.002	0.0011	-0.000006	0.434	-0.0001	0.00035	0.0041	0.00105	0.0097	-9.43	9.8	
750-DFI	16-May-03	0.687	-0.03	0.0228	-0.0001		0.0002	0.0003	0.0006	0.0449	0.0158	0.042	0.0013	0.034	0.31	0.0231	0.0312	0.0064	0.004	-0.0001	1.81	-0.0001	0.0005	0.0107	0.0007	0.033	-22.61	22.5	-0.29
750-DF1	31-May-03	0.648	0.0033	0.022	-0.00002		0.00019	0.000247	0.0011	0.0491	0.0138	0.113	0.00104	0.0315	0.345	0.0219	0.04	0.00619	0.0036	-0.000006	1.67	-0.0001	0.00043	0.0104	0.00081	0.0545	-22.29	22.3	0.13
750-DF2	31-May-03	0.629	0.0023	0.0233	-0.00002		0.00026	0.000236	0.0003	0.0592	0.0161	0.119	0.0002	0.0313	0.393	0.0241	0.0462	0.00665	0.0042	-0.000006	1.76	-0.0001	0.00038	0.01	0.00056	0.0711	-30.20	18.8	-23.35
950-DF3	15-May-03	0.853	-0.03	0.0336	-0.0002		0.0001	0.0003	0.0005	0.0506	0.0117	0.042	0.0012	0.0284	0.456	0.0279	0.03	0.0085	0.005	-0.0001	3.14	-0.0001	0.0005	0.0077	0.0012	0.03	-24.88	22.6	-4.85
950-DF3	30-May-03	0.626	0.0084	0.0308	-0.00002		0.00017	0.000366	-0.0001	0.0494	0.0125	0.084	0.00026	0.0259	0.448	0.0276	0.0313	0.00861	0.0063	-0.000006	3	-0.0001	0.00042	0.0076	0.00116	0.0336	-24.47	12.6	-31.86
950-DF4	31-May-03	0.71	0.0055	0.0424	-0.00002		0.00029	0.000443	0.0006	0.0633	0.0149	0.058	0.0009	0.0326	0.594	0.0361	0.0343	0.0112	0.0074	-0.000006	3.78	-0.0001	0.00056	0.00988	0.00159	0.0306	-34.73	9.5	-57.05
1250-DF1	15-May-03	0.905	-0.03	0.1	-0.0002		0.0003	0.0025	0.0014	0.0595	0.017	0.045	0.0006	0.0404	0.534	0.0276	0.0734	0.0235	0.015	-0.0001	8.92	-0.0001	0.0005	0.0086	0.0019	0.129	-52.89	52.0	
1300-SU1	15-May-03	0.623	-0.03	0.0334	-0.0002		0.0001	0.0005	0.0003	0.0415	0.0178	0.059	0.0015	0.0256	0.364	0.0221	0.0338	0.0088	0.005	-0.0001	2.96	-0.0001	0.0003	0.0069	0.0012	0.035	-22.90	22.5	-0.84
1300-SU1	30-May-03	0.73	0.0107	0.0424	-0.00002		0.00039	0.00115	0.0002	0.046	0.019	0.154	0.0012	0.0277	0.395	0.0192	0.0468	0.0106	0.0124	-0.000006	5.21	-0.0001	0.00055	0.00544	0.00158	0.0757	-36.68	17.7	-34.86
1650-RM1	30-May-03																												
1650-RM2	15-May-03	0.363	-0.03	0.221	-0.0002		0.0003	0.0027	0.0011	0.0591	0.0643	0.099	0.001	0.0691	0.631	0.026	0.0251	0.0314	0.069	-0.0001	29.7	-0.0001	0.0007	0.0044	0.0006	0.016	-138.63	126.6	-4.54
1650-RSI	16-May-03	1.03	0.0069	0.0107	-0.00002		-0.00002	0.00014	0.0008	0.00496	0.00817	0.048	0.00207	0.0165	0.0937	0.00995	0.0157	0.00332	0.0013	-0.000006	0.493	-0.0001	0.00065	0.00774	0.00199	0.04	-10.77	13.1	9.60
1650-RS1	30-May-03	0.268	0.0235	0.0189	-0.00002		0.00056	0.000266	0.0006	0.0229	0.0113	0.207	0.0159	0.0468	0.33	0.015	0.0495	0.00625	0.0025	-0.000006	0.65	-0.0001	0.012	0.00422	0.00182	0.389	-19.65	19.5	-0.48
1650-SU2	16-May-03	3.1	-0.03	0.0125	-0.0001		0.0003	0.0017	0.0003	0.0288	0.0087	0.103	0.0074	0.028	0.489	0.0166	0.0482	0.0097	0.004	-0.0001	1.95	-0.0001	0.0007	0.0013	0.0051	0.024	-26.29	27.6	2.35
1650-SU2	30-May-03	1.56	0.0076	0.0191	-0.00002		0.00099	0.0021	-0.0001	0.084	0.0136	0.124	0.00275	0.0283	0.608	0.0233	0.0981	0.0136	0.0085	-0.000006	3.32	-0.0001	0.00072	0.00443	0.00368	0.204	-47.82	34.8	-15.79
2000-DF2	16-May-03	0.231	-0.03	0.268	-0.0001		-0.0001	0.0106	0.0008	0.0111	0.0495	-0.03	0.0003	0.0815	0.382	0.0078	0.0146	0.0298	0.048	-0.0001	22.4	-0.0001	0.0006	0.0011	0.0005	-0.01	-119.93	113.7	-2.67
2000-SB1	30-May-03	0.439	0.0087	0.0966	-0.00002		0.00031	0.00332	-0.0001	0.0346	0.0311	0.127	0.00121	0.0426	0.417	0.0142	0.0245	0.0126	0.0232	-0.000006	9.22	-0.0001	0.00065	0.00539	0.00091	0.0233	-51.22	52.3	1.03
2000-SU1	30-May-03	1.01	0.0047	0.059	-0.00002		0.0006	0.002	-0.0001	0.0597	0.0236	0.133	0.00168	0.0348	0.5	0.0205	0.0628	0.0145	0.0219	-0.000006	8.69	-0.0001	0.00068	0.00466	0.00213	0.105	-56.26	50.4	-5.49

Appendix E

Water and Load Balance

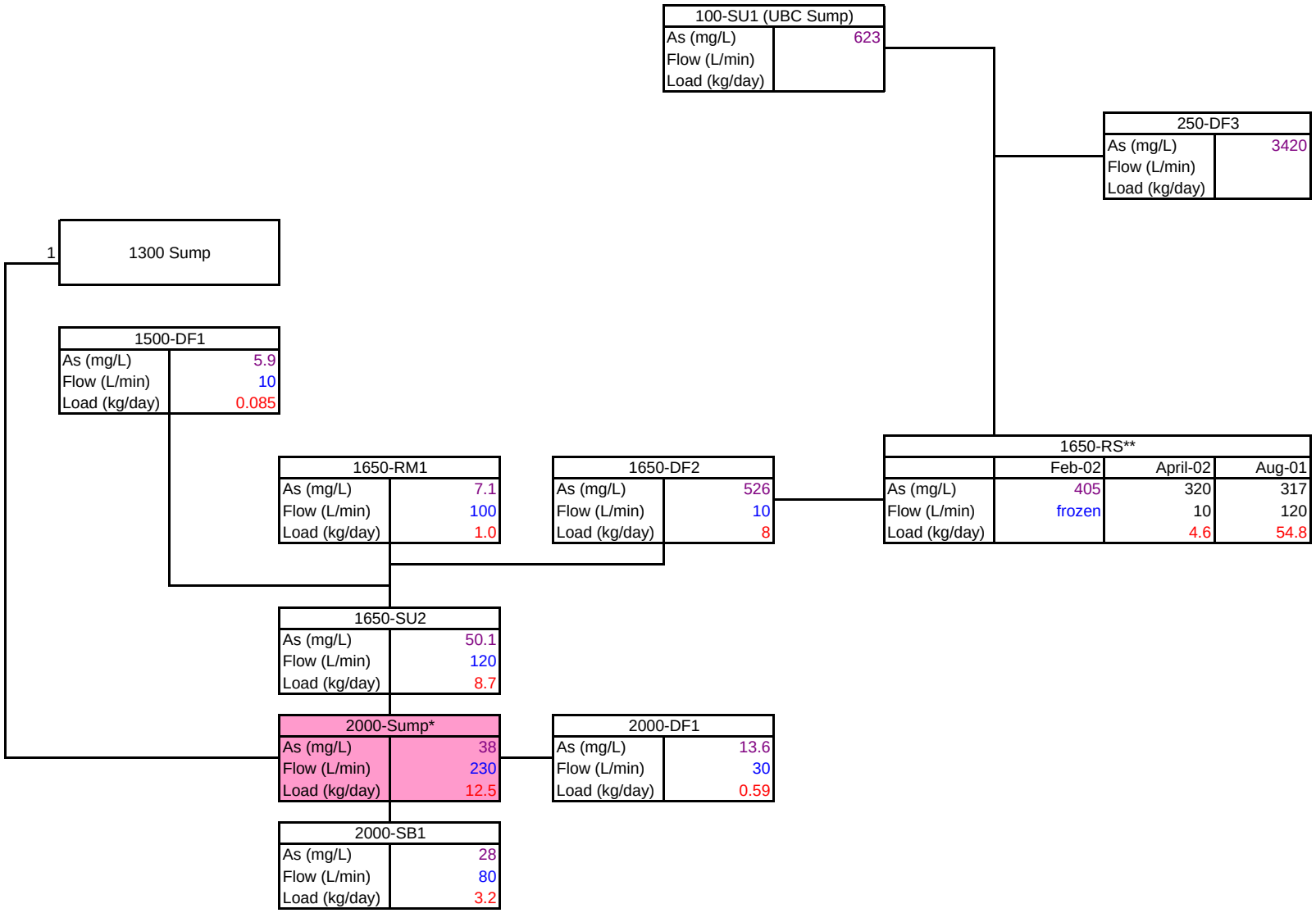


Overall Mass Balance (Arsenic)

Notes: * indicates the values are calculated from flowpaths entering this location
** indicates that an additional sample was collected in April

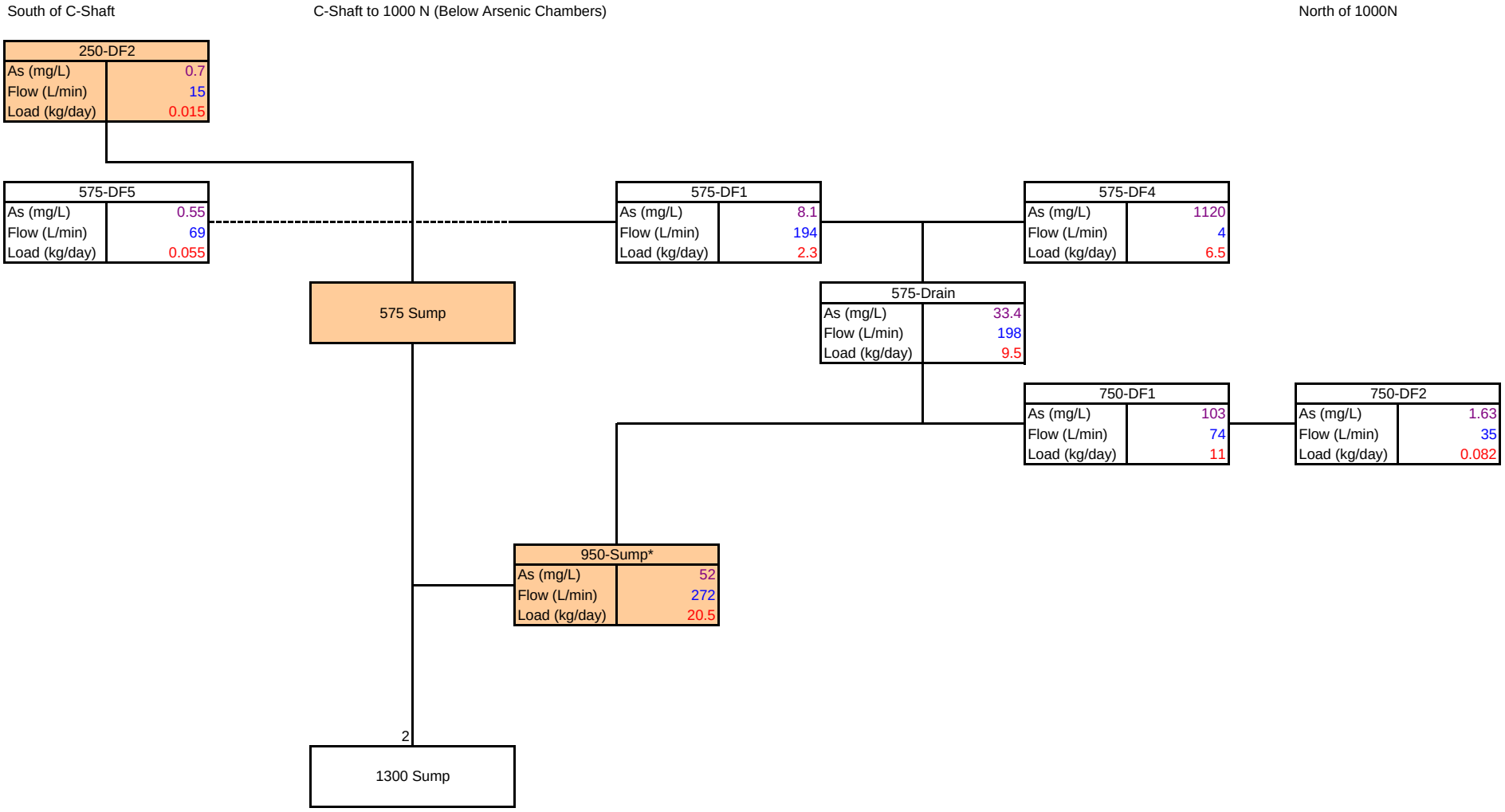
Appendix E1 - Winter Water and Load Balance

C-Shaft to 1000N*



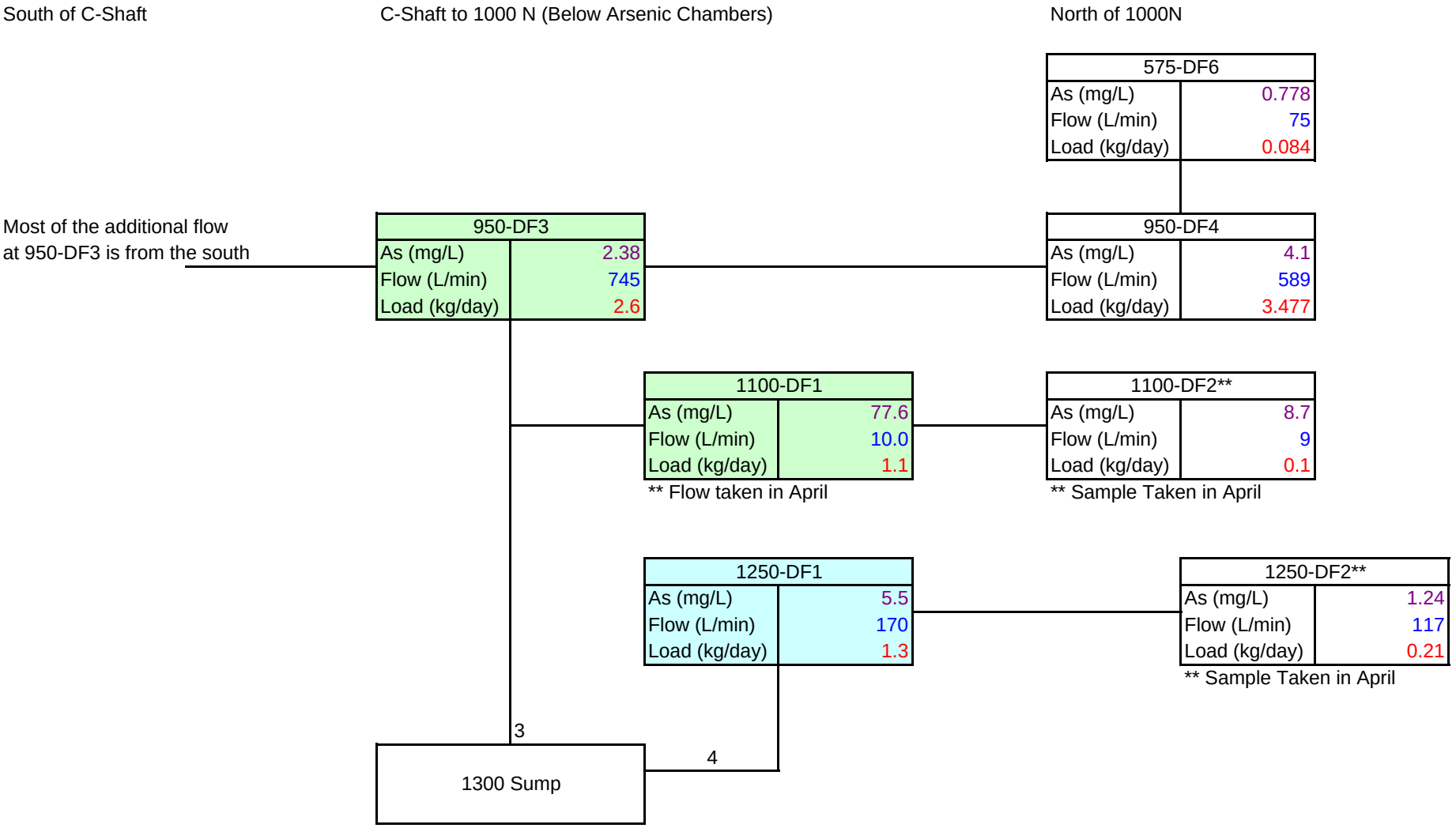
Flow Pathway #1, Concentration, Flows and Loads (Arsenic)

Appendix E1 - Winter Water and Load Balance

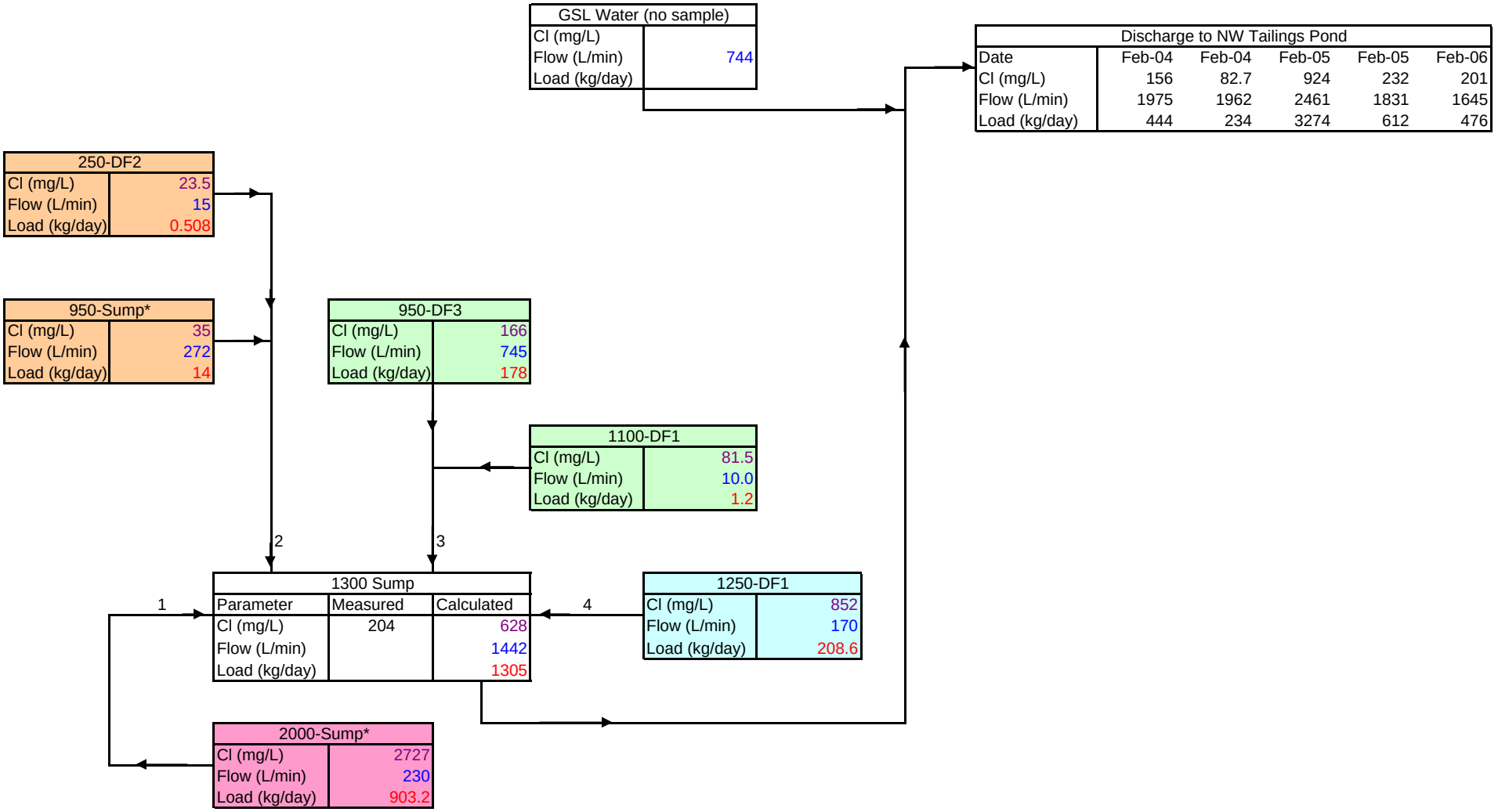


Flow Pathway #2, Concentration, Flows and Loads (Arsenic)

Appendix E1 - Winter Water and Load Balance



Flow Pathways #3&4, Concentration, Flows and Loads (Arsenic)

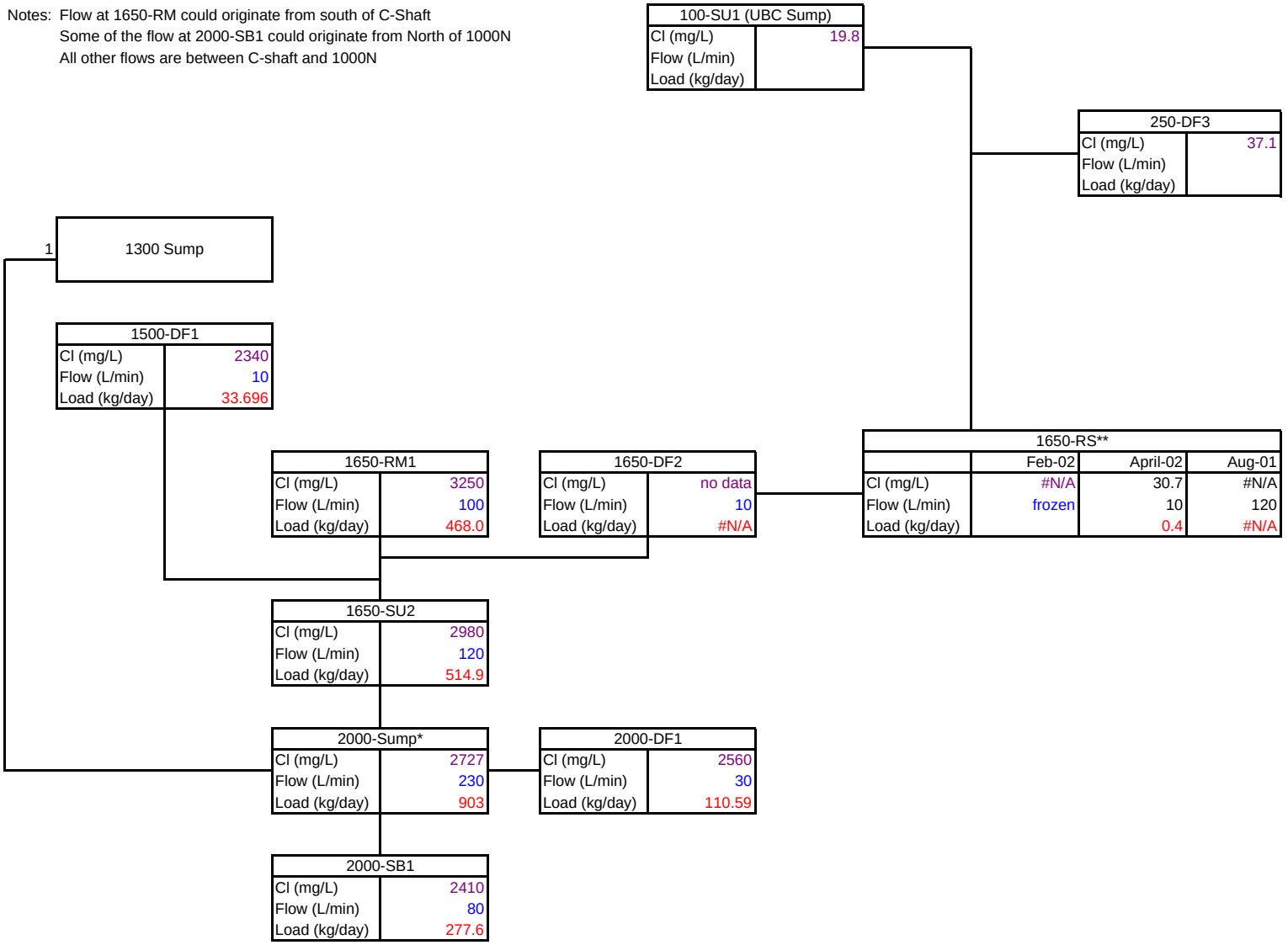


Overall Mass Balance (Chloride)

Notes: * indicates the values are calculated from flowpaths entering this location
** indicates that an additional sample was collected in April

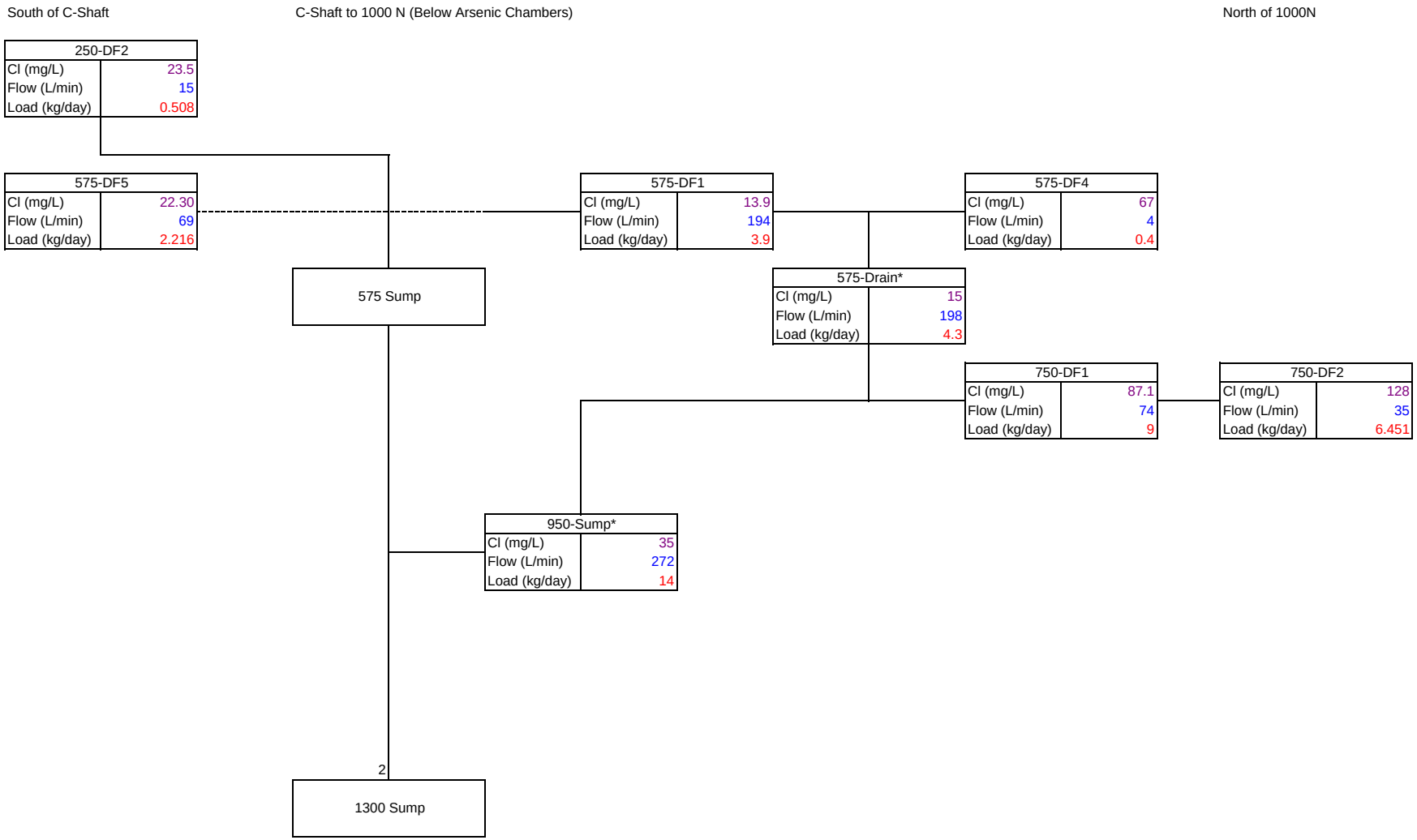
C-Shaft to 1000N*

Notes: Flow at 1650-RM could originate from south of C-Shaft
Some of the flow at 2000-SB1 could originate from North of 1000N
All other flows are between C-shaft and 1000N



Flow Pathway #1, Concentration, Flows and Loads (Chloride)

Appendix E1 - Winter Water and Load Balance



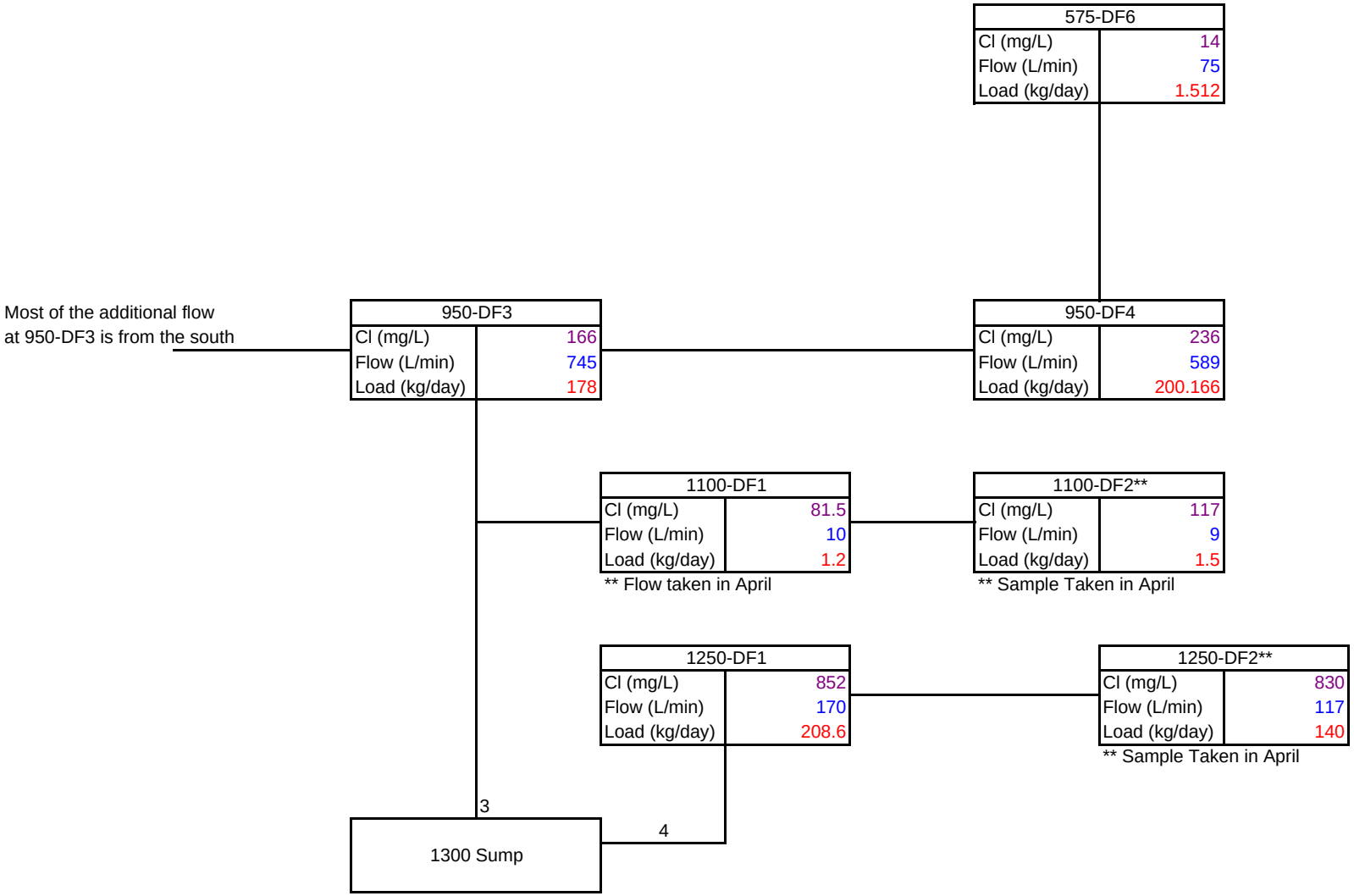
Flow Pathway #2, Concentration, Flows and Loads (Chloride)

Appendix E1 - Winter Water and Load Balance

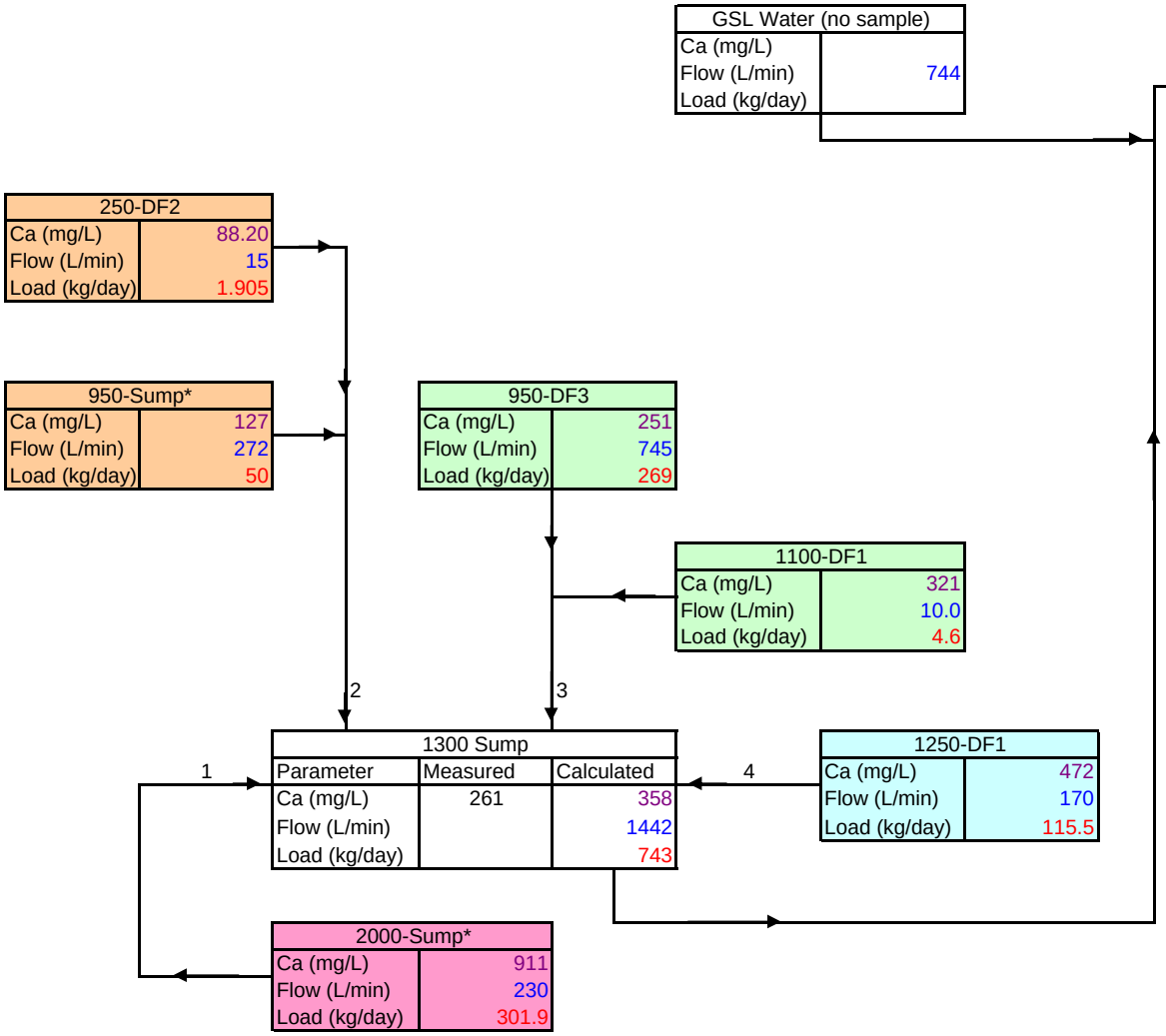
South of C-Shaft

C-Shaft to 1000 N (Below Arsenic Chambers)

North of 1000N



Flow Pathways #3&4, Concentration, Flows and Loads (Chloride)



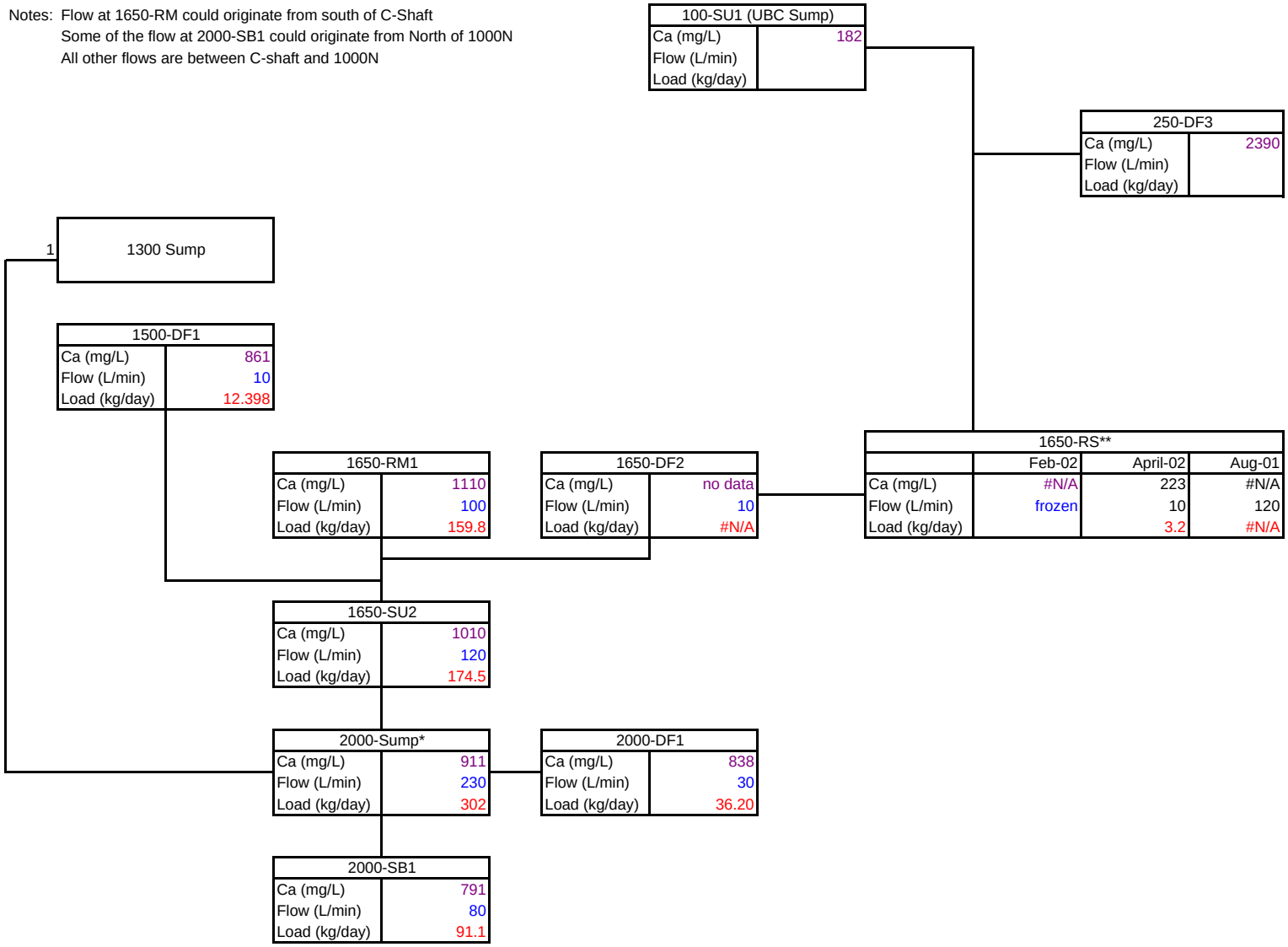
Overall Mass Balance (Calcium)

Notes: * indicates the values are calculated from flowpaths entering this location
** indicates that an additional sample was collected in April

Appendix E1 - Winter Water and Load Balance

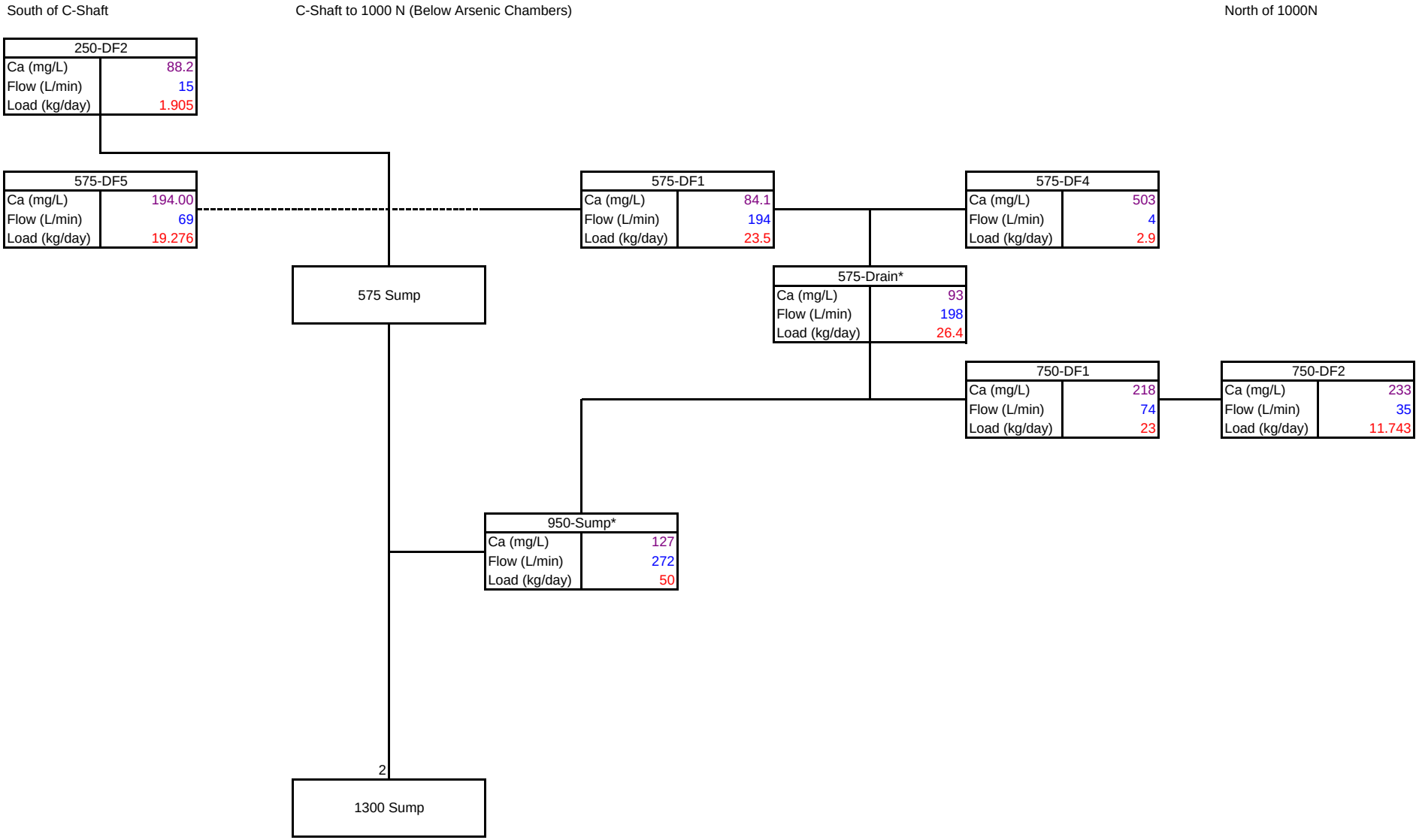
C-Shaft to 1000N*

Notes: Flow at 1650-RM could originate from south of C-Shaft
Some of the flow at 2000-SB1 could originate from North of 1000N
All other flows are between C-shaft and 1000N



Flow Pathway #1, Concentration, Flows and Loads (Calcium)

Appendix E1 - Winter Water and Load Balance



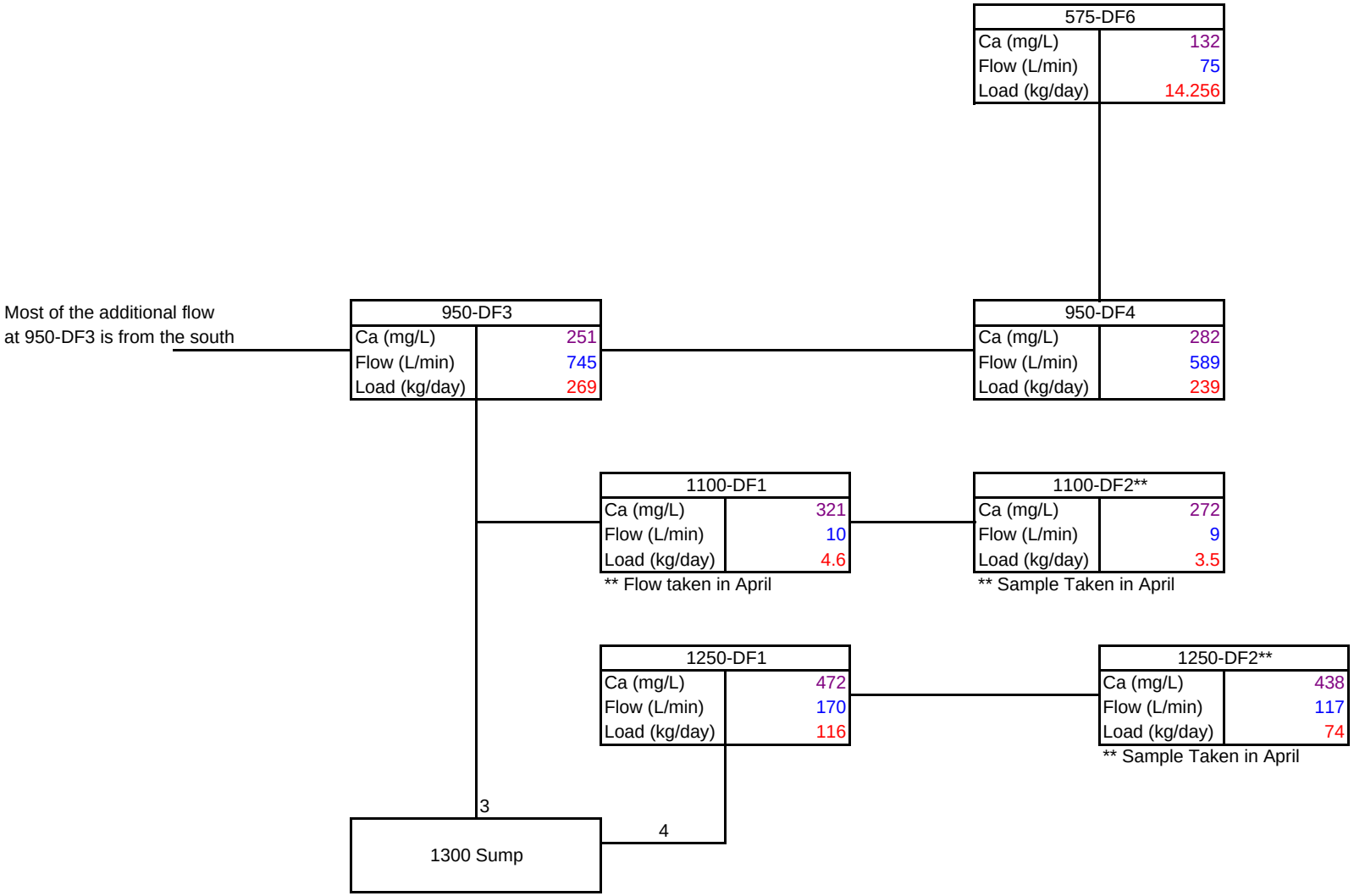
Flow Pathway #2, Concentration, Flows and Loads (Calcium)

Appendix E1 - Winter Water and Load Balance

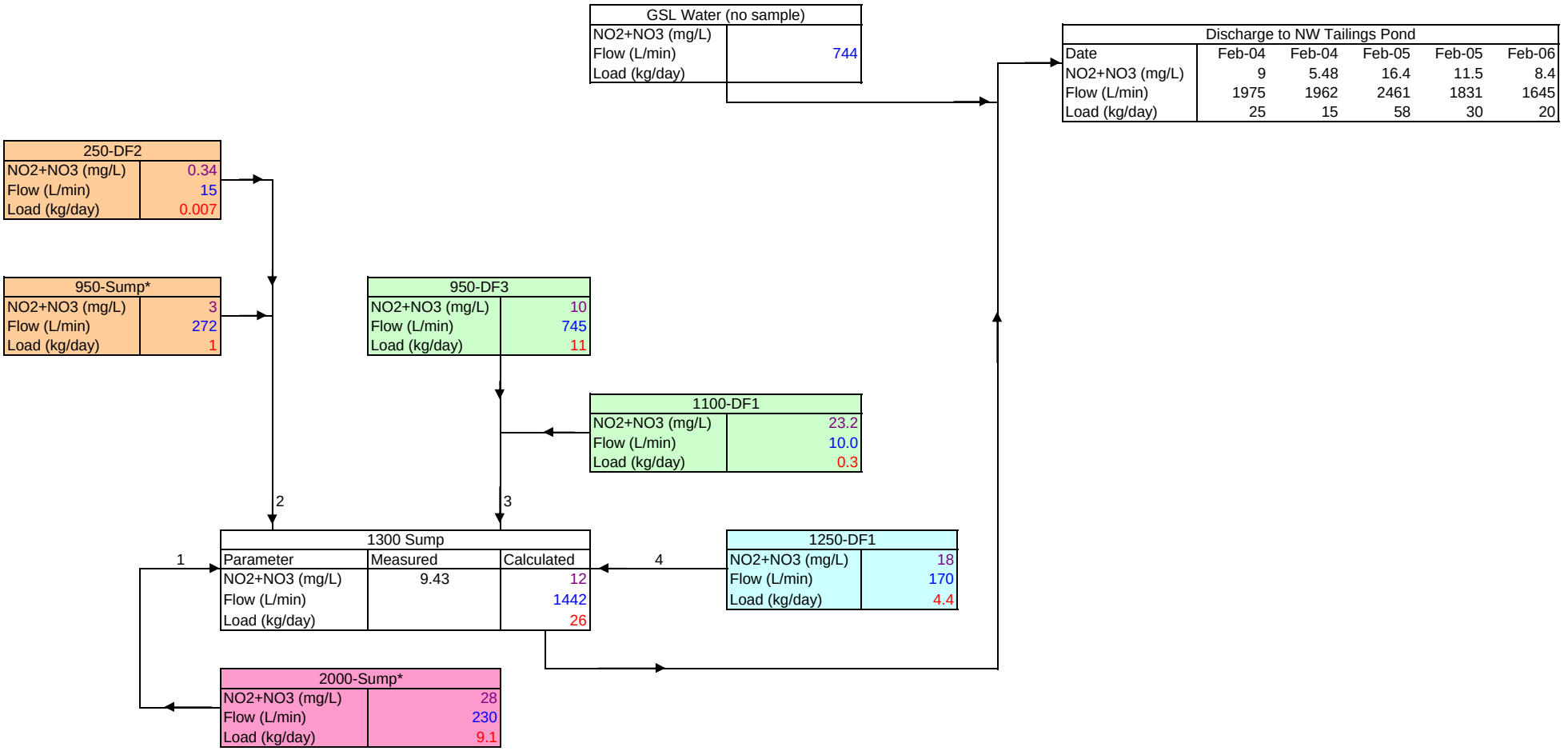
South of C-Shaft

C-Shaft to 1000 N (Below Arsenic Chambers)

North of 1000N



Flow Pathways #3&4, Concentration, Flows and Loads (Calcium)



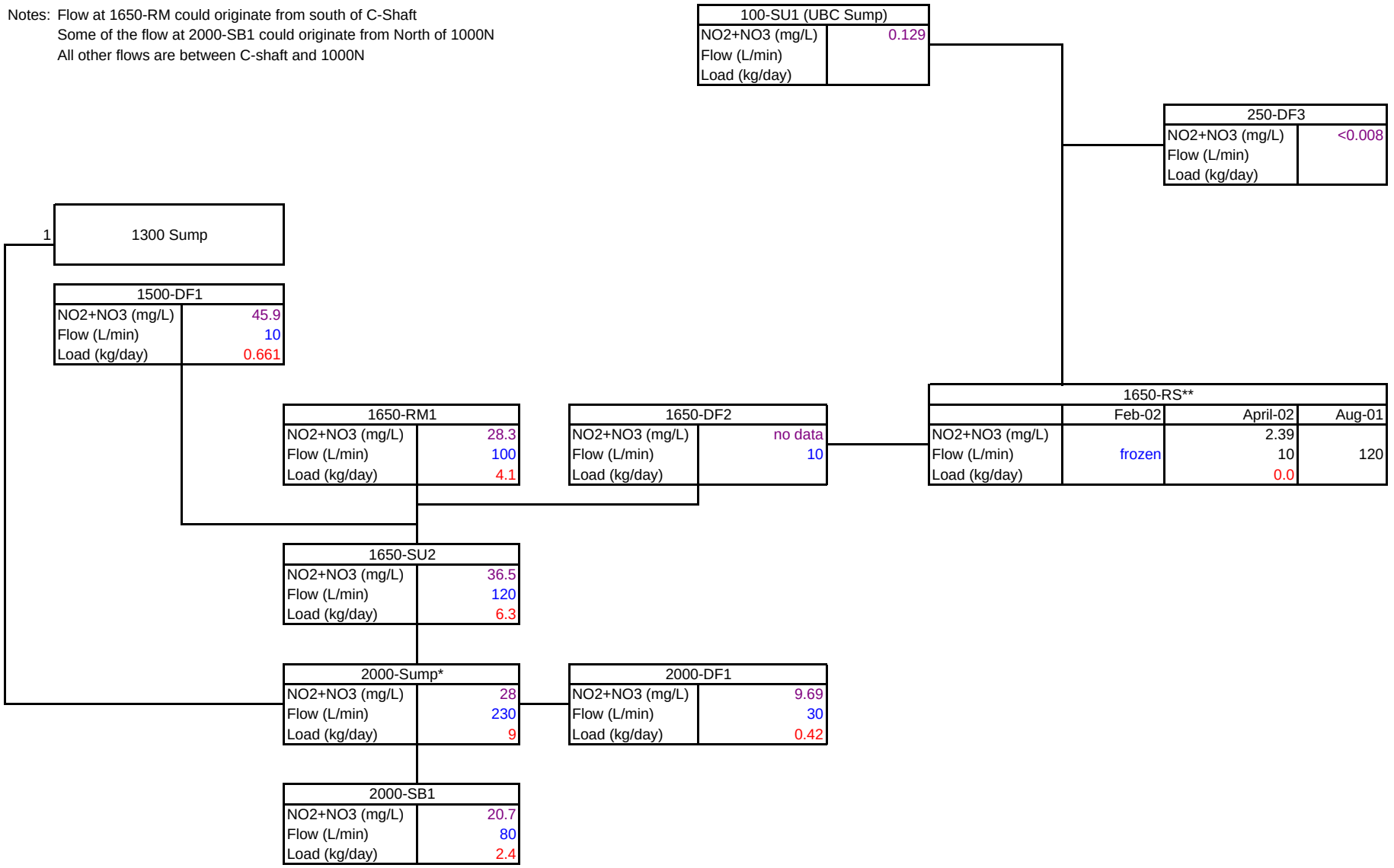
Overall Mass Balance (NO2+NO3)

Notes: * indiNO2+NO3tes the values are NO2+NO3lculated from flowpaths entering this loNO2+NO3tion
** indiNO2+NO3tes that an additional sample was collected in April

Appendix E1 - Winter Water and Load Balance

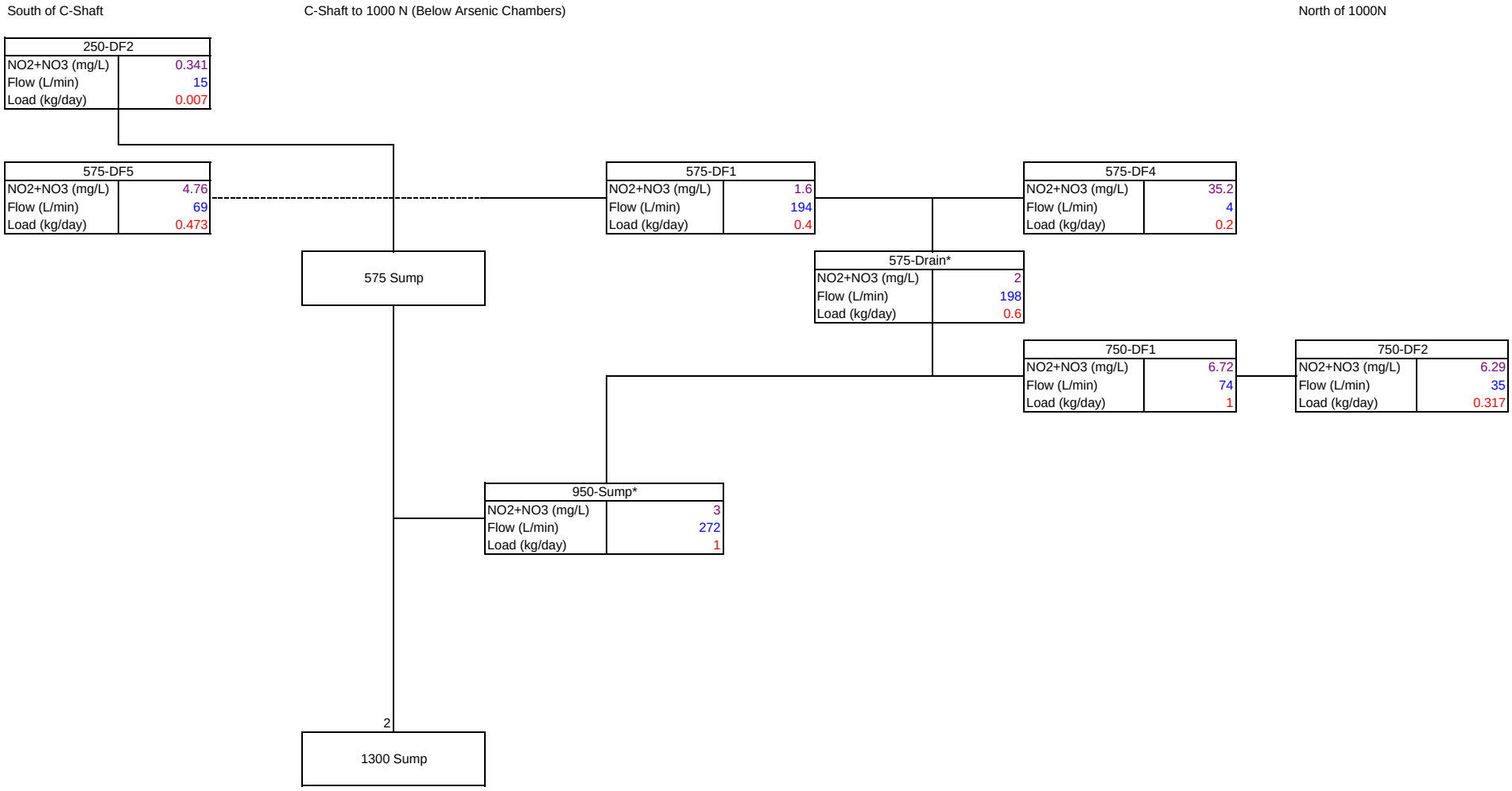
C-Shaft to 1000N*

Notes: Flow at 1650-RM could originate from south of C-Shaft
Some of the flow at 2000-SB1 could originate from North of 1000N
All other flows are between C-shaft and 1000N



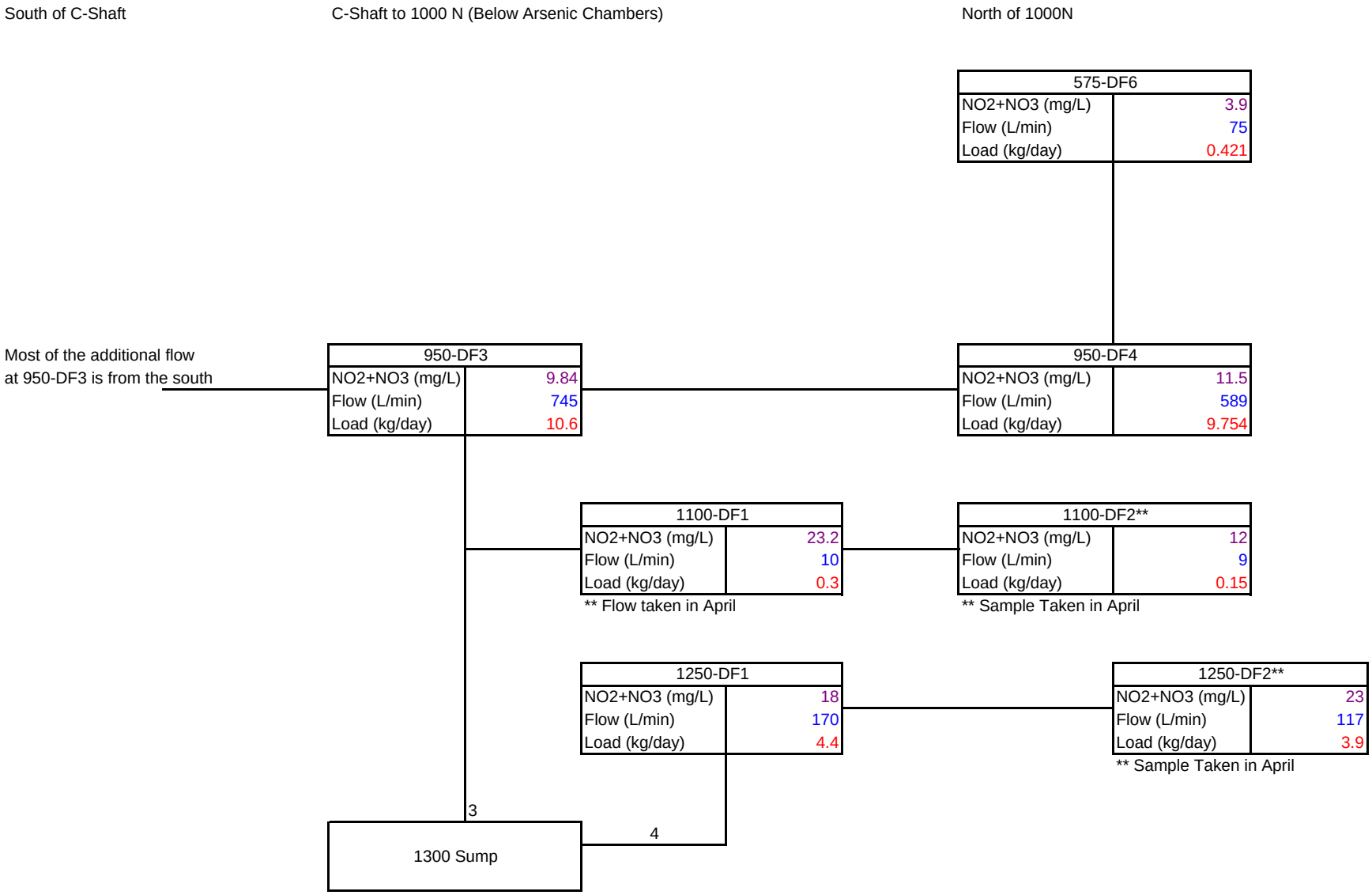
Flow Pathway #1, Concentration, Flows and Loads (NO3+NO2)

Appendix E1 - Winter Water and Load Balance



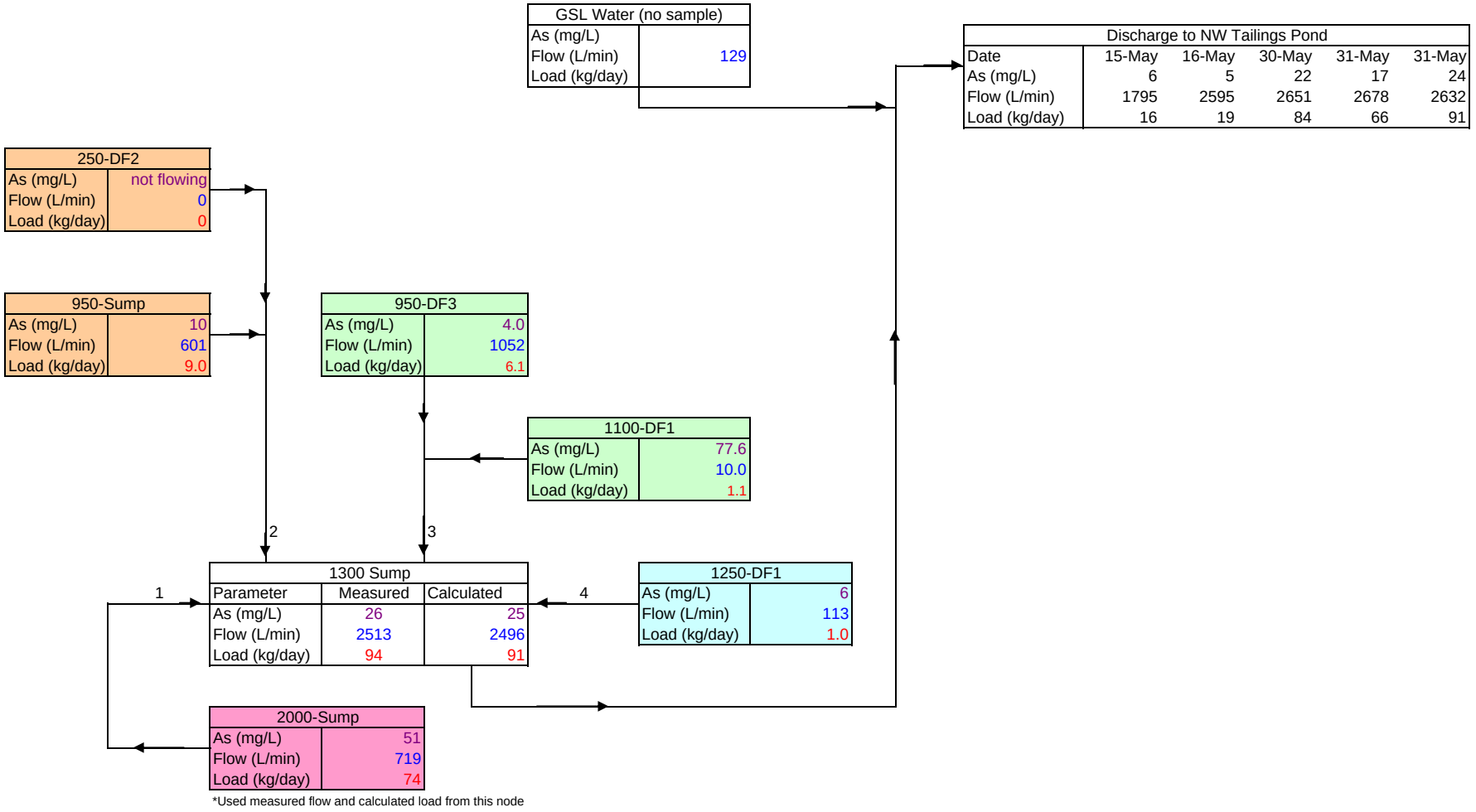
Flow Pathway #2, Concentration, Flows and Loads (NO3+NO2)

Appendix E1 - Winter Water and Load Balance



Flow Pathways #3&4, Concentration, Flows and Loads (NO3+NO2)

Attachment E2 - Freshet Water and Load Balance

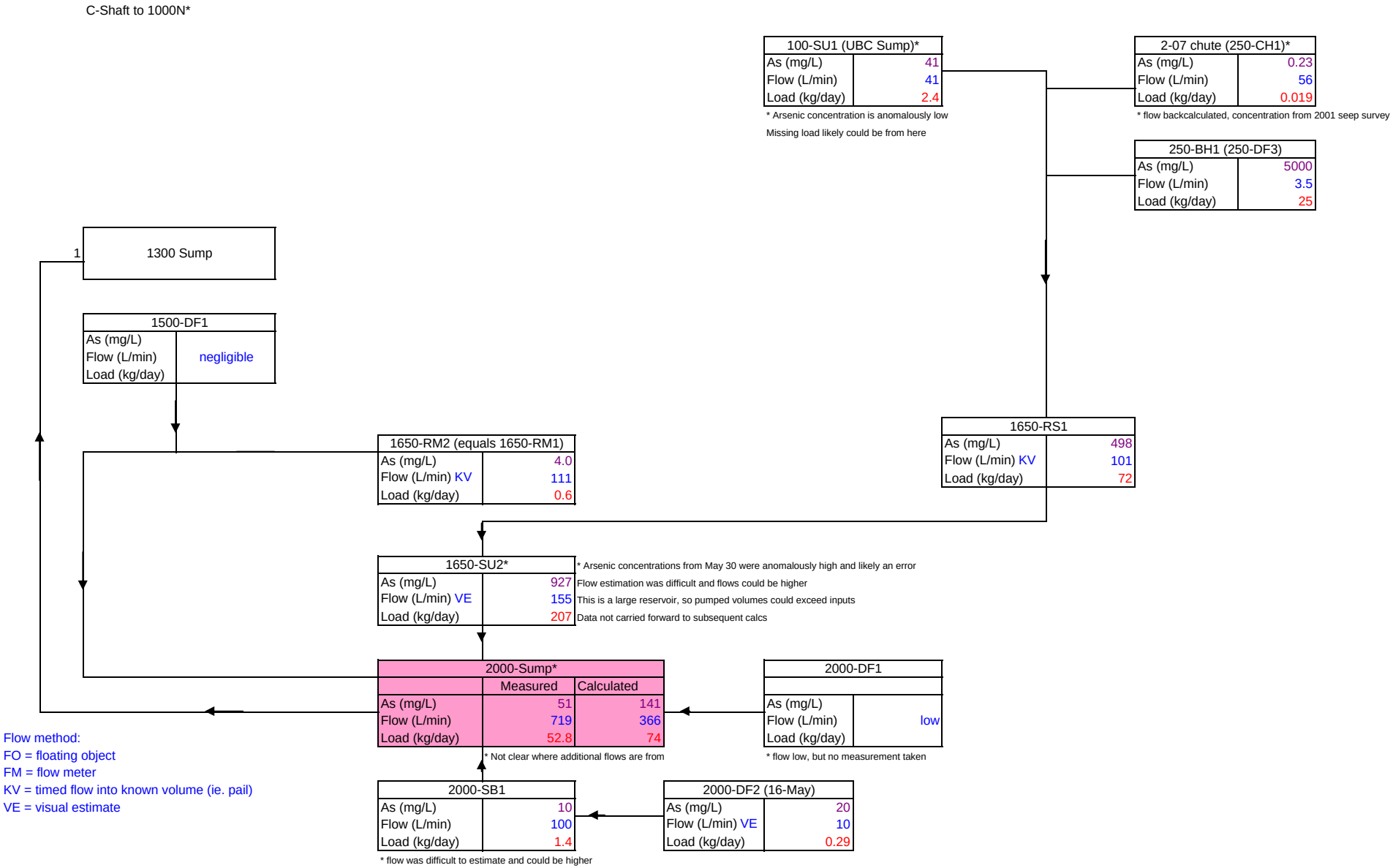


*Used measured flow and calculated load from this node

Overall Mass Balance (Arsenic)

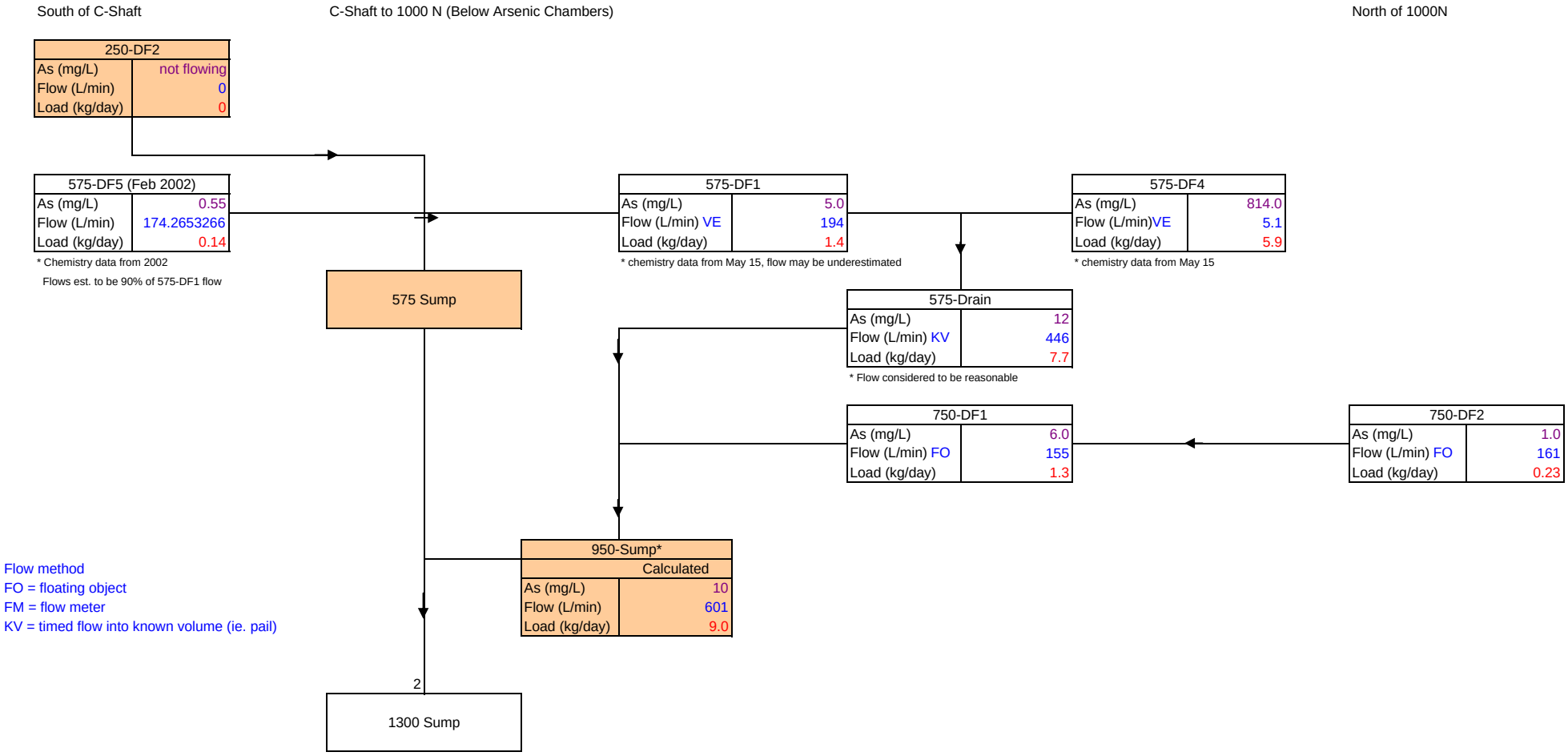
Notes: * indicates the values are calculated from flowpaths entering this location

Attachment E2 - Freshet Water and Load Balance



Flow Pathway #1, Concentration, Flows and Loads (Arsenic) May-30 unless otherwise indicated

Attachment E2 - Freshet Water and Load Balance

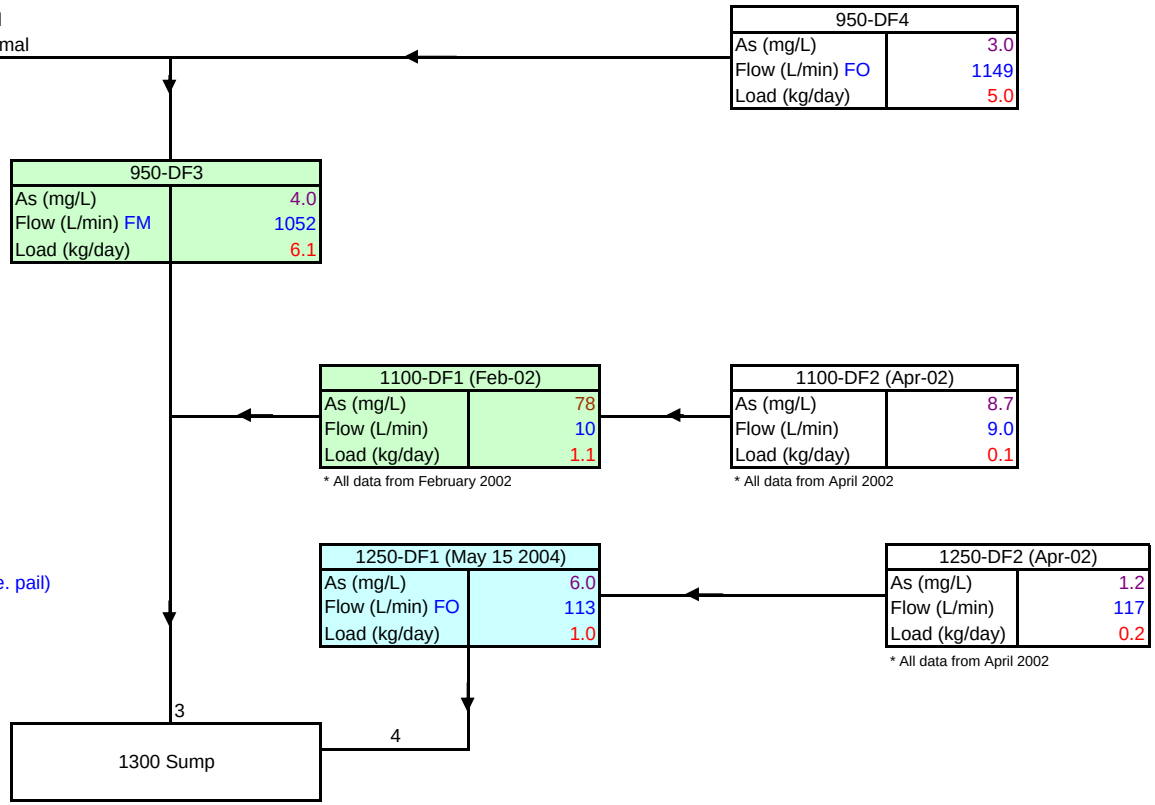


Flow Pathway #2, Concentration, Flows and Loads (Arsenic) May 30, 31, 2003 (unless otherwise indicated)

Attachment E2 - Freshet Water and Load Balance

South of C-Shaft | C-Shaft to 1000 N (Below Arsenic Chambers) | North of 1000N

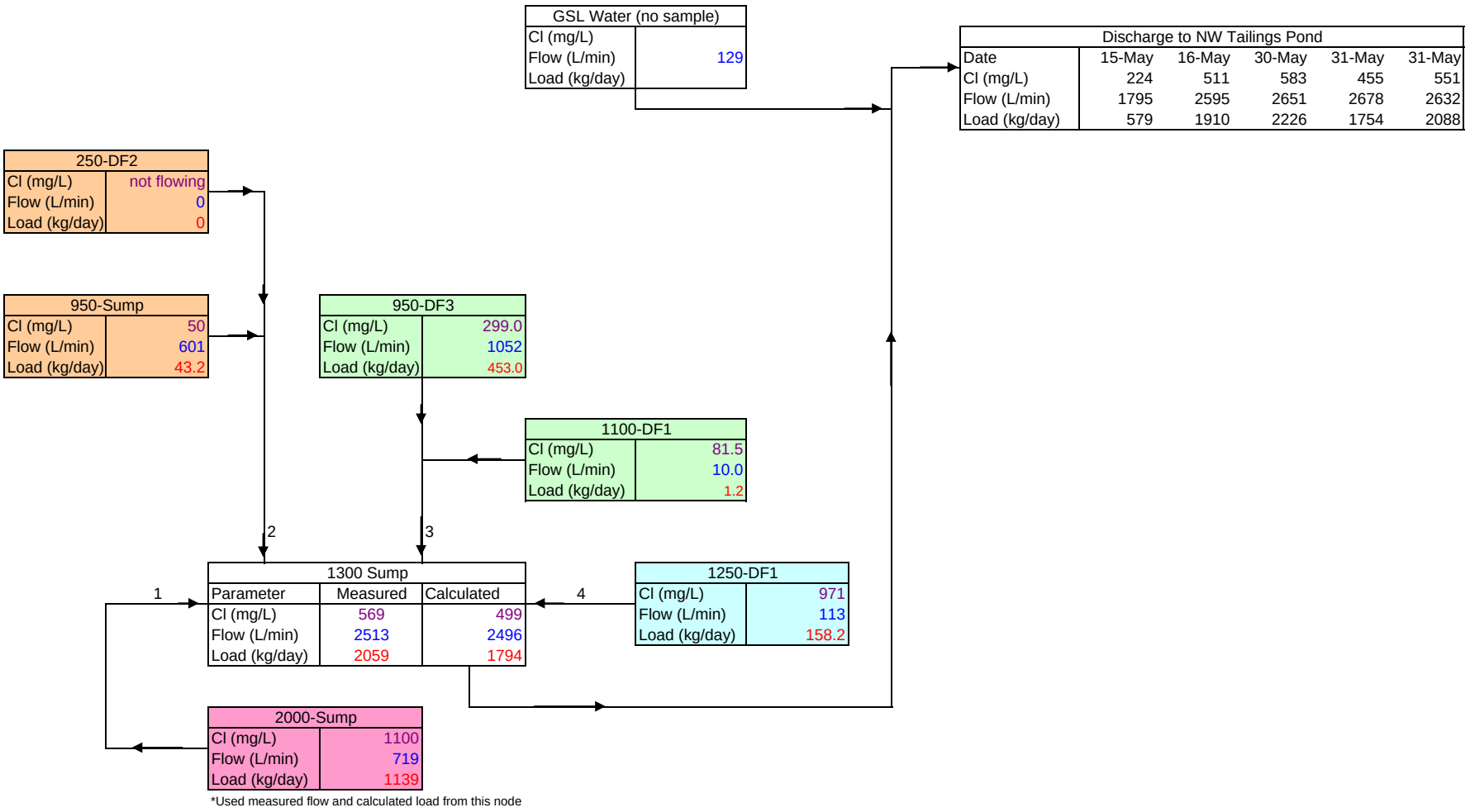
750 Level Bulkhead Valve was closed
Therefore flows from South were minimal



Flow method
FO = floating object
FM = flow meter
KV = timed flow into known volume (ie. pail)

Flow Pathways #3&4, Concentration, Flows and Loads (Arsenic) May 30,31, 2004 (unless otherwise indicated)

Appendix E2 - Freshet Water and Load Balance



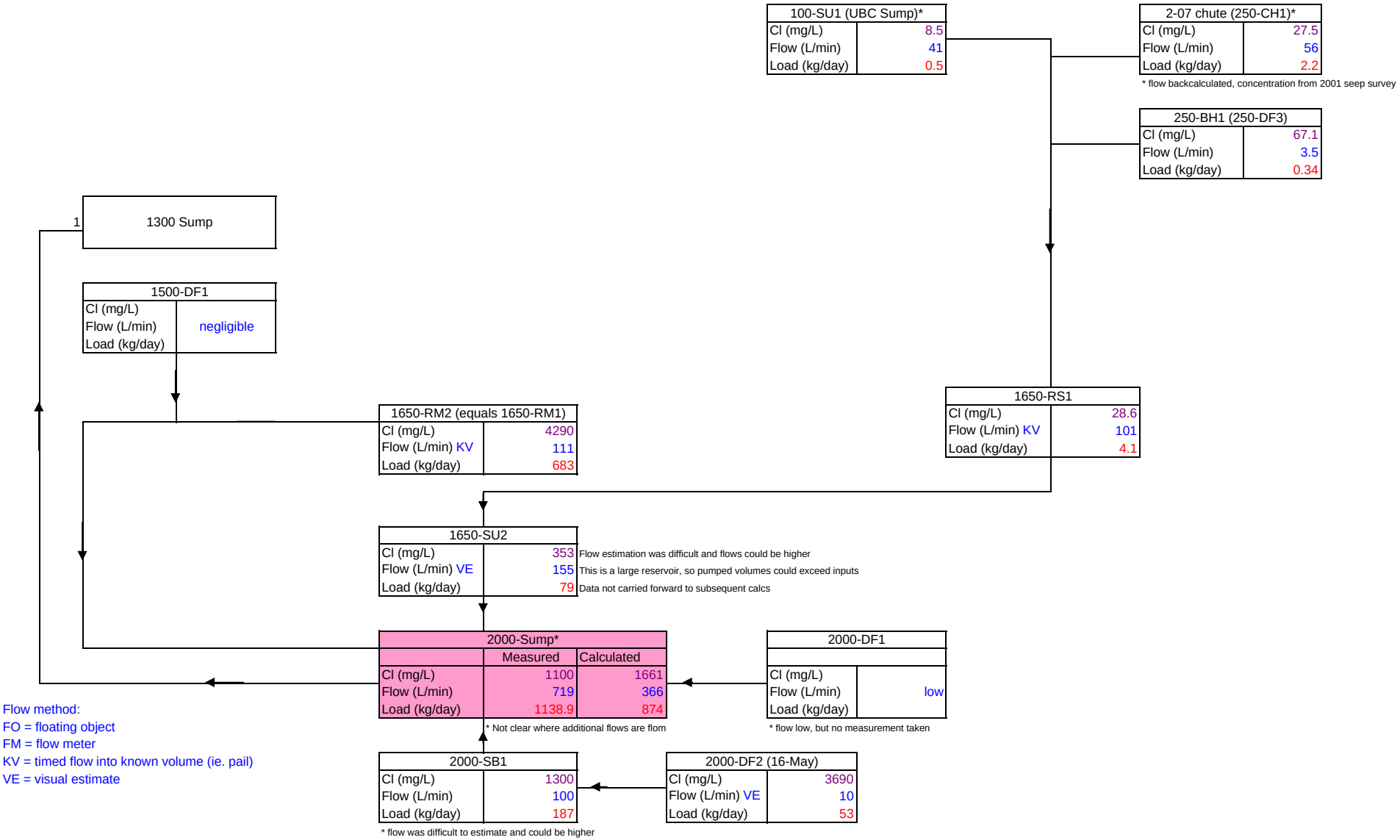
*Used measured flow and calculated load from this node

Overall Mass Balance (Chloride)

Notes: * indicates the values are calculated from flowpaths entering this location

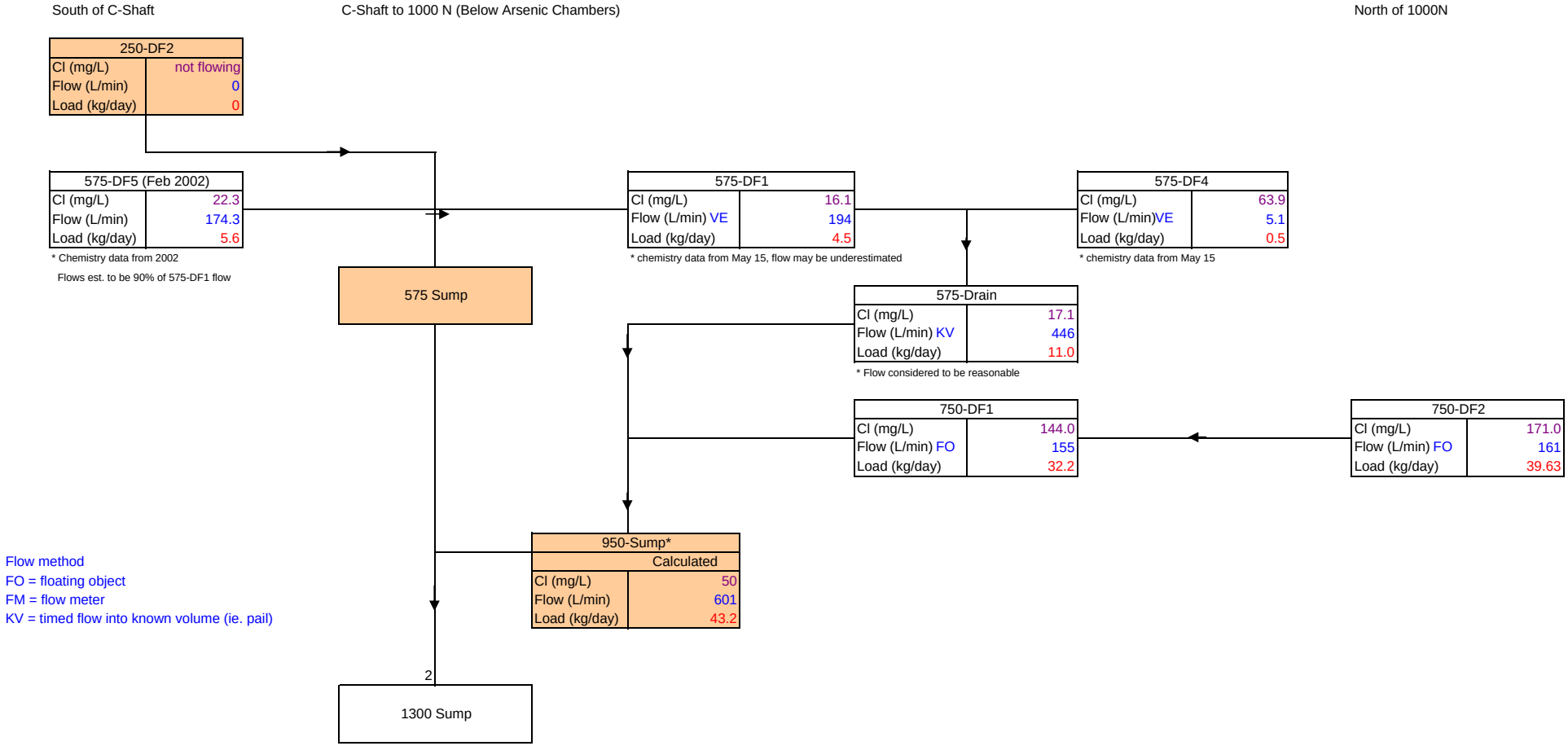
Appendix E2 - Freshet Water and Load Balance

C-Shaft to 1000N*



Flow Pathway #1, Concentration, Flows and Loads (Chloride) May-30 unless otherwise indicated

Appendix E2 - Freshet Water and Load Balance

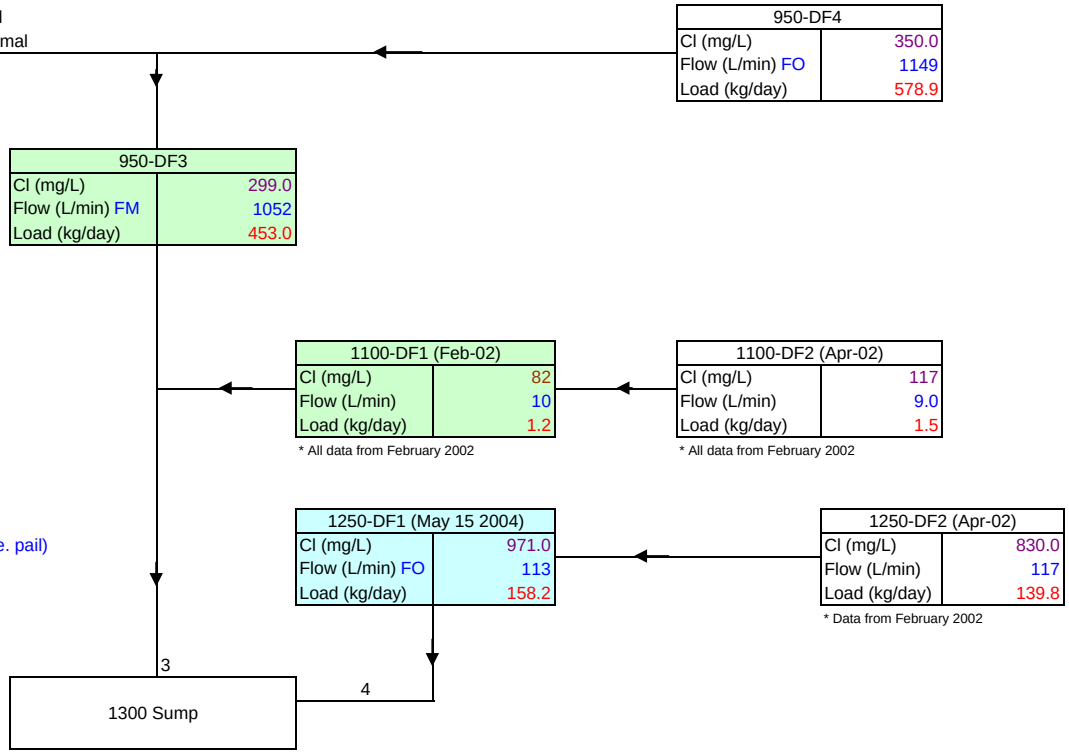


Flow Pathway #2, Concentration, Flows and Loads (Chloride) May 30, 31, 2003 (unless otherwise indicated)

Appendix E2 - Freshet Water and Load Balance

South of C-Shaft | C-Shaft to 1000 N (Below Arsenic Chambers) | North of 1000N

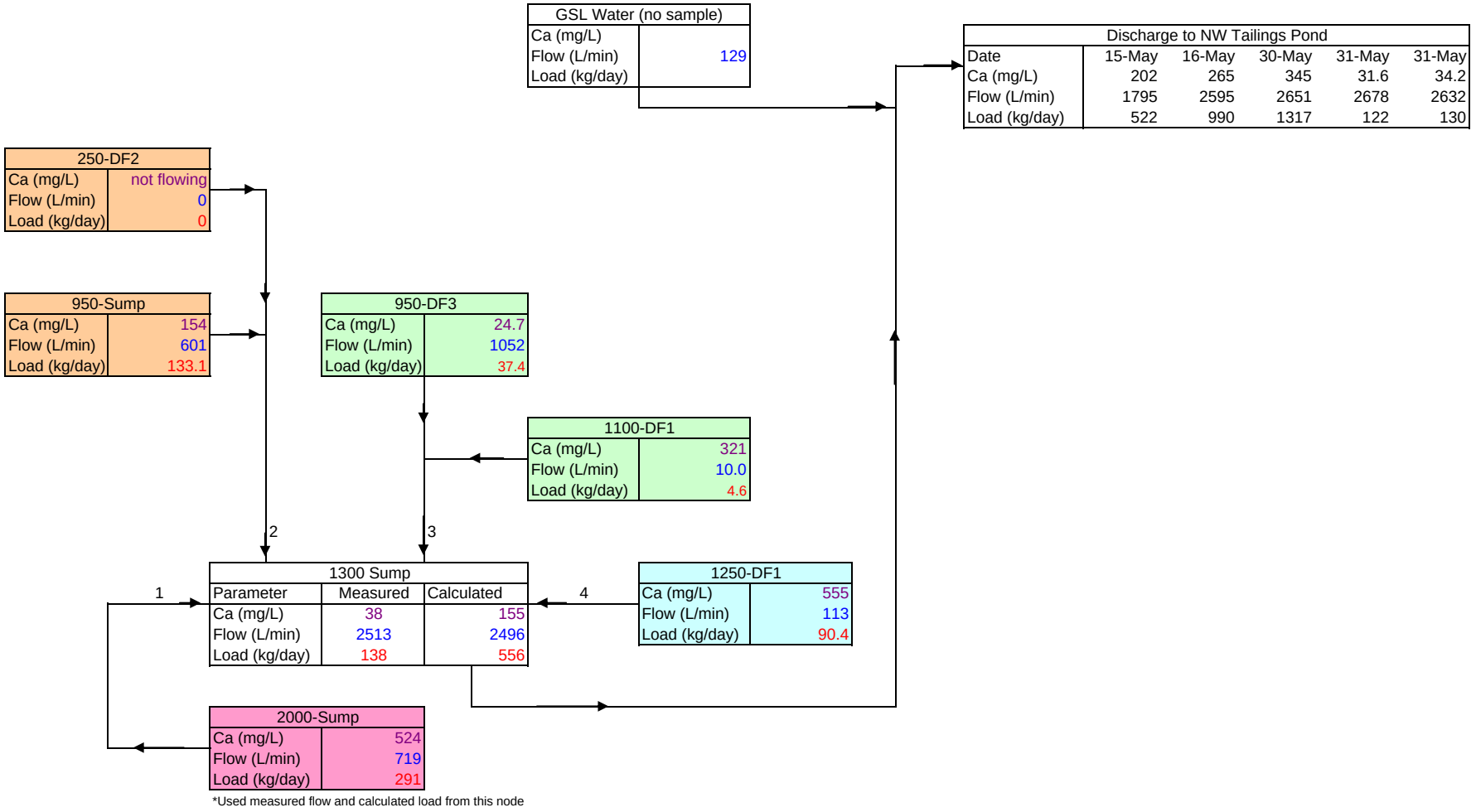
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FM = flow meter
KV = timed flow into known volume (ie. pail)

Flow Pathways #3&4, Concentration, Flows and Loads (Chloride) May 30,31, 2004 (unless otherwise indicated)

Attachment E2 - Freshet Water and Load Balance

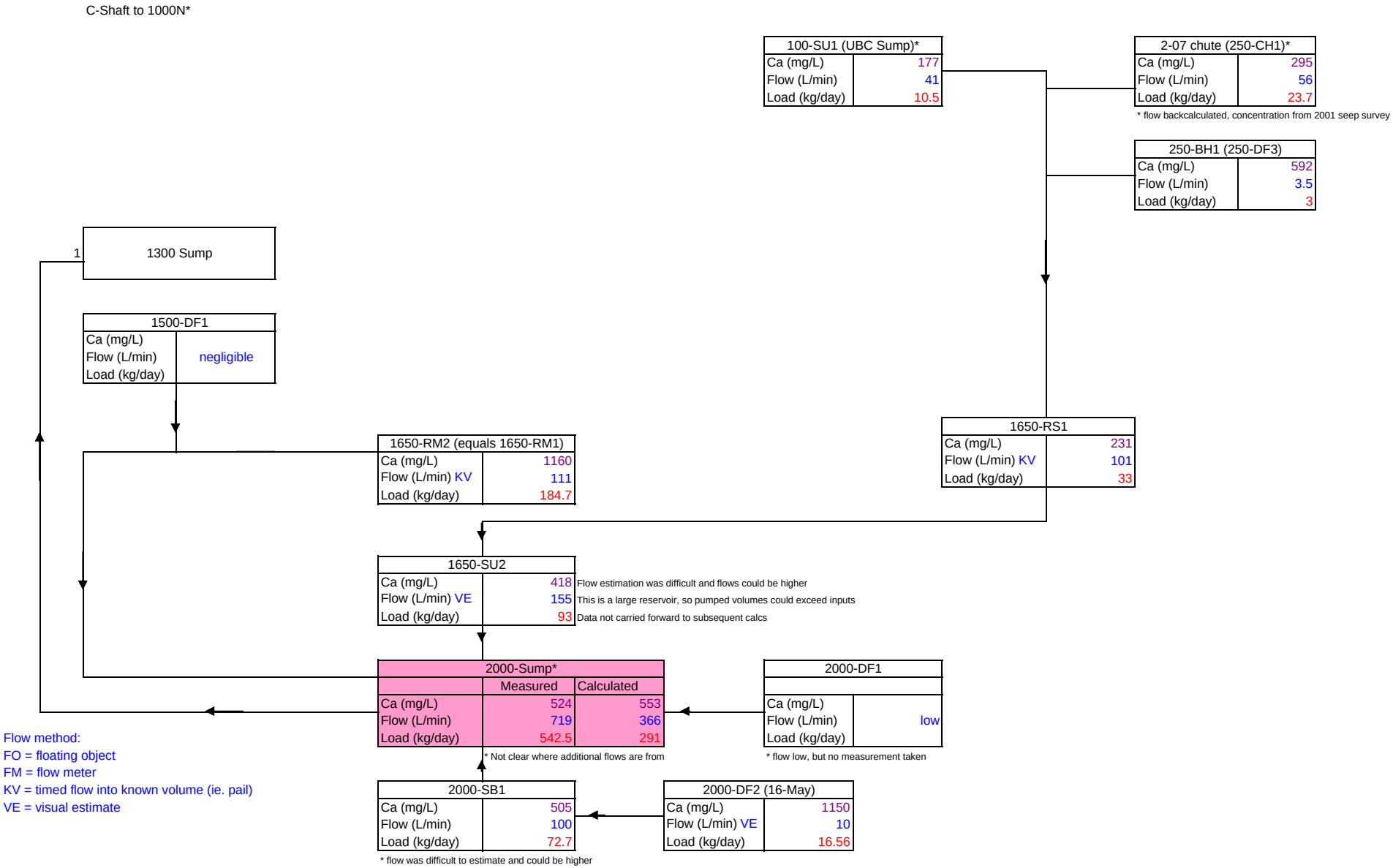


*Used measured flow and calculated load from this node

Overall Mass Balance (Calcium)

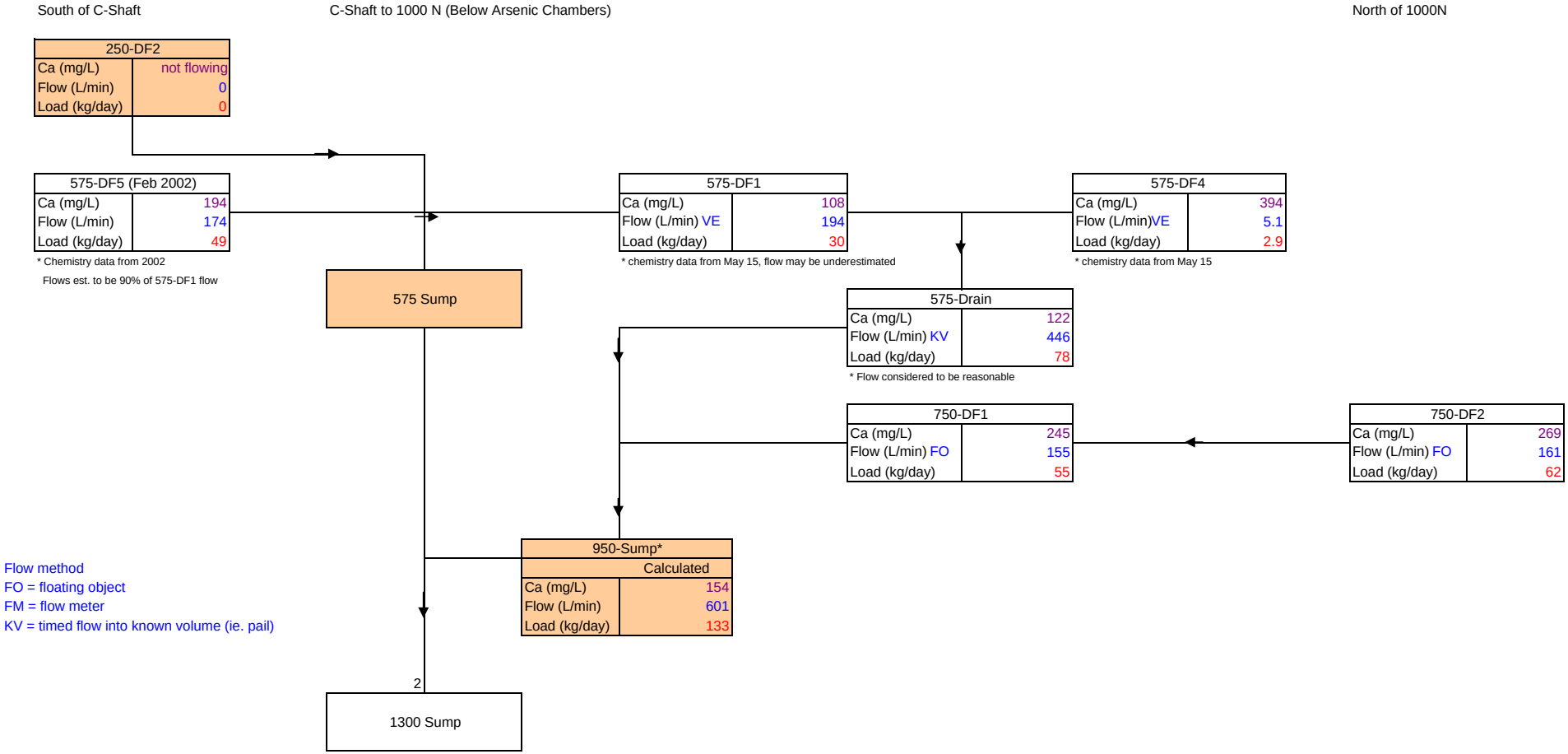
Notes: * indicates the values are calculated from flowpaths entering this location

Attachment E2 - Freshet Water and Load Balance



Flow Pathway #1, Concentration, Flows and Loads (Calcium) May-30 unless otherwise indicated

Attachment E2 - Freshet Water and Load Balance

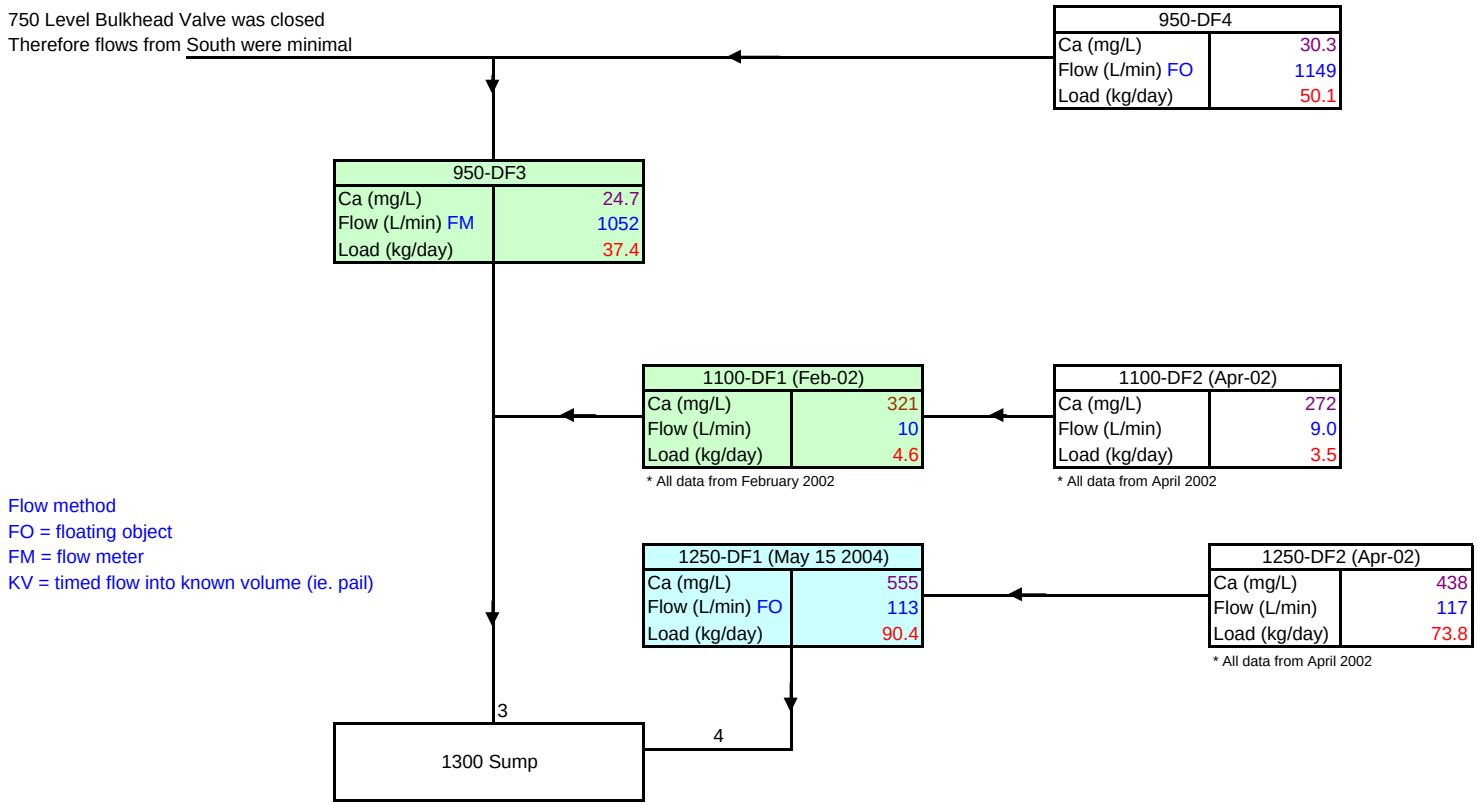


Flow Pathway #2, Concentration, Flows and Loads (Calcium) May 30, 31, 2003 (unless otherwise indicated)

Attachment E2 - Freshet Water and Load Balance

South of C-Shaft | C-Shaft to 1000 N (Below Arsenic Chambers) | North of 1000N

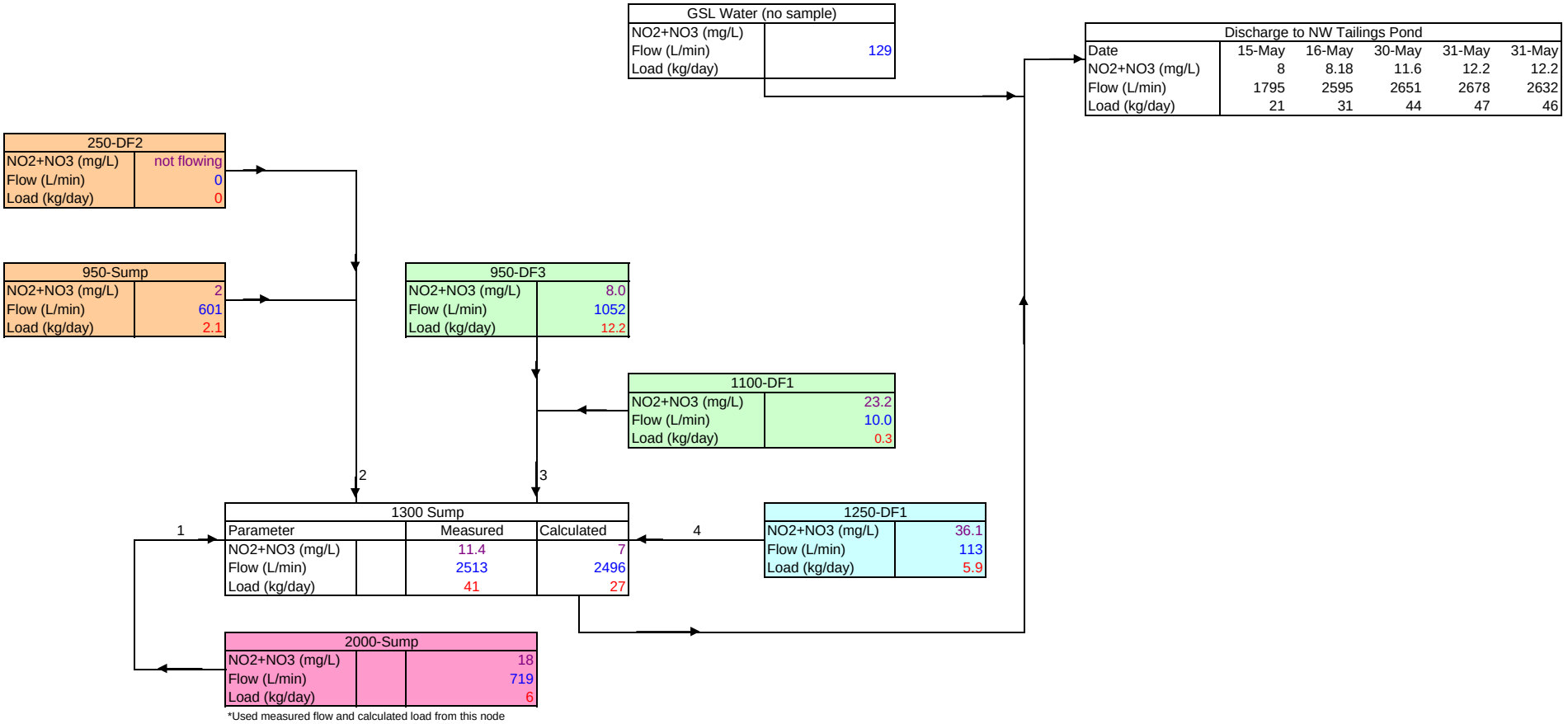
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Flow method
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Flow Pathways #3&4, Concentration, Flows and Loads (Calcium) May 30,31, 2004 (unless otherwise indicated)

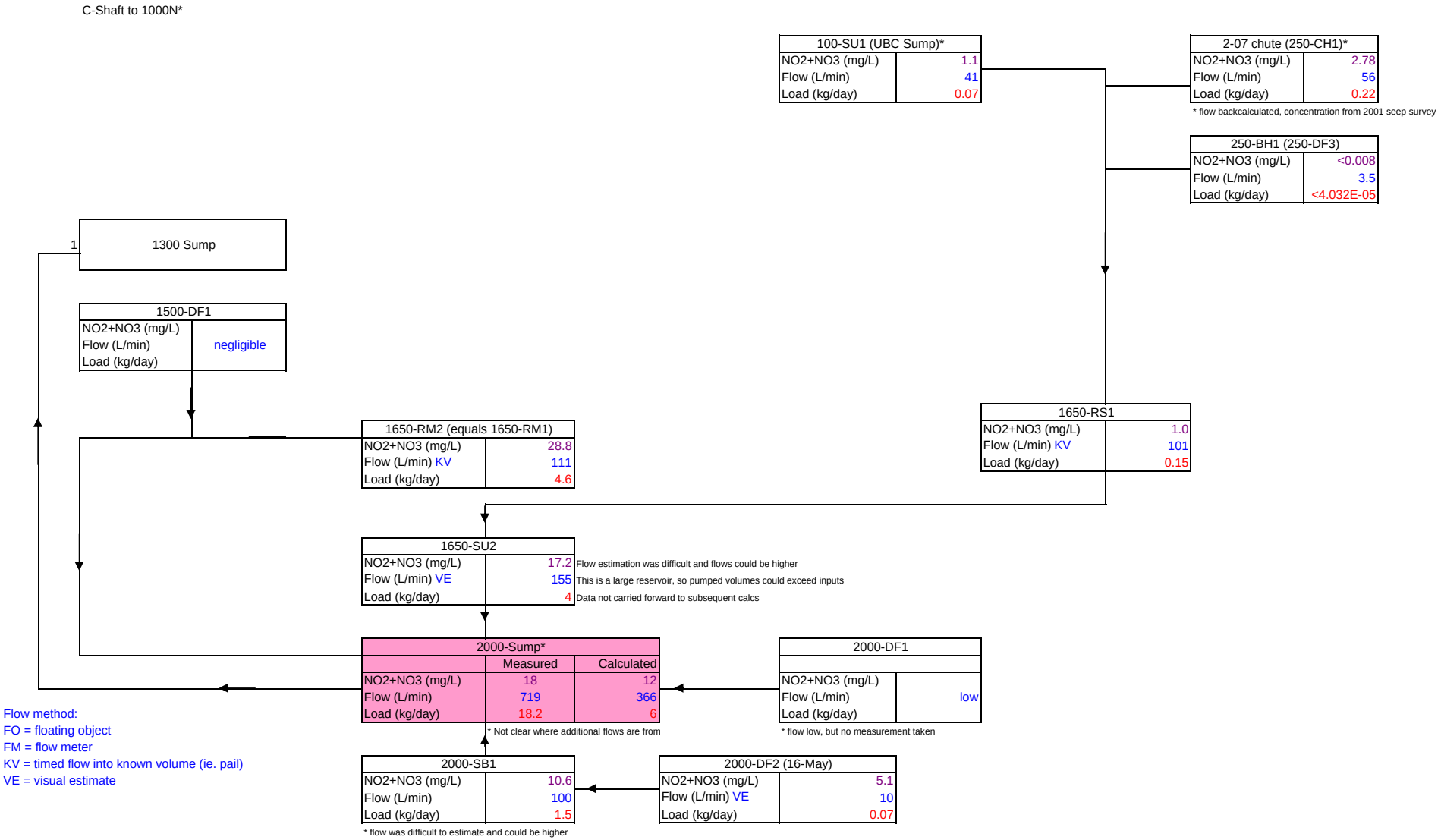
Attachment E2 - Freshet Water and Load Balance



Overall Mass Balance (NO2+NO3)

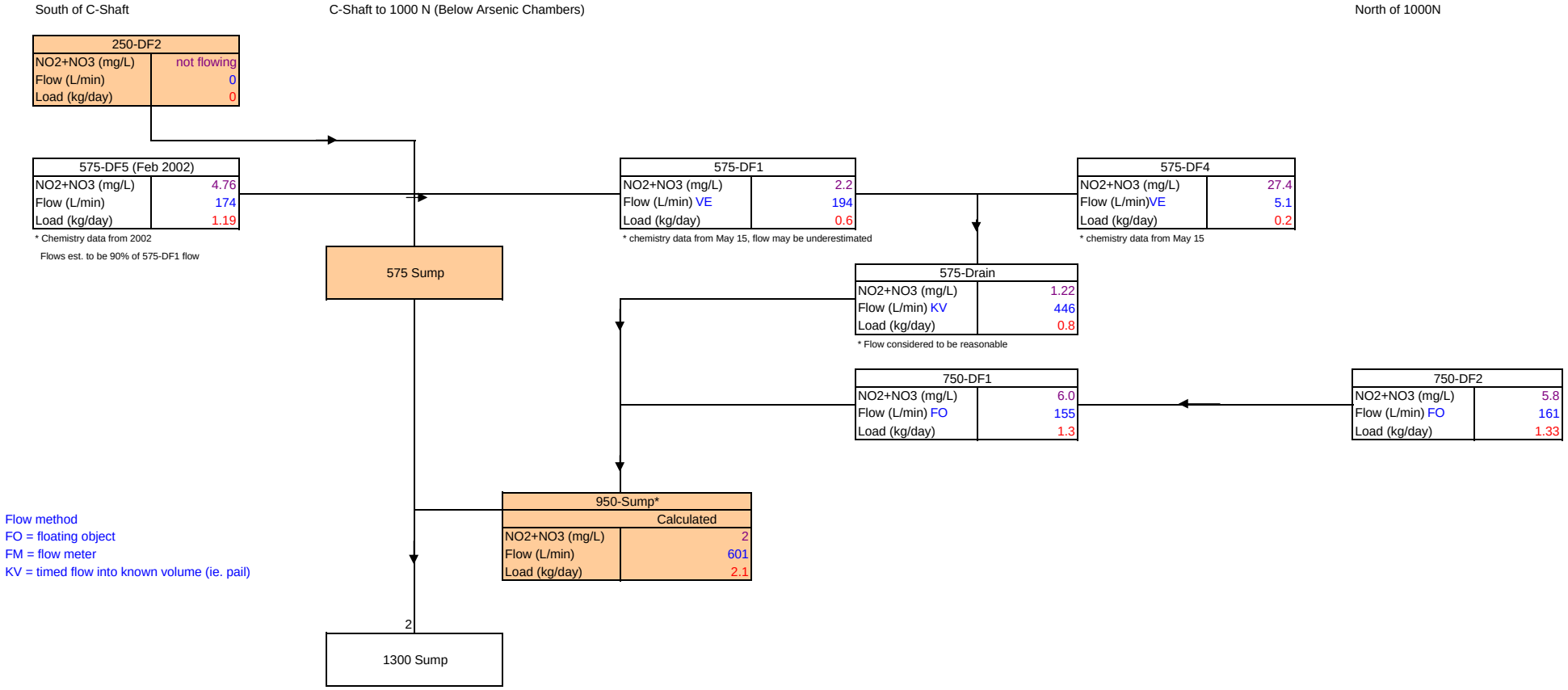
Notes: * indicates the values are calculated from flowpaths entering this location

Attachment E2 - Freshet Water and Load Balance



Flow Pathway #1, Concentration, Flows and Loads (NO2+NO3) May-30 unless otherwise indicated

Attachment E2 - Freshet Water and Load Balance

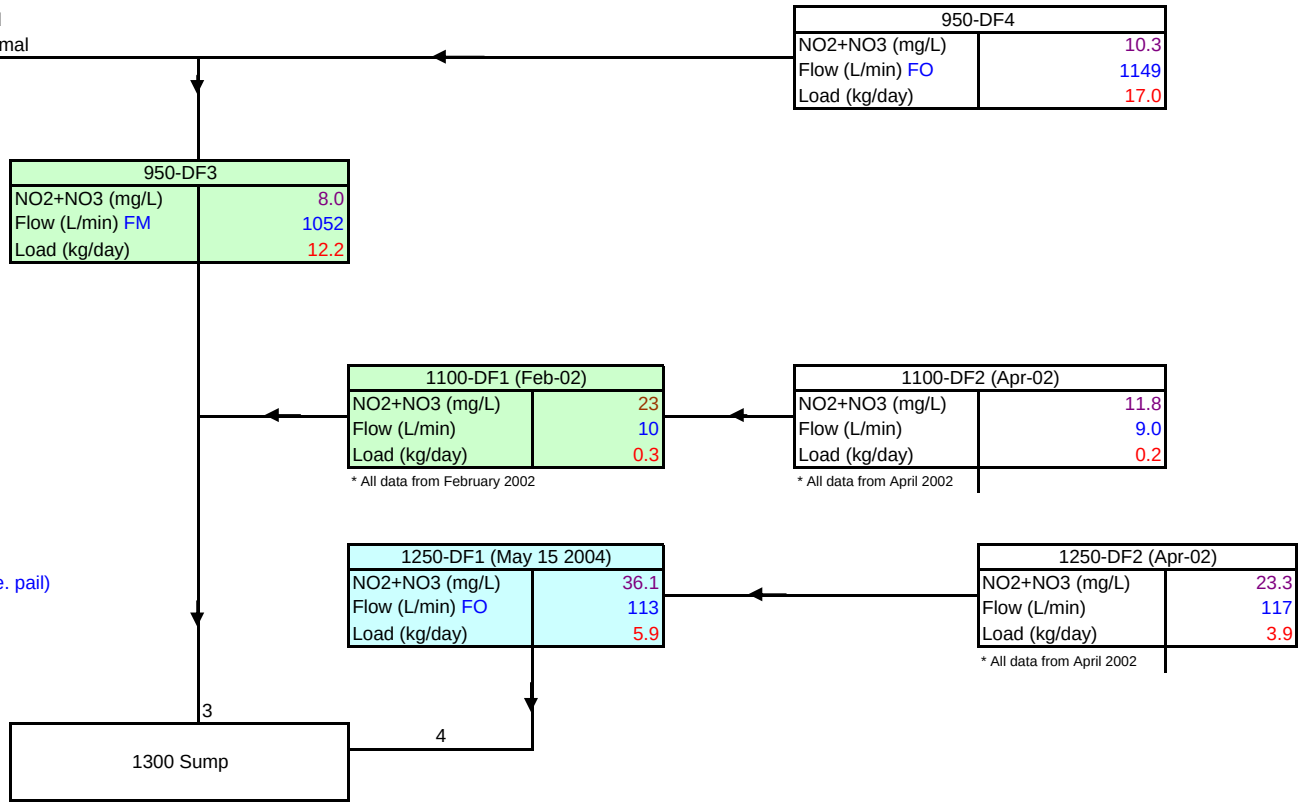


Flow Pathway #2, Concentration, Flows and Loads (NO2+NO3) May 30, 31, 2003 (unless otherwise indicated)

Attachment E2 - Freshet Water and Load Balance

South of C-Shaft | C-Shaft to 1000 N (Below Arsenic Chambers) | North of 1000N

750 Level Bulkhead Valve was closed
Therefore flows from South were minimal



Flow method
FO = floating object
FM = flow meter
KV = timed flow into known volume (ie. pail)

Flow Pathways #3&4, Concentration, Flows and Loads (NO2+NO3) May 30,31, 2004 (unless otherwise indicated)

Appendix F

Geochemical Modelling Results

Appendix F - Geochemical Modelling Results

NAME	250-dh1	000-sw2	575-sp1	950-ch2	2000-dh2	250-sp1	575-dh2
H3AsO3	0.000	0.000	0.000	0.000	0.011	2993	3088
H3AsO4	0.013	12	6.67	5.4	0.026	1223	915
Ba+2	0.019	0.016	0.029	0.0042	6.1	0.010	0.17
CO3-2	375	116	167	230	83	5.0	101
Ca+2	128	210	234	267	9236	369	510
Cl-1	10.0	286	258	23	32493	169	71
Fe+2	7.6	0.000	0.000	0.000	10	0.69	0.86
Fe+3	0.003	0.030	0.030	0.030	0.000	0.000	0.000
K+1	4.1	9.3	12	5.9	79	17	38
Mg+2	49	50	68	58	718	208	572
Mn+3	0.034	0.05	0.41	0.24	0.77	0.51	2.18
NH4+1	0.094	0.09	1.15	0.022	0.01	6.02	2.87
Na+1	25	133	137	46	8869	126	103
SO4-2	301	262	405	733	116	529	2518
Sb(OH)3	0.000	0.000	0.000	0.000	0.0020	14	189
Sb(OH)6-	0.022	1.4	2.1	0.62	0.0008	0.78	7.3
Sr+2	3.52	2.4	1.9	0.65	32	1.0	2.2
%diff	0.49	15	14	1.48	0.58	0.94	2.8
pH	7.09	8.27	7.29	8.02	6.31	6.60	6.60
Eh	144	371	424	372	100	55	50
ionic strength (m)	0.017	0.025	0.029	0.029	0.50	0.067	0.11
NAME	Sat. Index	Sat. Index	Sat. Index	Sat. Index	Sat. Index	Sat. Index	Sat. Index
BARITE	**0.237**	**0.055**	**0.423**	**-0.255**	**1.267**	**-0.144**	**1.426**
CALCITE	**-0.227**	**0.505**	**-0.32**	**0.722**	*-1.622*	-2.534	*-1.222*
DOLOMITE (D)	*-1.486*	**-0.229**	*-1.788*	**0.177**	-4.973	-5.93	-2.995
EPSOMITE	-3.513	-3.642	-3.367	-3.209	-4.009	-2.989	-2.106
FERRIHYDRITE	**1.256**	**2.627**	**2.363**	**2.605**	-2.166	-2.943	-3.079
GOETHITE	**6.384**	**7.755**	**7.491**	**7.733**	**2.973**	**2.186**	**2.049**
GYPSUM	*-1.033*	*-0.953*	*-0.769*	**-0.493**	*-0.772*	*-0.675*	**-0.101**
HALITE	-8.388	-6.056	-6.117	-7.71	-2.278	-6.31	-6.85
MAGHEMITE	**5.908**	**8.651**	**8.123**	**8.607**	*-0.901*	-2.487	-2.76
SIDERITE (P)	**0.126**	-5.623	-4.747	-4.722	-3.08	-3.624	-2.34
SIDERITE (C)	**0.716**	-5.033	-4.157	-4.132	-2.49	-3.034	*-1.75*
STRONTIANITE	*-1.292*	*-0.945*	*-1.909*	*-1.392*	-3.596	-4.605	-3.095
BIRNESSITE	**6.176**	15.053	13.009	14.756	**2.772**	**3.433**	**3.817**
NSUTITE	**6.763**	15.64	13.596	15.343	**3.359**	**4.02**	**4.404**
ARSENOLITE	-41.426	-81.127	-74.434	-78.692	-23.514	-2.009	*-1.935*
CLAUDETITE	-41.217	-80.918	-74.225	-78.483	-23.305	*-1.799*	*-1.726*
Sb2O4	-5.791	-15.181	-12.832	-14.907	-4.119	**2.401**	**4.503**
Sb4O6 II,CUB	-21.317	-61.268	-56.493	-59.794	-11.641	**3.467**	**8.047**
Sb4O6 I,ORTH	-24.237	-64.188	-59.412	-62.714	-14.561	**0.547**	**5.127**
Sb(OH)3 (s)	-2.947	-12.935	-11.741	-12.566	*-0.545*	**3.248**	**4.393**
Sb2O3 SENARM	-8.121	-28.097	-25.709	-27.36	-3.283	**4.271**	**6.561**
Sb2O3 VALENT	-12.152	-32.128	-29.74	-31.391	-7.314	**0.239**	**2.529**
CA3(ASO4)2	-13.611	-4.61	-7.174	-5.741	-11.016	-4.262	-4.645
CA2ASO4OH	-11.002	-5.222	-7.476	-6.024	-9.715	-6.655	-6.854
MG3ASO4)210W	-12.293	-3.917	-6.21	-5.13	-11.911	-2.444	*-1.897*
FEASO4.2W	-6.579	-4.547	-3.177	-4.424	-8.695	-5.123	-5.43
XSCORODIT	-2.369	**-0.337**	**1.033**	**-0.214**	-4.485	*-0.913*	*-1.22*