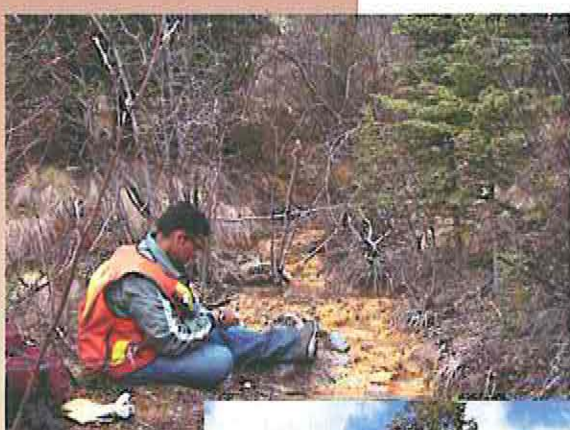
FMC167

Deloitte & Touche

AMP Event #4 Response: 2006 Status Report

Prepared for:

DELOITTE & TOUCHE INC.
Interim Receiver of Anvil Range Mining Corporation
Suite 1900, 79 Wellington Street West
Toronto, ON M5K 1B9



Prepared by:

SRK Consulting
Engineers and Scientists

Project Reference Number
SRK 1CD003.082

February 2007

2006 AMP Event #4 Response: Status Report

Prepared For

Deloitte & Touche Inc.

Interim Receiver of Anvil Range Mining Corporation
Suite 1900, 79 Wellington Street West
Toronto, ON M5K 1B9

Prepared By
SRK Consulting (Canada) Inc.
Suite 800, 1066 West Hastings Street
Vancouver, B.C. V6E 3X2

Tel: 604.681.4196 Fax: 604.687.5532
E-mail: vancouver@srk.com Web site: www.srk.com

SRK Project Number 1CD003.082

February 2007

Table of Contents

List of Figures

List of Appendices

1 Introduction

As required under Water Licence QZ03-059, an Adaptive Management Plan (AMP) for the Anvil Range Mine was submitted to the Yukon Territory Water Board on June 30, 2004 (GLL, 2004). The AMP outlines the short-term mine management strategies that have been instituted to ensure environmental protection during the period leading up to the implementation of a Final Closure and Reclamation Plan.

The AMP specifies eight events that, if triggered, would require a management response to ensure maintenance of acceptable environmental conditions. Event #4, *"Degraded Seepage Quality from the Grum Rock Dump"*, addresses the potential for increased contaminant loadings from Grum Dump to levels which could have an adverse impact on the receiving environment in Vangorda Creek. The initial trigger for the implementation of the AMP was a sustained and statistically significant increase in concentrations of sulphate, copper or zinc in seepage from the Grum Dump, over the 1998 to 2002 reference period. This trigger was intended to provide an indication that oxidation products are being released from the dump, and that increased monitoring and surveillance is now required to ensure protection of Vangorda Creek.

Loadings from Grum Dump to Vangorda Creek have historically been monitored at station V2, on Tributary A of Grum Creek (Figure 1.1). As indicated in the July 16, 2004 letter of notification to the Water Board (SRK 2004a), the specific threshold for total sulphate at V2 was exceeded on the date of AMP implementation (July 1, 2004).

Although increased sulphate concentrations do not in isolation present a threat to Vangorda Creek, a management response is required as part of the AMP. On August 16, 2004, SRK Consulting (SRK) submitted a letter to the Water Board, on behalf of Deloitte and Touche, outlining the proposed response plan to address this issue (SRK 2004b). The plan included a series of investigative actions intended to better understand hydrological and geochemical conditions downgradient of the Grum Dump, and to assess the level of environmental impact of Grum Dump loadings on Vangorda Creek.

Key components of the plan were:

- Collection of routine water quality samples;
- Review of existing water quality records;
- Seepage surveys;
- Detailed contaminant pathway survey;
- Installation of flow monitoring station on Grum Creek;
- Groundwater monitoring well installation; and
- Reporting.

The potential for increased contaminant loading from the Grum Dump was acknowledged prior to implementation of the AMP. Therefore, several of these activities were already underway. Where relevant, results from these studies are included in this report. In addition, an evaluation of seepage collection options for surface and shallow groundwater downgradient of Grum Dump was completed in June 2004 (SRK 2004c).

The Response Plan was initiated in the second half of 2004. 2004 Event #4 Response activities were summarized in the 2004 AMP Event #4: Status Report (SRK 2005), which also outlined the remaining items to be completed in 2005 as part of the Response Plan. A summary of full-year water quality monitoring results was presented in the AMP Annual Review for 2005 (GLL 2006), and a stand-alone report summarizing the 2005 AMP Event #4 activities was finalized in October 2006.

This document is intended to record the current status of the various response activities, and to review monitoring results to the end of 2006. The document is organized as follows:

- Section 2 summarizes the 2006 field activities that were completed as part of AMP response and other programs relevant to Grum Dump seepage;
- Section 3 discusses the results of 2006 monitoring activities, and reviews historical water quality at selected stations;
- Section 4 presents a summary of 2006 Response Plan activities, and conclusions from the 2006 water quality monitoring; and
- Section 5 presents recommendations for further monitoring, and reporting and discussion of monitoring results.

2 Summary of 2006 Field Activities

2.1 Water Quality Monitoring

2.1.1 Reference Water Quality Stations

Monitoring of the nine Reference Water Quality Stations (RWQSs) (Figure 2.1) identified in the AMP and in follow-up work in 2005 was carried out by site environmental staff or by Gartner Lee Limited (GLL) during 2006. These stations were:

- V15 - located at the outlet of the Tributary A sedimentation pond.
- V2 - located on the main stem of Grum Creek, below Tributary A.
- P96-9A and BH05-9b - located adjacent to Tributary A, downgradient from V15.
- V2A - located at the culvert outfall of the ditch that presently diverts Grum Creek into Moose Pond.
- Moose Seep- located between Moose Pond and Vangorda Creek.
- Moose Well 2- located between Moose Pond and Vangorda Creek.
- V14 - located at the Grum Dump Toe Access Road downgradient of SRK-GD05. This station appears to have changed locations over the course of the monitoring period, and may also have been monitored on the road upgradient of Sheep Creek, and upstream of V15 at the dump toe.
- V16 - located in the ditch adjacent to the Grum Toe Access Road between V15 and Grum Creek.

Historical monitoring results are discussed in Section 3.1.1 along with results from 2006 monitoring.

2.1.2 Waste Rock Seepage Survey

Seepage from the toe of the Grum waste rock dump has been monitored as part of the biannual seepage survey that has been carried out since 2002. Stations SRK-GD1, SRK-GD4, SRK-GD5, SRK-GD6, SRK-GD-16 and SRK-GD21 monitor seepage from the southern toe of the dump, within the Vangorda Creek catchment. Station locations are shown in Figure 2.1, and monitoring results are discussed in Section 3.1.2. A broader discussion of waste rock dump seepage will be included in the 2006 Waste Rock and Seepage Monitoring Report (SRK, in progress).

2.1.3 Downgradient Pathways Survey

Selected downgradient seepage monitoring stations (GD05 d/s, Sweet Creek, Sheep Creek, Moose Seep) have been monitored on a spring/ fall basis since 2003, and monitoring of these stations was continued in 2005. Selected additional stations have been intermittently monitored, and two additional stations were sampled in 2006 (WGD01 and WTA-02). These downgradient stations monitor water quality along potential Grum Dump drainage pathways not captured in the routine monitoring program. Station locations are shown in Figure 2.1, and monitoring results are discussed in Section 3.1.3.

2.1.4 Additional Groundwater Monitoring

Five groundwater monitoring wells were installed in 2004 and 2005 that are not included in the list of RWQSs. These five wells (SRK04-5A, SRK04-5B, SRK05-5C, SRK05-07, and SRK05-08) are located adjacent to the Grum Dump Toe Access Road, as shown in Figure 2.1. Monitoring results from these wells are discussed in Section 3.1.4.

2.2 Grum Creek Weir Instrumentation

A 90° V-notch weir was installed on Grum Creek at the upstream end of the Grum Creek Diversion in September 2004. Water level was recorded using a Thalimedes water level monitoring instrument, with a built-in data logger, over the period of April through September 2005 (SRK, 2006). The instrument was removed in September 2005 by SRK staff for data recovery and over-winter storage.

In 2006 it was decided to install a different instrument to monitor water level at the Grum Creek weir, based on successes at weirs on Lower Faro Creek under freezing conditions. The instrument was a vented pressure transducer (model INW PT2X, manufactured by Instrumentation Northwest) with an integrated data logger. Installation was carried out on June 1, 2006, by Laberge Environmental Services; a summary of installation details is included in Appendix A. The resulting Grum Creek flow record is discussed in Section 3.2.

3 Results of 2006 Monitoring, Field Activities, and Data Review

3.1 Water Quality Monitoring

3.1.1 Reference Water Quality Stations

Station V15

Station V15 is located at the outlet of the Tributary A sedimentation pond (upstream of Station V2-Figure 2.1), and has been a reliable sampling point since pond construction in 1995. Surface flow at V15 has been approximately 1/3 of the volume observed downstream at V2 in recent years. The V15 sedimentation pond is thought to be directly downgradient from the Grum sulphide cell via a groundwater pathway, and water chemistry at this location is expected to be a good indicator of the arrival and loading of oxidation products from the sulphide cell. A summary of sulphate and total and dissolved zinc concentrations at V15 is shown in Figure 3.1.

Sulphate concentrations at V15 steadily increased over the 1995 through 2001 period. From 2001 through early 2004, sulphate concentrations at V15 were within a stable range (700 to 1050 mg/L). This stable period was followed by a period of increasing concentrations from around 1000 mg/L to around 2000 mg/L by June 2005, with a single high result of 2990 mg/L recorded in February 2005. Samples collected during the June 2005 through October 2006 period indicated sulphate concentrations in the range of 1600 to 2090 mg/L, and it appears that sulphate concentrations have stabilized at present. Future monitoring will be necessary to verify the observation of a stable trend.

Dissolved and total zinc concentrations at V15 were high variably from 1995 to 2002, typically ranging from 0.01 to 0.1 mg/L, with occasional values as high as 1 mg/L. This variability is the result of operational and post-operational water management, as discussed below for Station V2. Following the implementation of dump runoff control in 2002, zinc concentrations have been lower and more uniform, ranging between 0.006 and 0.05 mg/L. In 2006, zinc at V15 showed a dramatic trend of increasing concentrations, with a uniform increase from 0.07 mg/L in January to a concentration of 0.56 mg/L in October. The pattern of increasing zinc concentrations appears to be a textbook case of breakthrough of an attenuated chemical species, and the results to date do not indicate that the rate of increase in concentrations is diminishing. Future monitoring at V15 is critical for understanding retardation factors and evolution of water chemistry downgradient of Grum Dump.

Slightly alkaline waters have been observed over the period of record, with pH values consistently between 7.1 and 8.5 since 2000.

Station V2

Zinc and sulphate concentrations at Station V2 are shown in Figure 3.2 for the entire period of record (1988 through 2006). As indicated in the figure, total and dissolved zinc concentrations were highly variable during mining operations, and runoff and erosion from the Grum Dump led to continued variable and elevated zinc concentrations at V2 during the period from the cessation of mining through 2002. Improved runoff management since 2002 has resulted in total and dissolved zinc concentrations within a much narrower range at V2. Surface flow at V2 has been visually estimated to be about 3 times the volume observed upstream at V15 in recent years, which reflects in part a contribution from seepage losses from the Grum Creek diversion.

In 2006, the range of zinc concentrations at V2 was similar to that observed in 2004 and 2005 (2006 range from below detection (0.005 mg/L) to 0.04 mg/L). The trend of increasing zinc concentrations noted in 2005 appears to be levelling off, although it is unclear at this time why increased dissolved zinc concentrations upstream at V15 (discussed above) have not resulted in similar increases at V2.

Sulphate concentrations at V2 showed a consistent increase from the initial pre-mining period through operations, and this trend continued through mid-2004. This increasing trend in sulphate concentrations at V2 triggered Event #4 of the Adaptive Management Plan on the date of implementation (July 1, 2004). Since mid-2004, sulphate concentrations at V2 have stabilized within a seasonally-variable range of 700 to 1100 mg/L, with the highest observed sulphate concentration to date occurring in January 2006. Future monitoring is required to confirm that sulphate concentrations at V2 have stabilized.

Water at V2 continues to show slightly alkaline pH conditions. Other than the previously-reported sulphate trigger, were no specific thresholds exceeded in 2006 at V2.

Station V2A

Zinc and sulphate concentrations at Station V2A are shown in Figure 3.3 for the entire period of record (1997 through 2006). Sulphate concentrations at V2A show a similar pattern to those at Station V2, with concentrations increasing from 1997 through 2004, and appearing to have stabilized in 2005 and 2006. In 2006, sulphate concentrations at V2A remained within a similar range to those observed in 2004 and 2005 (2006 range 381 to 937 mg/L) with the highest concentrations occurring in July and August.

Zinc concentrations have shown strong season patterns in 2004 through 2006, with the highest 2006 concentrations occurring in April. Zinc concentrations were generally within a range of 0.05 to 2 mg/L over the period of mid-2001 through 2006, with all 2006 values below maximums observed in the previous two years. There is no trend of increasing zinc concentrations over the mid-2001 through 2006 period. The seasonal variability in zinc concentration at V2A has been emphasized by the increase in monitoring frequency since mid-2004.

Water at Station V2A continues to show slightly alkaline pH conditions.

Station V14 and V16

Stations V14 and V16 have been historically monitored on a sporadic basis, from 1989 in the case of V14 and from 1995 in the case of V16; both stations have been consistently monitored since 2004. V14 was originally established to sample seepage present on the Grum Dump Toe Access Road upgradient of Sheep Creek (Figure 2.1). However, historical station location maps also occasionally show V14 to be located on the road downgradient of dump toe seep SRK-GD05, as well as upstream of V15 at the dump toe.

Station V16 is located in the ditch adjacent to the Grum Toe Access Road between V15 and Grum Creek (Figure 2.1), and was initially established in 1995 when water management activities included selective diversion of Grum Creek water to either Moose Pond or to V15, depending on water quality. During September 2004, this station was observed to receive seepage from the adjacent disturbed ground, particular in the area of SRK04-5. No September 2004 sample was collected during routine monitoring. This station also variably receives runoff from the adjacent road.

Zinc and sulphate data for the period of record are shown in Figure 3.4 for Stations V14 and V16. Values for both parameters remain within previously observed ranges. Given the sporadic and uncertain nature of the monitoring, trends in concentration cannot be reliably evaluated. Although sampling of these stations is required by the water licence, the resulting data has questionable value for informing management decisions.

Moose Seep

Moose Seep is located below Moose Pond approximately 25 m upslope from Vangorda Creek just upstream of Grum Creek (Figure 2.1), and has been monitored since Fall 2003. Monitoring frequency increased from twice-yearly to twice-monthly in 2005 as part of the AMP Event #4 Response.

Discontinuous surface flow was observed between natural depressions in the original moss ground cover for approximately 25 m upslope of the sample station and downslope to the edge of Vangorda Creek. No mineral soil was exposed in this vicinity. Minor lime-green algae were present in the sampled pond at the time of initial sampling. Surface flow into the sampled depression has been visually estimated to be about 1 L/minute and was the largest seep identified below Moose Pond during the initial survey.

Zinc and sulphate concentrations at Moose Seep over the period of monitoring are shown in Figure 3.5. Sulphate concentrations have ranged from 166 to 814 mg/L, and observed zinc concentrations have ranged from less than detection (0.005 mg/L) to 0.012 mg/L. Zinc concentrations appear to be somewhat lower in 2006 than were observed in 2005, with 6 of 13 samples collected in 2006 returning zinc concentrations below the detection limit of 0.005 mg/L. Moose Seep had neutral to slightly alkaline pH during all monitoring rounds.

Moose Well

Installation of Moose Well 2 (Figure 2.1) was completed in September 2005, as described in the 2005 AMP Event #4 Report (SRK 2006). Sampling of Moose Well 2 was first carried out on October 3, 2005, and analytical values of 763 mg/L sulphate and 0.0094 mg/L dissolved zinc were reported. Thirteen sampling events from April through October 2006 returned a seasonal pattern of sulphate concentrations, with a low of 313 mg/L observed in April and a maximum value of 926 mg/L in August. Dissolved zinc concentrations did not show a similar seasonal pattern, although the yearly maximum concentration (0.011mg/L) occurred in September. Dissolved zinc and sulphate concentrations over the period of record are shown in Figure 3.5. Field pH was between 7 and 8 during all monitoring rounds.

The seasonal variation in sulphate concentrations in 2006 was similar to the pattern observed upgradient at V2A (the point of Grum Creek discharge into Moose Pond). These similar sulphate concentrations in shallow groundwater and in Grum Creek at V2A support the assumption that infiltration into Moose Pond reports to Vangorda Creek via a diffuse shallow groundwater pathway.

The low zinc concentrations observed at Moose Well 2 (<0.005 to 0.011 mg/L vs. ~0.2 mg/L at V2A in 2006) support the interpretation that zinc loadings from Moose Pond to Vangorda Creek are low, and that significant attenuation is occurring along the seepage pathway between Moose Pond and Moose Well 2. The available information suggests that this attenuation will continue to provide Vangorda Creek with a measure of protection against elevated zinc loadings from Moose Pond over the short term. Ongoing monitoring of Moose Well 2 is required to confirm that concentration of dissolved zinc in shallow groundwater downgradient of Moose Pond remains low.

Station P96-9A and P96-9B/BH05-9B

A single hole was drilled and one shallow (P96-9A) and one deeper piezometer (P96-9B) were installed in 1996 to allow monitoring of groundwater quality adjacent to Tributary A, immediately downstream of the Grum Dump toe access road (Figure 2.1). These wells were intended to monitor the early arrival of oxidation products from the Grum sulphide cell in groundwater, in the same way that V15 was intended to monitor surface seepage.

P96-9B became non-functional in 2001 and no samples have been collected from the deeper well since that time. In 2005, BH05-9B was installed to replace the damaged P96-9B.

Sulphate concentrations in the shallow unconfined aquifer at P96-9A show an increasing trend over the 1996-2001 period (Figure 3.6), and then show a period of stable concentrations with seasonal variations (950 to 1700 mg/L) from 2001 through 2006. Field pHs have varied between 5.9 and 7.7 since installation, and results from 2006 indicate that pH conditions have stabilized in the range of 6.5 to 7.0. Dissolved iron concentrations have been somewhat variable, but remained below 0.08 mg/L since 2001. Zinc concentrations remain low (up to 0.03 mg/L from 1999 through June 2006), but the September 2006 result (0.091 mg/L) was the highest value observed at this station, and was more than triple the dissolved zinc concentrations observed from 1999 through 2005. The September 2006 maximum concentration coincides with the increase in zinc concentrations observed in surface seepage at the upgradient station V15 in 2006, and suggests that a breakthrough in zinc concentrations has begun in the shallow groundwater in this area.

Sulphate concentrations in the deeper confined aquifer (P96-9B), which experienced flowing artesian conditions, were between 100 and 320 mg/L from 1996 through 2001, and were similar in the replacement well BH-05-09B (Figure 3.7). From 1996 through 2001, dissolved iron concentrations varied from 0.01 mg/L to 0.31 mg/L, with the highest concentration measured in the 2001 sample. Dissolved iron values from the replacement well in 2006 were higher, with values ranging from 0.5 to 0.7 mg/L. Dissolved zinc concentrations ranged from below the detection limit of 0.01 mg/L to 0.04 mg/L; samples since 1999 have had dissolved zinc concentrations at or near the detection limit. Dissolved zinc values in 2006 were in a similar range to previous concentrations, with values of 0.005 to 0.007 recorded in spring and fall monitoring. Field pH reported for the 1996 to 2001 period ranged from 7.6 to 8.3 standard pH units, and showed no discernable trend. Field pH values in 2006 were 7.8 and 8.13, suggesting that pH conditions have remained stable in the deeper aquifer at this location.

3.1.2 Grum Dump Toe Seeps

SRK-GD01

SRK-GD01 is located where the main stem of Grum Creek emerges from the toe of Grum Dump (Figure 2.1). During initial surveys, two seeps were identified and separately sampled as SRK-GD01 and SRK-GD02. Review of analytical results showed that both had similar chemistry and were likely from the same source, and monitoring of SRK-GD02 was terminated following 2003 monitoring.

SRK-GD01 represents the largest surface flow identified at the toe of Grum Dump by a wide margin, and is thus considered to be the most important single source of surface flows originating from the dump. Sulphate concentrations have ranged between 1080 and 1630 mg/L over the monitoring period (2002 through 2006), with the highest observed sulphate concentration occurring in May 2006. Dissolved zinc has varied between 2.5 and 17 mg/L over the same period, with peaks during the 2004 and 2005 freshets. Fall zinc concentrations have remained relatively constant (range of 2.5 to 3.7 mg/L) over the monitoring period. In 2006, dissolved zinc concentrations were at the low end of the observed range in both May (3.1 mg/L) and September (2.8 mg/L).

Neutral pH conditions were observed during all sampling rounds. Figure 3.8 shows dissolved zinc and total sulphate at SRK-GD01 over the five year period from 2002 to 2006. Complete results, including data from previous years, are provided in Appendix B1.

SRK-GD05

Stations SRK-GD05 and SRK–GD06 are located at the dump toe directly upgradient of the linear topographic depression shown on Figure 1.1 as No Fork Creek. During initial surveys, two seeps were identified and separately sampled as SRK-GD05 and SRK-GD06. Review of analytical results showed that both had similar chemistry and were likely from the same source. Therefore, monitoring of SRK-GD06 was terminated following 2003 monitoring.

Sulphate and dissolved zinc data for SRK-GD05 are summarized in Figure 3.9. Slightly alkaline pH has been observed at SRK-GD05 during all sampling rounds. Sulphate concentrations ranged from 1080 to 1760 mg/L over the monitoring period, and appear to have stabilized within the range of 1440 to 1760 mg/L since 2004. Zinc concentrations ranged from 1.7 to 5.2 mg/L, with the highest concentrations measured in September 2005; zinc concentrations in both May 2006 (2.3 mg/L) and September 2006 (2.13 mg/L) were at the low end of the previously-observed range. Complete results, including data from previous years, are provided in Appendix B1.

Flows volumes at SRK-GD05 are low compared to Grum Creek flows, but this seep appears to flow continuously and has been sampled during all sampling rounds. Although seepage infiltrates into the ground within a few metres of the dump toe, emergent seepage is observed topographically downgradient in No Fork Creek at station GD05 d/s, with seepage volumes that exceed those observed at the toe on the basis of visual observation and crude field measurements. It is inferred that subsurface flow is more significant than surface flow at SRK-GD05, and that the No Fork Creek drainage is a preferred groundwater flowpath and a potential route for transport of contaminants from Grum Dump to Vangorda Creek. Sampling results from No Fork Creek are discussed in Section 3.1.3 under station GD05 d/s.

SRK-GD16

SRK-GD16 is located at the toe of Grum Dump topographically upgradient from the linear depression shown on Figure 2.1 as Sweet Creek. Flows were observed during only two of ten sampling rounds. Seepage had field pHs ranging from 7.3 to 7.5, sulphate concentrations of 1680 to 2090 mg/L, and dissolved zinc concentrations of 10.8 to 60 mg/L. The high zinc sample was collected in May 2005, and represents the highest zinc concentration observed from any external toe seep from Grum Dump. Complete results, including data from previous years, are provided in Appendix B1.

During geotechnical investigations in 2003, a 4 m test pit was excavated adjacent to the Grum Dump Toe Access Road (SRK, 2004c) at a location immediately downgradient of SRK-GD16. The pit was sited in a gentle topographic swale that is the upstream extension of the linear depression occupied by Sweet Creek. Although no surface flow was observed at SRK-GD16 at the time, heavy seepage into the test pit was observed at a depth of 3 m. The observed seepage flow rate was sufficient to cause destabilization and collapse of the test pit walls, and indicated that subsurface flow was likely occurring upgradient of Sweet Creek.

A monitoring well (SRK05-07) was installed adjacent to the Grum Dump Toe Access Road in August 2005, near the test pit location described above (Figure 2.1). Monitoring results from this well are discussed in Section 3.1.4.

SRK-GD04 and SRK-GD21

SRK-GD04 and SRK-GD21 are located immediately upgradient of V15 and Tributary A (Figure 2.1) at a minor topographic low along the dump toe. Surface flow in this area was observed during only 5 of 10 sampling rounds. Sulphate concentrations ranged from 1350 to 2170 mg/L, zinc concentrations ranged from 1.8 to 3.7 mg/L, and pH ranged from 7.1 to 7.9 standard pH units. A sample was collected in May 2006 which had the highest recorded field pH (7.9), and which returned a sulphate concentration (1670 mg/L) at the low end of the previously-observed range and a zinc concentration (3.42 mg/L) at the high end of the previously-observed range. Complete results, including data from previous years, are provided in Appendix B1.

3.1.3 Downgradient Pathways Survey

GD05 d/s

Station GD05 d/s is located in the linear depression topographically downgradient from the toe seep station SRK-GD05 (Figure 2.1), which was discussed in Section 3.1.2. This station, which is located at the downstream limit of surface flow, was previously sampled by SRK in 2003, 2004, and 2005. The bed of the flow was original ground (moss and vegetation), with minor hard tan precipitate observed on the moss.

Seepage at GD05 d/s had field pHs ranging from of 6.9 to 8.0, sulphate concentrations of 972 to 1360 mg/L. Dissolved zinc concentrations were <0.005 mg/L during all seven monitoring rounds from 2003 through 2006. Figure 3.10 shows dissolved zinc and total sulphate concentrations over the monitoring period at GD05 d/s; sulphate concentrations remained within a stable range from September 2004 through 2006, similar to the trend observed in the upgradient dump toe seep at SRK-GD05. Complete results are provided in Appendix B2.

Sweet Creek

Sweet Creek was sampled in September 2004, and in both May and September 2005 and 2006, at a sampling station 20 metres above the confluence with Vangorda Creek (Figure 2.1). This station is downgradient of dump toe seepage station SRK-GD16, as discussed in Section 3.1.2. At this location a small inactive fan has formed at the mouth of the steep Sweet Creek drainage within the incised Vangorda Creek valley. This fan may provide a subsurface flow path to Vangorda Creek. Surface flow volumes have been estimated by the bucket-and-stopwatch method to be approximately 40 to 90 L/min. The stream bed at this location was covered with moss or vegetation, which itself was coated with a hard tan to orangey tan precipitate crust.

aquifer are lower than observed in the shallow unconfined aquifer. However, the strong upward gradient observed at these wells indicates that contaminants from the shallow unconfined aquifer cannot migrate advectively to the deeper (confined) aquifer, and therefore will not degrade the deeper aquifer at this location.

SRK05-05c

Installation of SRK05-05c was completed in August, 2005, as described in the 2005 AMP Event #4 Report (SRK 2006). Water quality at SRK05-05c was monitored in November 2005, and again in September 2006. Sulphate concentration was 173 and 387 mg/L, respectively, and dissolved zinc concentration was below the detection limit of 0.005 mg/L for November 2005. No dissolved zinc result was available for the September 2006 monitoring round.

Although Grum Creek is within 10 m of SRK05-05c and is slightly topographically upgradient, the much higher sulphate concentrations in the creek (~900 mg/L at V2A) suggest that the shallow groundwater at SRK05-05c has a significant component of the flow that originates from some other source. Sulphate concentrations at V15 (which is located in a topographic low which receives seepage directly from Grum Dump) are much higher than at SRK05-05c, suggesting a local runoff source for most of the shallow groundwater at SRK05-05c. As the adjacent wells SRK04-05a and –b are screened in a confined, artesian aquifer, it is possible that the shallow groundwater at SRK05-05c is sourced from the underlying hydrostratigraphic unit. The preceding section discusses the water quality in these deeper artesian wells.

SRK05-07

SRK05-07 was installed in shallow bedrock on the south side of the Grum Dump Toe Access Road, downgradient of the dump toe seep location SRK-GD16 and upgradient of the Sweet Creek sample station (Figure 2.1). Seep SRK-GD16 has been intermittently observed and sampled as a surface flow, as discussed in Section 3.1.2. In 2003, a test pit excavated on the upgradient (north) side of the road showed water inflow to the pit at a depth of approximately 3 m (SRK 2004c). The drill log and installation details for SRK05-07 are included in the 2005 AMP Event #4 Report (SRK 2006).

Monitoring of SRK05-07 in September 2006 showed that sulphate concentrations were 1080 mg/L at the time of monitoring, and that dissolved zinc concentrations were <0.025 mg/L. Field pH was 7.8. These conditions are similar to those observed in shallow groundwater at P96-9A, which is located 625 m to the northeast.

SRK05-08

SRK05-08 was installed in shallow bedrock on the south side of the Grum Dump Toe Access Road, at the intersection of the road and a ridge that runs perpendicular from the dump toe to Vangorda Creek (Figure 2.1). This ridge forms a surface water divide, and the location was selected to assess whether groundwater flow mimicked surface patterns, and whether an effective capture system could be developed with wells in the topographic lows exclusively. The drill log and installation details for SRK05-08 are included in the 2005 AMP Event #4 Report (SRK 2006).

Monitoring of SRK05-08 in June and September 2006 showed sulphate concentrations ranging from 458 to 494 mg/L, and dissolved zinc concentrations ranging from 0.0092 to 0.052 mg/L. Field pH was 7.8 to 7.9 The observed water chemistry demonstrates that weathering products from the Grum Dump are likely present at SRK05-08; an analysis of hydrogeological conditions is required to assess whether water from this location could be effectively captured by wells located in the adjacent topographic lows.

3.2 Grum Creek Discharge Monitoring

Flow monitoring at the Grum Creek weir did not capture peak freshet flows in 2006, due to timing of re-installation of the monitoring instrument. Freshet flows in 2007 should be captured, as the instrument installed in 2006 was not removed in the fall, and thus will be in place to record freshet water levels. Summer base flow in Grum Creek, for the period of August through September, appeared to be around 1 L/s, which is less than indicated by 2005 monitoring. Raw data and corrected flow volumes are shown in Figure 3.13. At present, it is not clear whether the apparent difference in flow conditions between 2005 and 2006 is representative, or whether the difference is an artifact of changing monitoring systems. Investigations in 2007 will be carried out to reconcile 2005 and 2006 flow records.

The 2006 measurements of Grum Creek discharge are somewhat lower than estimates of runoff from the upgradient catchment that were incorporated into the water and load balance (average annual runoff at Moose Seep estimated to be 7.4 L/s- SRK 2005). The discharge data will be used to calibrate the runoff model at a later date, along with precipitation records from the station installed on the Grum Dump near toe seep station SRK-GD01, when revisions to the Grum Dump water and load balance are required.

4 Summary and Conclusions

4.1 Final Implementation of AMP Event #4 Response Plan

The final components of the AMP Response Plan were implemented in 2005. The following summary addresses the points raised in "*Section 6: Recommendation and Commitments for Further Action*", in the 2005 AMP Event #4 Status Report (SRK 2006), and the actions taken in 2006 to address these commitments.

Recommendation #1: Continue monitoring of surface and groundwater

Response actions in 2006:

- Continued monitoring at stations V15, V2, V2a, Moose Seep, and Moose Well 2 twice-monthly as flow conditions permitted.
- Reviewed monitoring data and included monitoring results as part of the regular monthly report to the Water Board.

Recommendation #2: Implement collection and transfer of water to Vangorda Pit if zinc concentrations exceed acceptable levels at station V2, at Moose Seep, or at Moose Well 2

Response actions in 2006:

- Monitored the water quality stations discussed above. Monitoring results showed that all drainage from Grum Dump was fit for discharge; no collection and transfer of water was necessary.

Recommendation #3: Monitor potential contaminant pathways downgradient of Grum Dump at stations that are not part of the routine monitoring network

Response actions in 2006:

- Carried out May and September monitoring of both Grum Dump toe seeps and previously-identified downgradient stations between Grum Dump and Vangorda Creek.

Recommendation #4: Re-install flow monitoring instrumentation at the Grum Creek weir for the open-water period of 2006

Response actions in 2006:

- Re-installed and monitored Grum Creek discharge monitoring instrumentation. Retrieved monitoring data during September 2006 monitoring activities.

Recommendation #4: Review monitoring data on an ongoing basis and report Reference Water Quality Station monitoring data in the regular monthly report to the Water Board

Response actions in 2006:

- Reported results of 2006 monitoring activities to Water Board in regular monthly report.
- Prepared this report to document 2006 Response activities in detail.

4.2 Water Quality Monitoring Results

Water quality at Station V2 continues to show that sulphate concentrations continue to exceed the initial trigger established in the AMP. There were no additional triggers beyond that identified for sulphate in 2004, and zinc concentrations did not show the same increasing trend observed for sulphate.

Results of 2006 dump toe seepage surveys indicate that zinc concentrations in dump seepage may be stabilizing, with dissolved zinc concentrations at all toe seepage stations within the previously-observed ranges. In particular, zinc concentrations in Grum Creek (the largest discharge from Grum Dump) in 2006 were within the previously observed range.

Downgradient monitoring stations east of V2 below Moose Pond and west of V2 near Vangorda Creek show similar elevated sulphate concentrations, but zinc concentrations are typically at or near detection levels (0.005 mg/L). The monitoring data thus shows that zinc loading from Grum Dump to Vangorda Creek continues to be minimal (~5 kg/yr, as estimated from the water and load balance) and that significant attenuation is occurring along surface and shallow subsurface flowpaths.

However, the dramatic and consistent rise in dissolved zinc concentration observed at V15 in 2006 is noteworthy. The data appear to show a classic case of breakthrough of attenuated chemical species, and the results reviewed to date do not suggest that the breakthrough process has run its course. It is reasonable to expect to see some measure of continued increase in zinc concentrations at V15, and that increases at V15 will lead to an increase in zinc concentrations observed at V2.

Diversion of water from station V15 to station V2A via the Grum Creek diversion would reduce zinc load that reports to station V2. As the most recent monitoring results from V15 indicate that Grum Creek (measured at V2A) has similar zinc concentrations and higher flow volumes, this diversion would not cause zinc concentrations in Grum Creek to increase beyond the range observed over the 2004 to 2006 period. This diversion of water from V15 to V2A would take advantage of the attenuation that has been observed to occur between Moose Pond and Vangorda Creek during that period.

5 Recommendations

The following points summarize recommendations for continued monitoring of water quality downgradient of Grum Dump, and for implementation of additional water management if zinc concentrations exceed acceptable levels.

1. Continue monitoring Reference Water Quality Stations, as required under the AMP, by site environmental staff on a twice-monthly basis.

2. Implement transfer of water from station V15 to station V2A in 2007, via Grum Creek diversion, as a pro-active short-term mitigation strategy to minimize zinc concentrations at station V2 until a final closure plan can be implemented.

3. Implement collection and transfer of water to Vangorda Pit if zinc concentrations exceed acceptable levels at station V2, at Moose Seep, or at Moose Well.

    a. In the absence of site specific water quality objectives, the discharge water quality criteria of 0.5 mg/L zinc will be used as an interim threshold for implementation of water collection activities. Surface water collection and transfer would be implemented if three consecutive samples either at Station V2, at Moose Seep, or at Moose Well 2 exceed 0.5 mg/L zinc.

    b. Once a site-specific water quality objective has been developed for Vangorda Creek, the threshold for implementation of contingency measures should be re-evaluated to ensure that loading from this flow pathway is within acceptable limits.

    c. In the event that the interim threshold is exceeded, notification will be sent to the Water Board within 30 days.

4. Continue Spring/ Fall downgradient pathway and dump toe seepage surveys.

5. Continue monitoring and maintenance of Grum Creek weir flow-monitoring instrumentation.

6. Review monitoring data on an ongoing basis. Results of the Reference Water Quality Station monitoring data should continue to be included as part of the regular monthly report to the Water Board.

7. Summarize the 2007 monitoring results in the AMP annual report prepared by GLL. There will be no stand-alone Event #4 Status Report prepared for 2007 unless water quality thresholds are exceeded that necessitate additional management response.

This report, **"2006 AMP Event #4 Response: Status Report"**, has been prepared by SRK Consulting (Canada) Inc.

Prepared by:

Dylan MacGregor, GIT (BC)

Reviewed by:

Peter Healey, P.Eng.

References

Gartner Lee Limited 2004. Anvil Range Mine Adaptive Management Plan Implementation Protocol, June 25, 2004. Report # GLL 40302.

Gartner Lee Limited 2006. Anvil Range Mine Adaptive Management Plan Annual Review for 2005 - Draft. Prepared for Deloitte & Touche, February 2006.

SRK Consulting 2004a. Letter to Tony Polyck, Manager: Water Inspections Section, Department of Environment, Government of Yukon, RE: AMP Event #4, Seepage Water Quality from Grum Rock Dump, Anvil Range Mine, Yukon. July 15, 2004.

SRK Consulting 2004b. Letter to Tony Polyck, Manager: Water Inspections Section, Department of Environment, Government of Yukon, RE: AMP Event #4, Seepage Water Quality from Grum Rock Dump, Anvil Range Mine, Yukon. August 16, 2004.

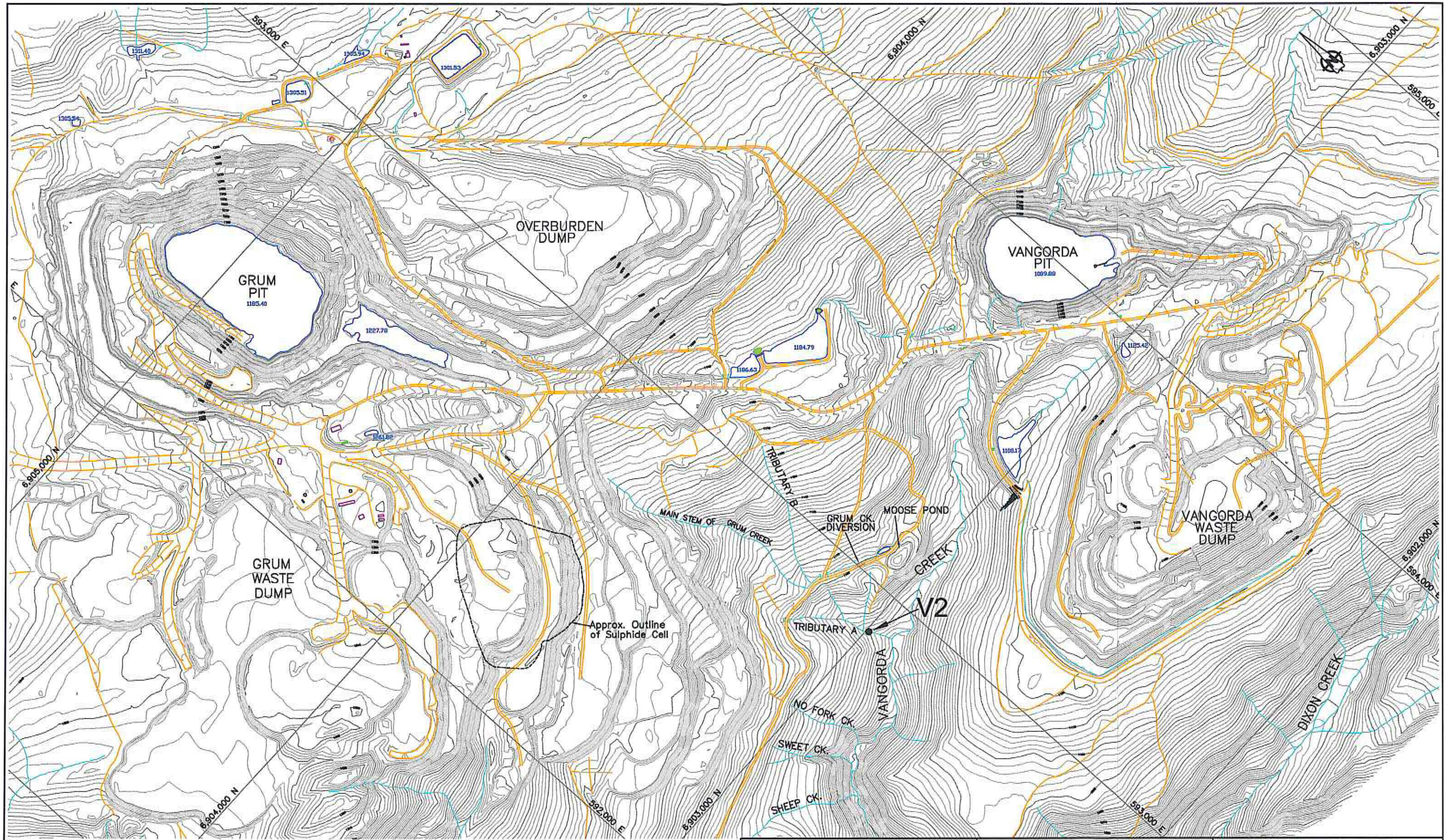
SRK Consulting 2004c. Design Options for Seepage Collection- Grum Rock Dump. Prepared for Deloitte & Touche, June 2004.

SRK Consulting 2005. AMP Event #4: Status Report. Prepared for Deloitte & Touche, May 2005.

SRK Consulting, 2006. AMP Event #4 Response: 2005 Status Report. Prepared for Deloitte & Touche, October 2006.

SRK Consulting, in progress. 2006 Waste Rock and Seepage Monitoring Report. In preparation for Deloitte & Touche, on behalf of the Faro Mine Closure Planning Office.

Figures



Date of Photography: 2003/07/25
Scale of Photography: 1:20000
Survey control derived from existing 1:20000 photography
Survey control based on: UTM Projection, NAD27
Compiled by The ORTHOSHOP, Calgary, September 2003
WO 8856

Note 1:
Sulphide cell outline from as-built drawing, Feb. 1996, as reported in Figure 1, Anvil Range Mining Corporation, May 1996.

0 100 200 300 400 500 Metres
1:10,000

SRK Consulting
Engineers and Scientists

SRK JOB NO.: 1CD003.082
Acad-Vangorda-Grum\Acad-2006\ site_plan_2006.dwg

Deloitte & Touche

Anvil Range Mining Complex

2006 AMP Event #4 Response: Status Report

Site Plan

DATE:	APPROVED:	FIGURE:
Jan. 2007	D.B.M.	1.1

Legend

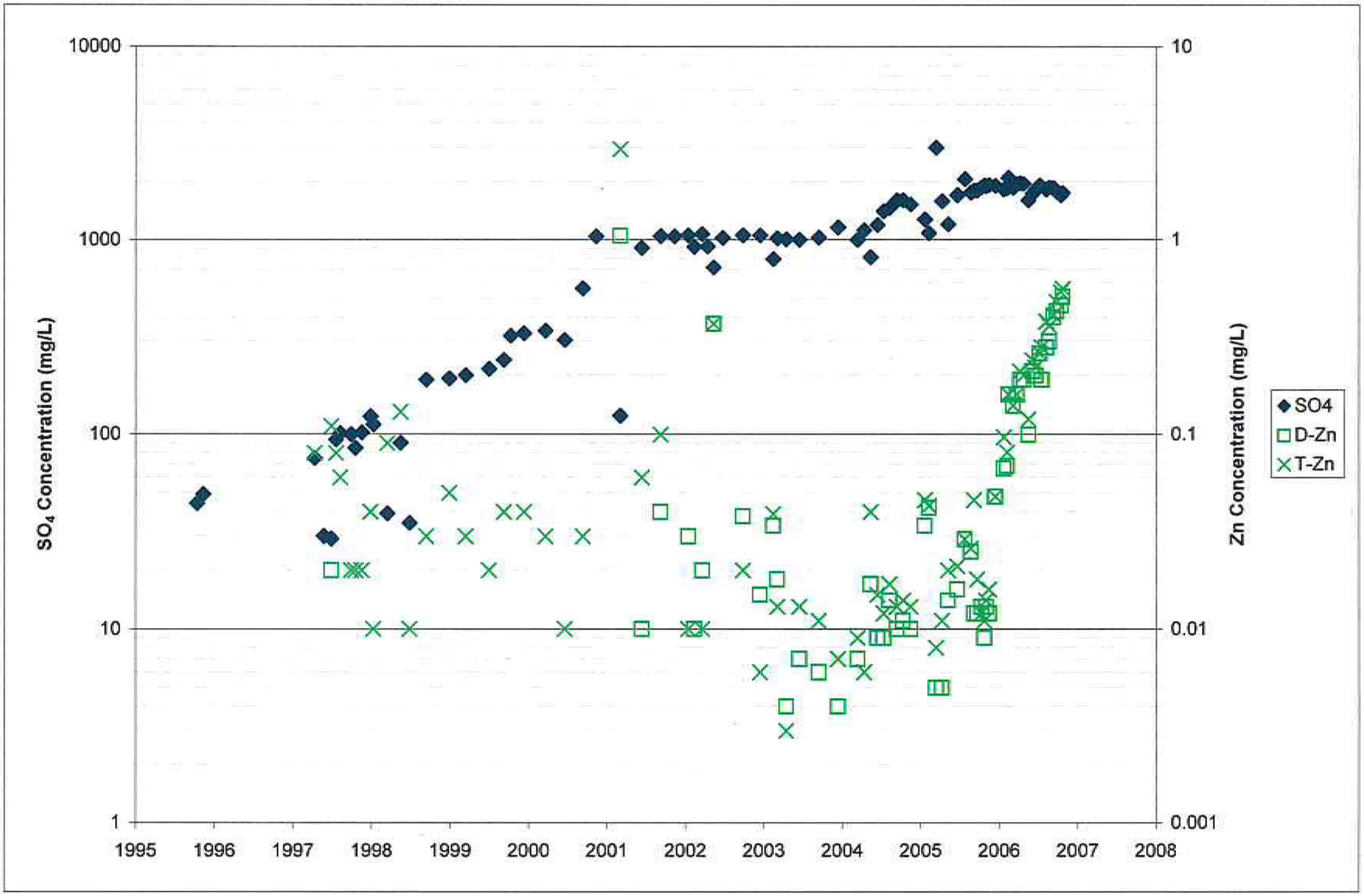
- Reference Water Quality Stations
- Dump Toe Seeps
- Downgradient Monitoring Stations
- Groundwater Monitoring Well

Note 1:
Sulphide cell outline from as-built drawing, Feb. 1996, as reported in Figure 1, Anvil Range Mining Corporation, May 1996.

0 50 100 150 200 250 300 Metres
Scale 1:5000

Date of Photography: 03/07/25
Scale of Photography: 1:20000
Survey control derived from existing 1:20000 photography
Survey control based on: UTM Projection, NAD27
Compiled by The ORTHOSHOP, Calgary, September 2003
WO 8858

SRK Consulting Engineers and Scientists Vancouver	Deloitte & Touche	2006 AMP Event #4 Response: Status Report
SRK JOB NO.: 1CD003.082	Anvil Range Mining Complex	2006 Borehole and Water Sampling Stations
Acad-Vangorda-Grum\Acad-2006\site_plan_2006-Photo.dwg		DATE: Jan. 2007 · APPROVED: D.B.M. · FIGURE: 2.1



Note: Dissolved zinc concentrations are plotted at the detection limit where values were reported as less than detection.

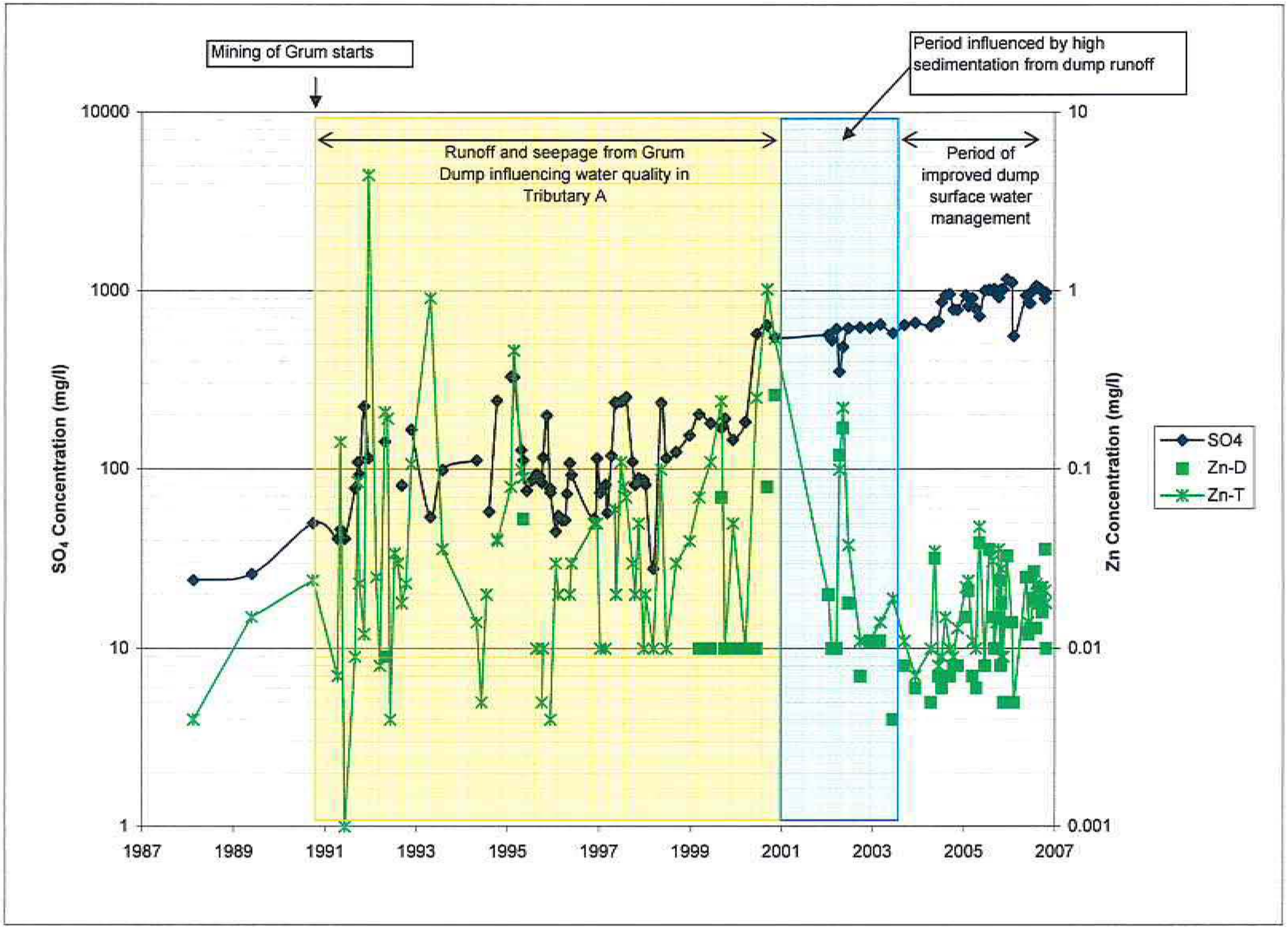
SRK Consulting
Engineers and Scientists

DELOITTE & TOUCHE INC.

2006 AMP Event #4 Response:
Status Report

Zinc and Sulphate Concentrations at V15

PROJECT	DATE	APPROVED	FIGURE
1CD003.082	January 2007		3.1



Note: Dissolved zinc concentrations are plotted at the detection limit where values were reported as less than detection.

SRK Consulting
Engineers and Scientists

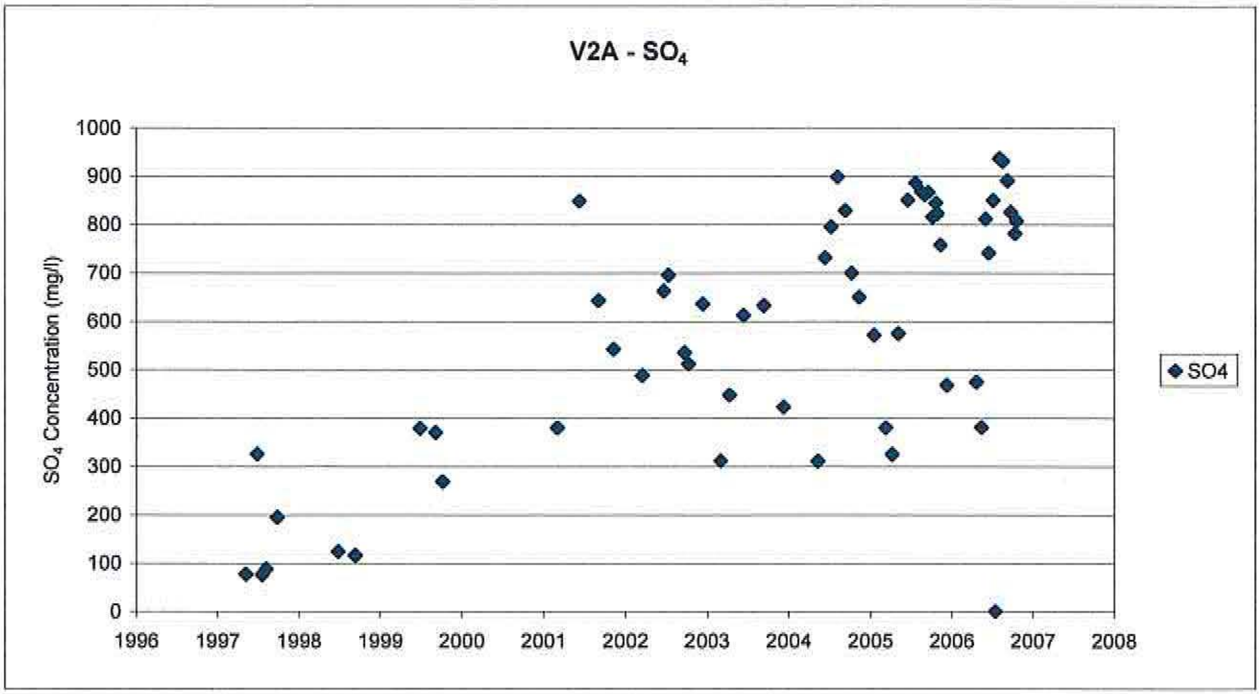
DELOITTE & TOUCHE INC.

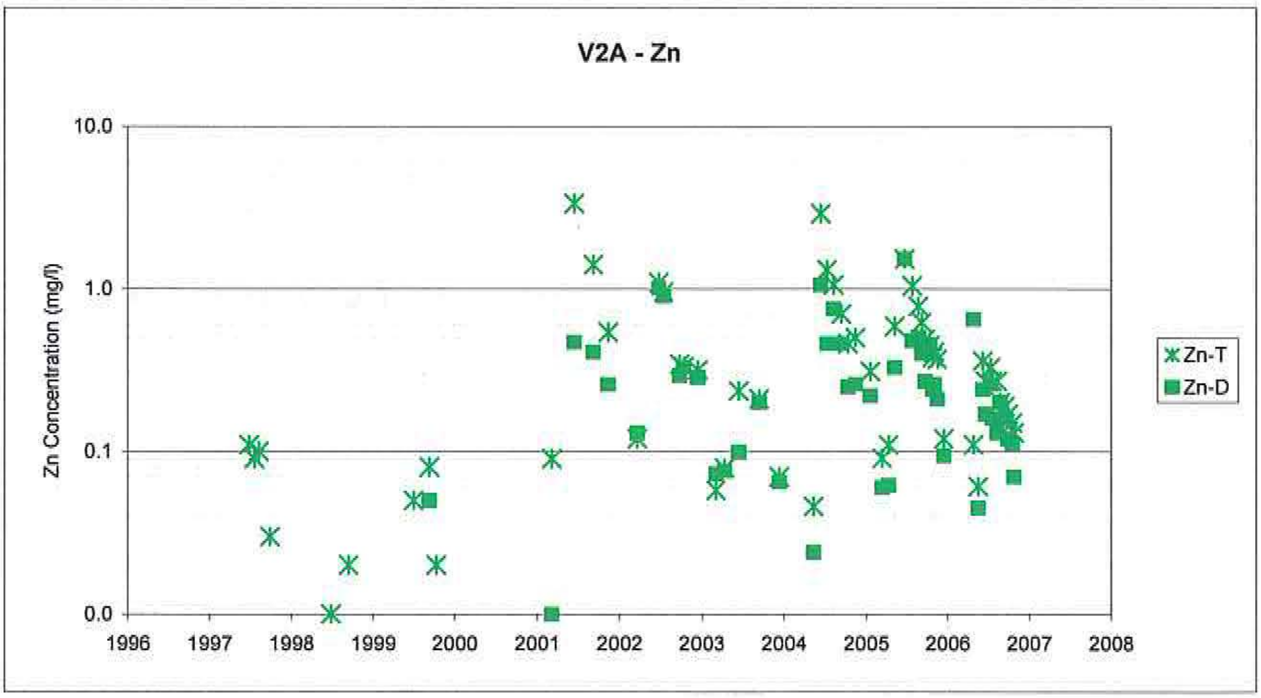
2006 AMP Event #4 Response: Status Report

Zinc and Sulphate Concentrations at V2

PROJECT	DATE	APPROVED	FIGURE
1CD003.082	January 2007		3.2

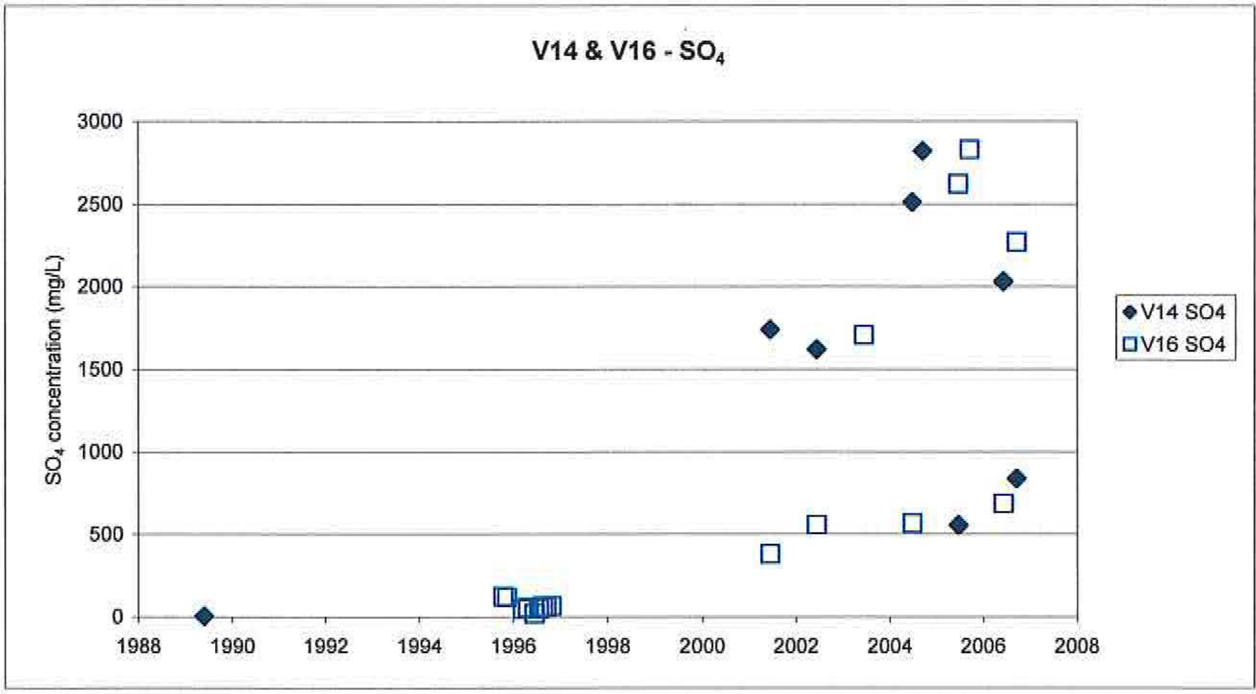
2006 AMP Water Quality Figures.xls

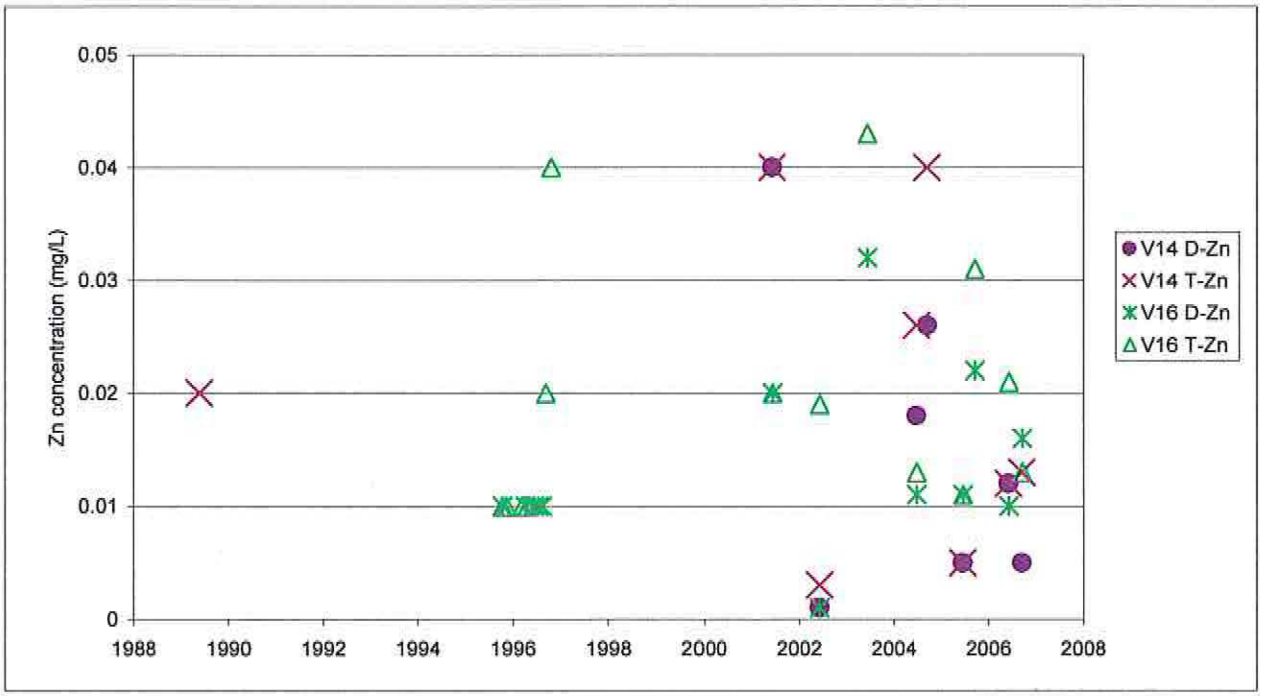




Note: Dissolved zinc concentrations are plotted at the detection limit where values were reported as less than detection.

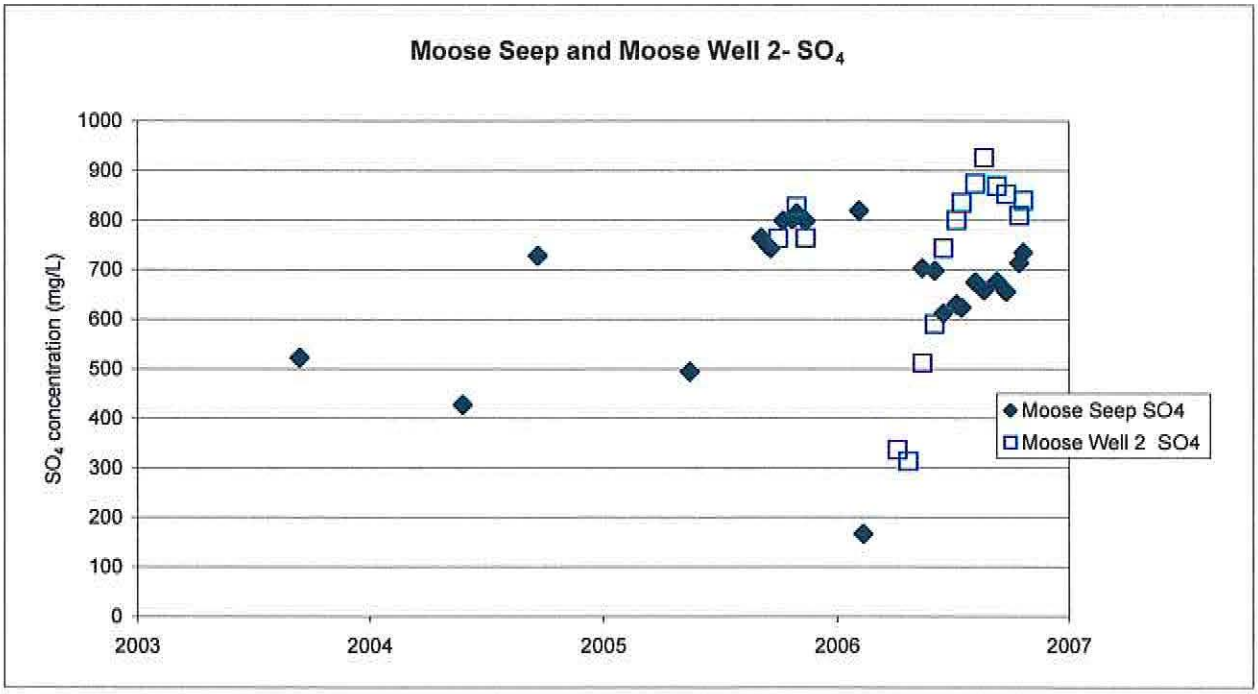
SRK Consulting Engineers and Scientists	2006 AMP Event #4 Response: Status Report			
	Zinc and Sulphate Concentrations at V2A			
DELOITTE & TOUCHE INC.	Project 1CD003.082	Date Jan-07	Approved	Figure 3.3

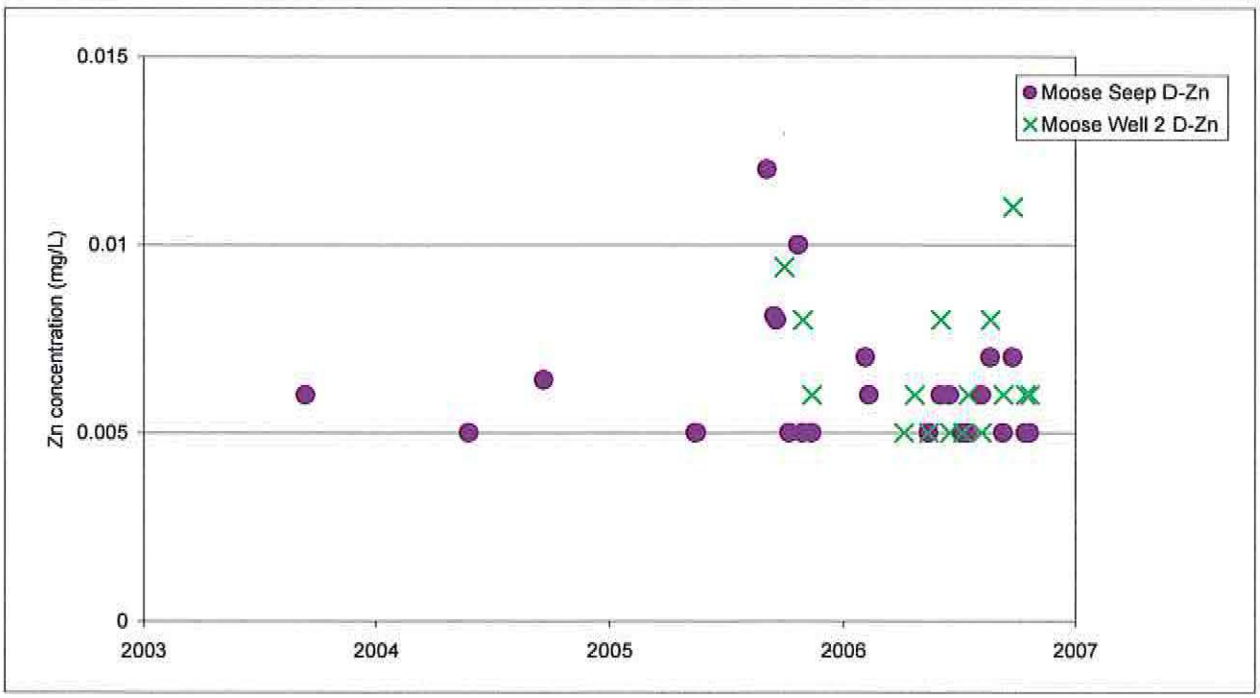




Note: Dissolved zinc concentrations are plotted at the detection limit where values were reported as less than detection.

SRK Consulting — Engineers and Scientists	2006 AMP Event #4 Response: Status Report			
	Zinc and Sulphate Concentrations at V14 and V16			
DELOITTE & TOUCHE INC.	Project	Date	Approved	Figure
	1CD003.082	Jan-07		3.4

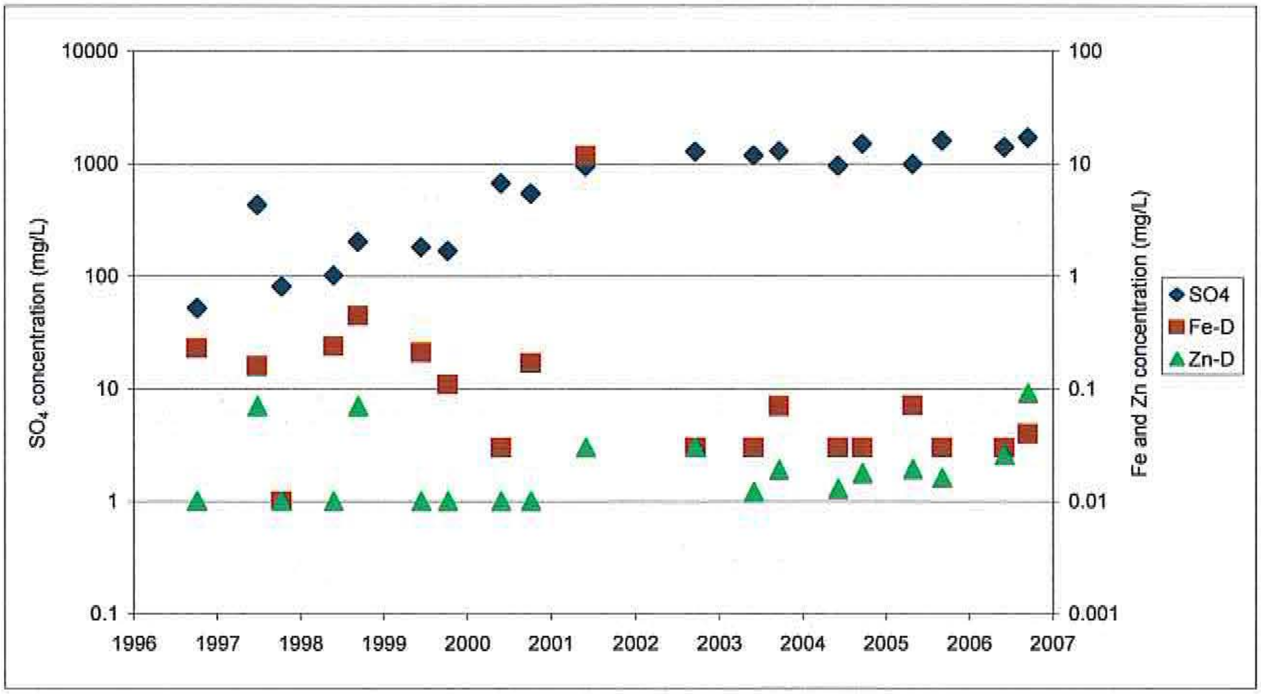


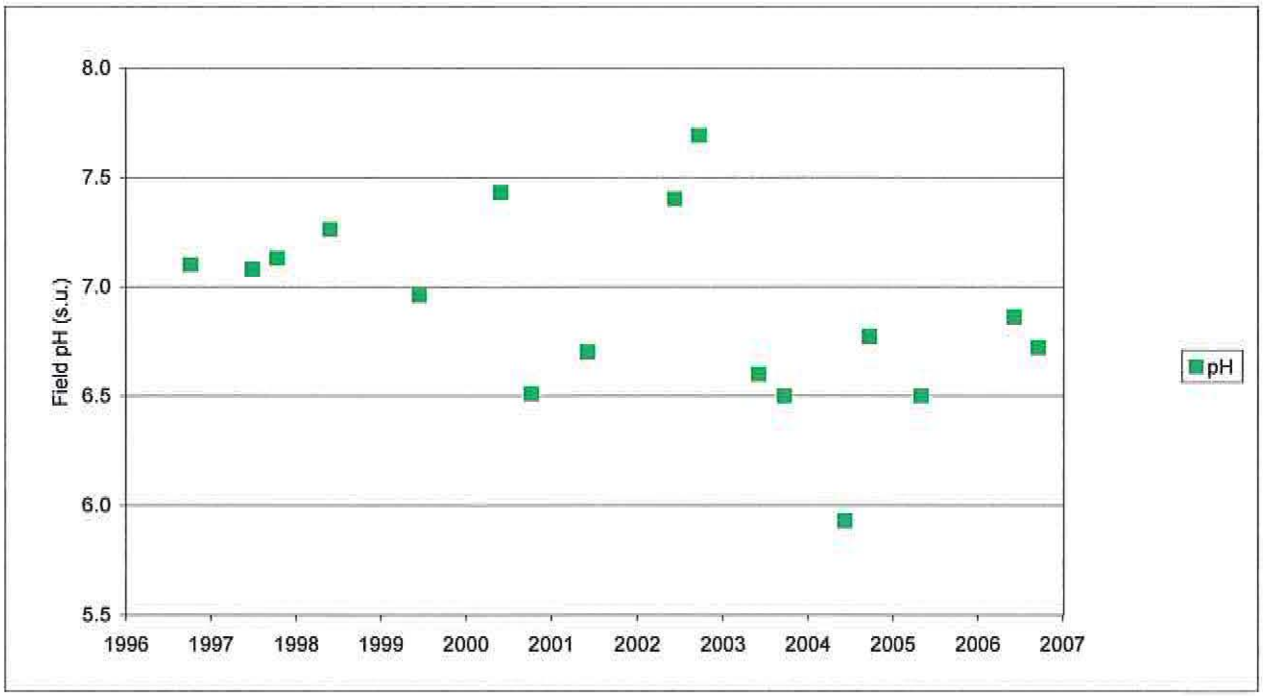


Note: Dissolved zinc concentrations are plotted at the detection limit where values were reported as less than detection (0.005 mg/L).

SRK Consulting *Engineers and Scientists*	2006 AMP Event #4 Response: Status Report
DELOITTE & TOUCHE INC.	Zinc and Sulphate Concentrations at Moose Seep and Moose Well 2

Project	Date	Approved	Figure
1CD003.082	Jan-07		3.5





Note: Dissolved zinc concentrations are plotted at the detection limit where values were reported as less than detection.

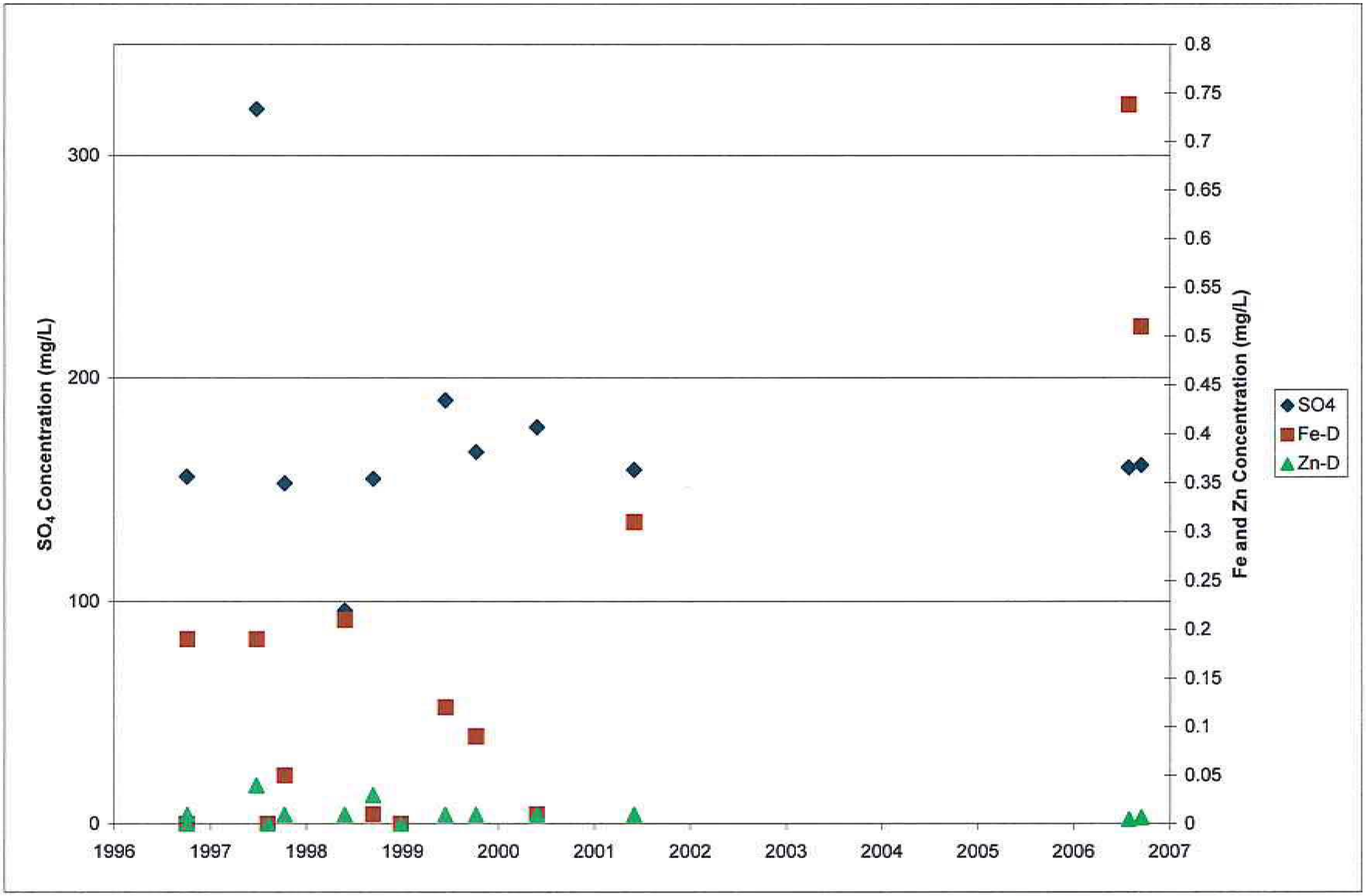
SRK Consulting
Engineers and Scientists

DELOITTE & TOUCHE INC.

2006 AMP Event #4 Response: Status Report

Zinc, Iron, and Sulphate Concentrations, and Field pH at P96-9a

Project	Date	Approved	Figure
1CD003.082	Jan-07		**3.6**



Note: Dissolved zinc concentrations are plotted at the detection limit where values were reported as less than detection.

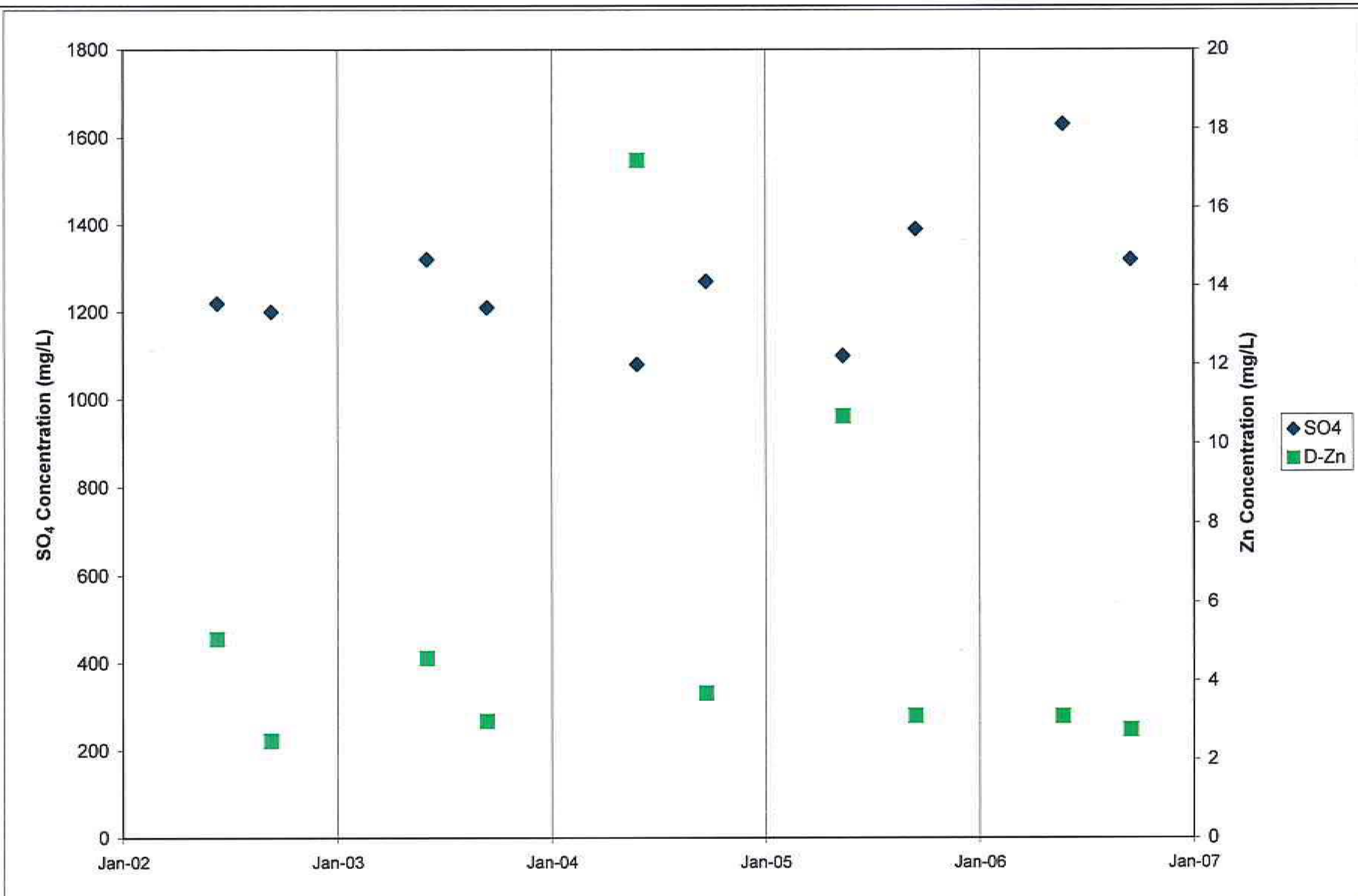
SRK Consulting
Engineers and Scientists

DELOITTE & TOUCHE INC.

2006 AMP Event #4 Response: Status Report

Zinc, Iron, and Sulphate Concentrations at P96-9B/BH05-9b

PROJECT	DATE	APPROVED	FIGURE
1CD003.082	January 2007		3.7



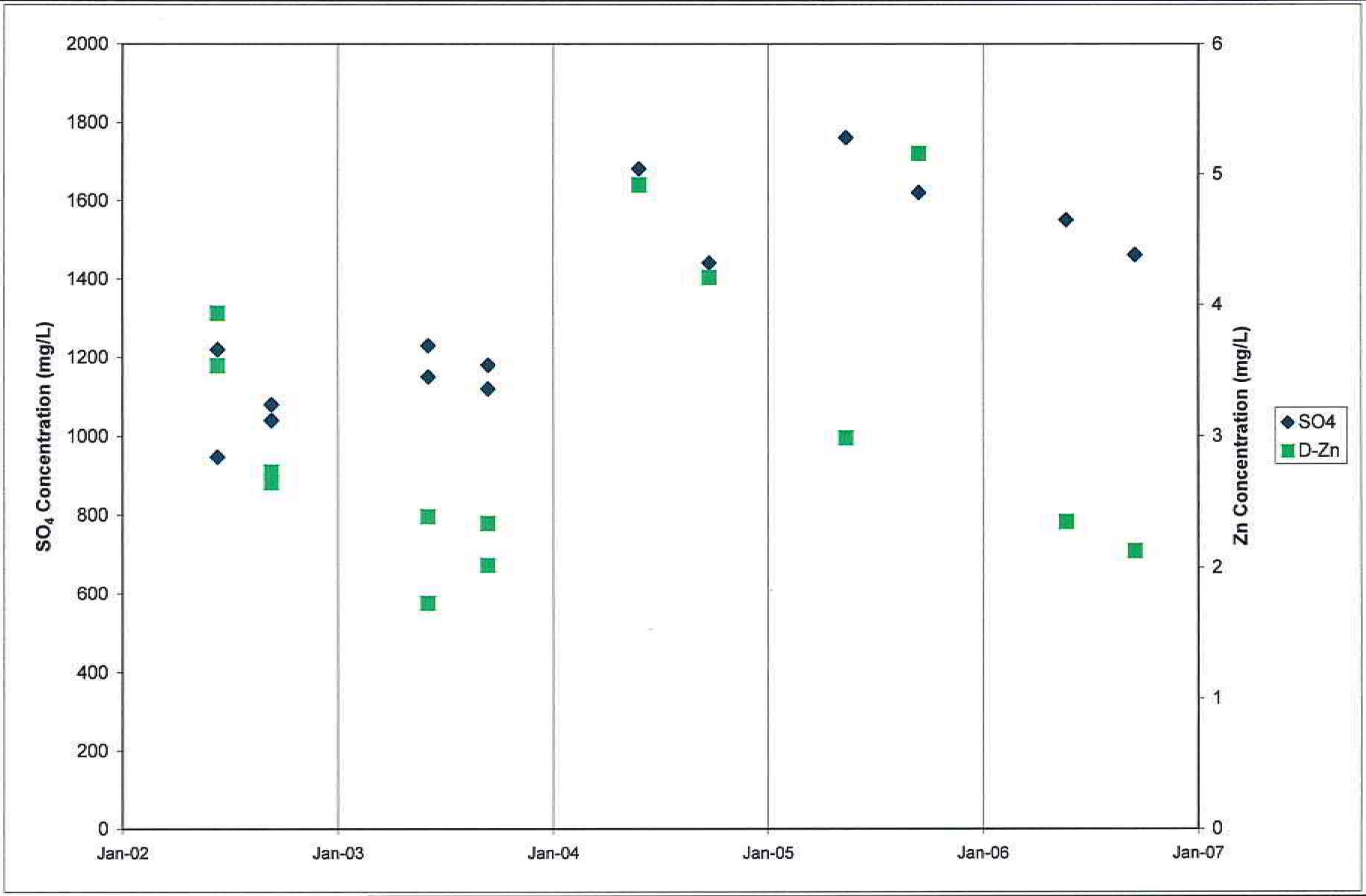
SRK Consulting
Engineers and Scientists

DELOITTE & TOUCHE INC.

2006 AMP Event #4 Response:
Status Report

Zinc and Sulphate Concentrations at SRK-GD01

PROJECT	DATE	APPROVED	FIGURE
1CD003.082	January 2007		3.8



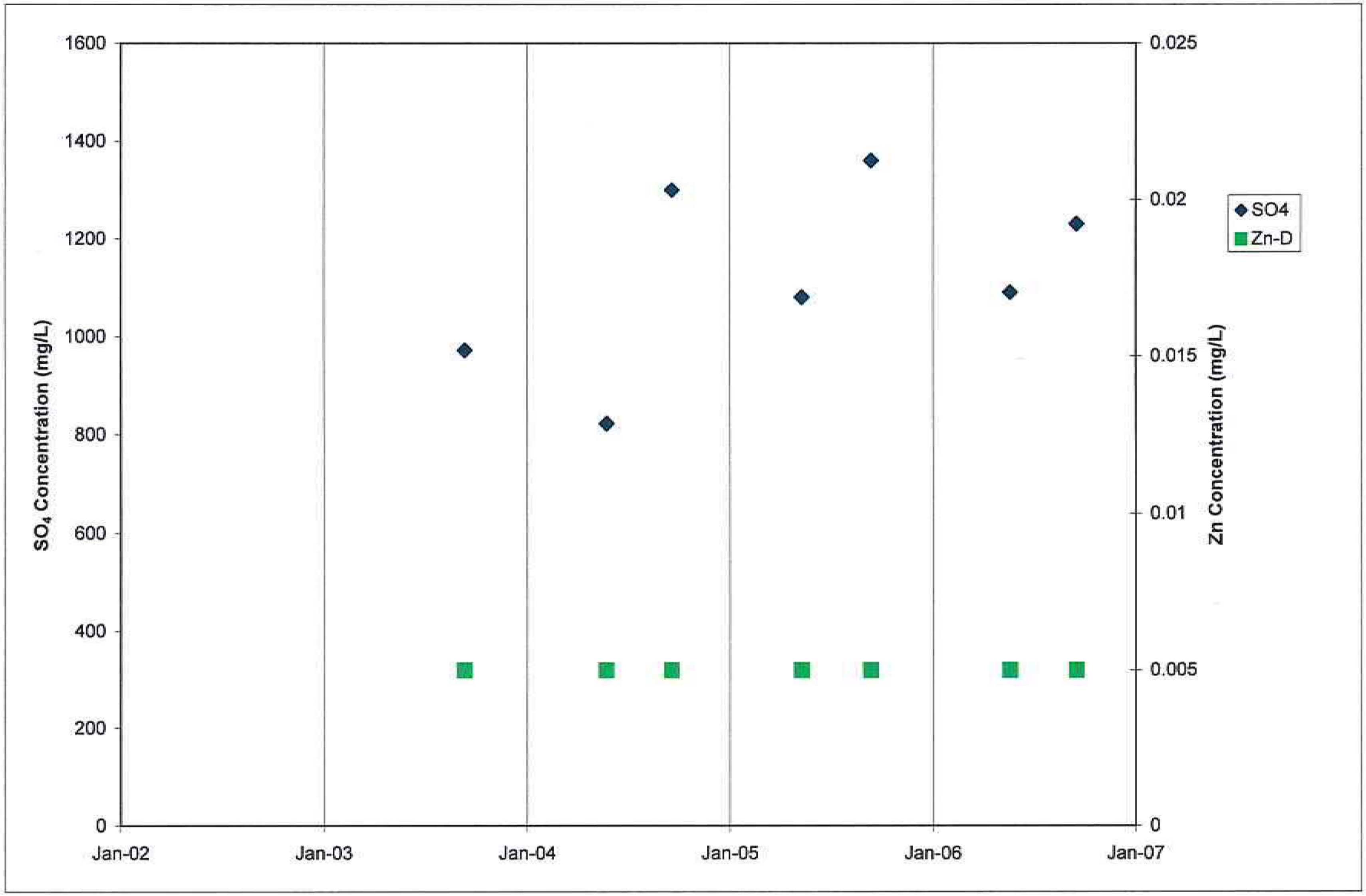
SRK Consulting
Engineers and Scientists

DELOITTE & TOUCHE INC.

2006 AMP Event #4 Response:
Status Report

Zinc and Sulphate Concentrations
at SRK-GD05 and -GD06

PROJECT	DATE	APPROVED	FIGURE
1CD003.082	January 2007		3.9



Note: Dissolved zinc concentrations are plotted at the detection limit where values were reported as less than detection.

Detection Limit = 0.005 mg/L Zn

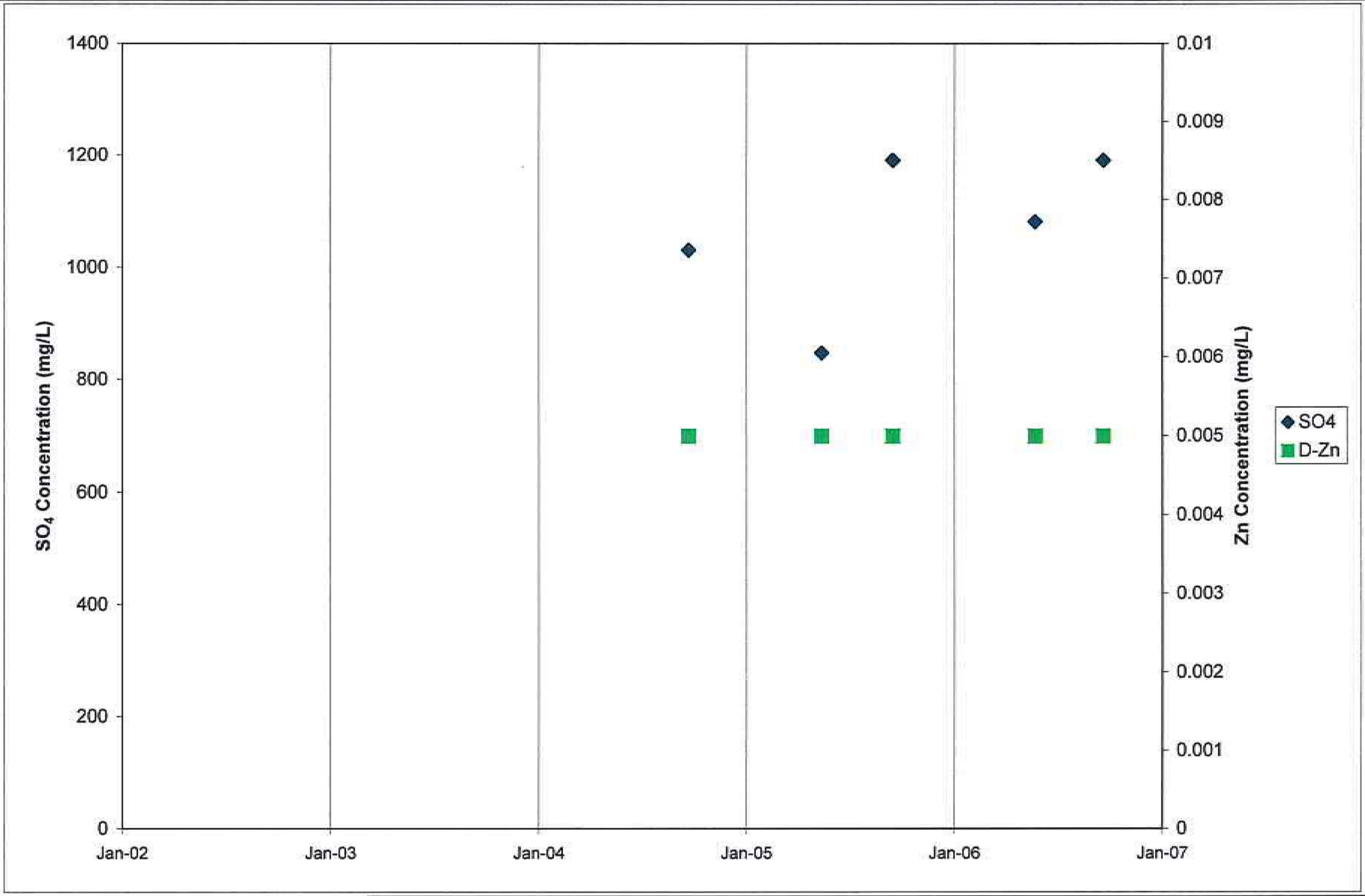
SRK Consulting
Engineers and Scientists

DELOITTE & TOUCHE INC.

2006 AMP Event #4 Response:
Status Report

Zinc and Sulphate Concentrations at GD05 d/s

PROJECT	DATE	APPROVED	FIGURE
1CD003.082	January 2007		**3.10**



Note: Dissolved zinc concentrations are plotted at the detection limit where values were reported as less than detection.

Detection Limit = 0.005 mg/L Zn

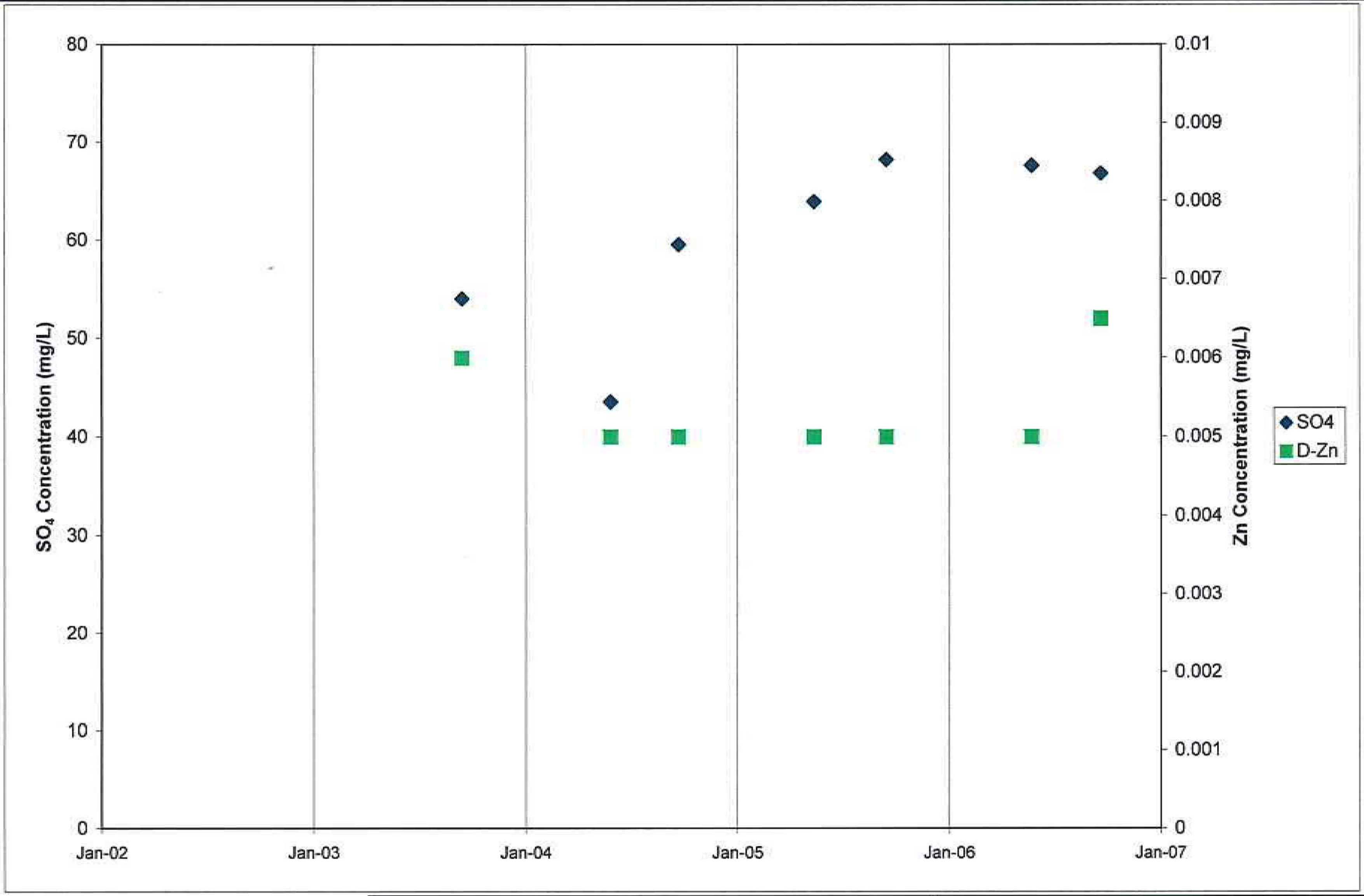
SRK Consulting
Engineers and Scientists

DELOITTE & TOUCHE INC.

2006 AMP Event #4 Response: Status Report

Zinc and Sulphate Concentrations at Sweet Creek

PROJECT	DATE	APPROVED	FIGURE
1CD003.082	January 2007		3.11



Note: Dissolved zinc concentrations are plotted at the detection limit where values were reported as less than detection.

Detection Limit = 0.005 mg/L Zn

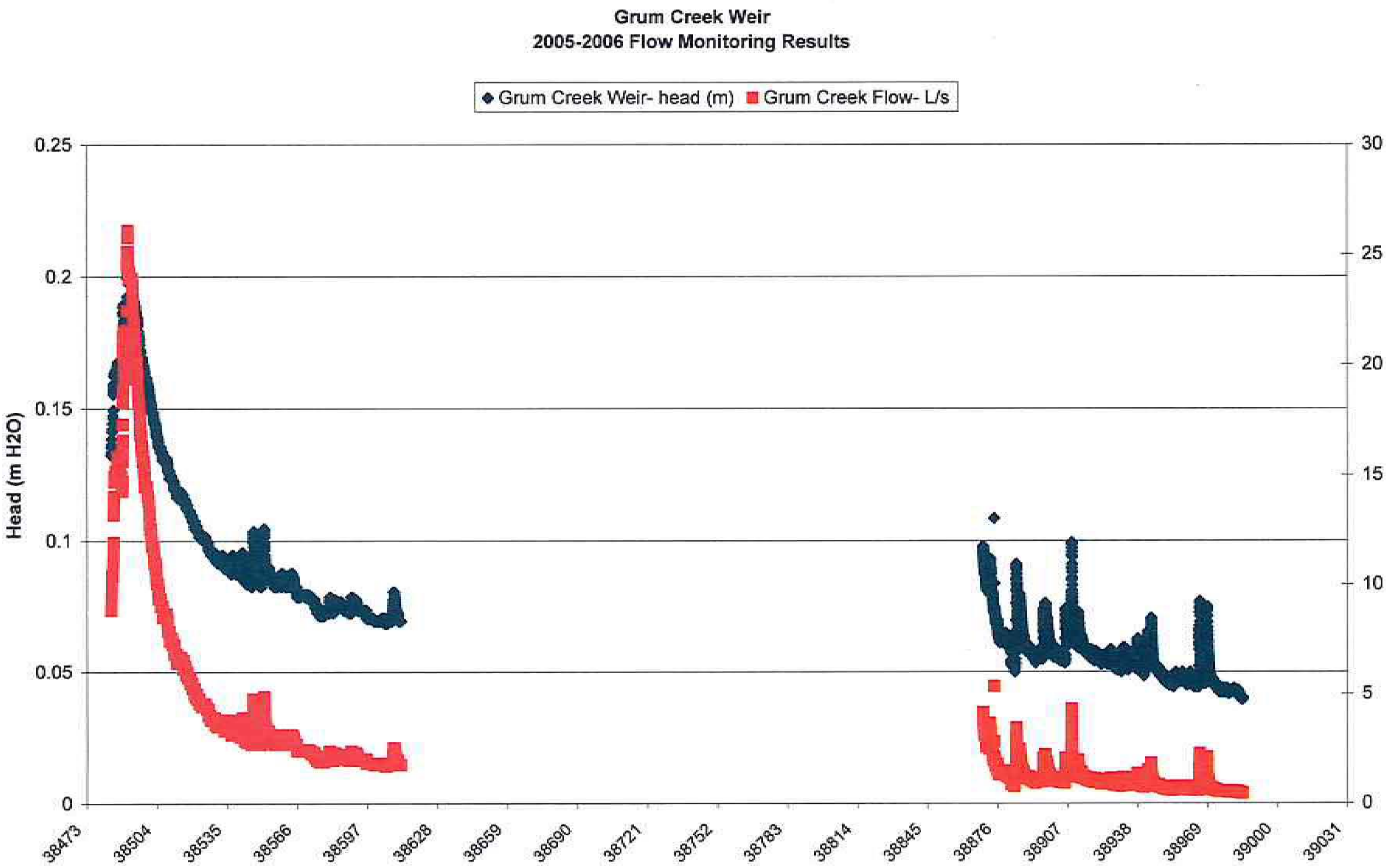
SRK Consulting
Engineers and Scientists

DELOITTE & TOUCHE INC.

2006 AMP Event #4 Response: Status Report

Zinc and Sulphate Concentrations at Sheep Creek

PROJECT	DATE	APPROVED	FIGURE
1CD003.082	January 2007		3.12



SRK Consulting
Engineers and Scientists

DELOITTE & TOUCHE INC.

2006 AMP Event #4 Response:
Status Report

Grum Creek Discharge at Weir

PROJECT	DATE	APPROVED	FIGURE
1CD003.082	January 2007		3.13

2006 AMP Water Quality Figures.xls

Appendix A
Grum Creek Flow Monitoring Instrument Installation Notes

Memorandum

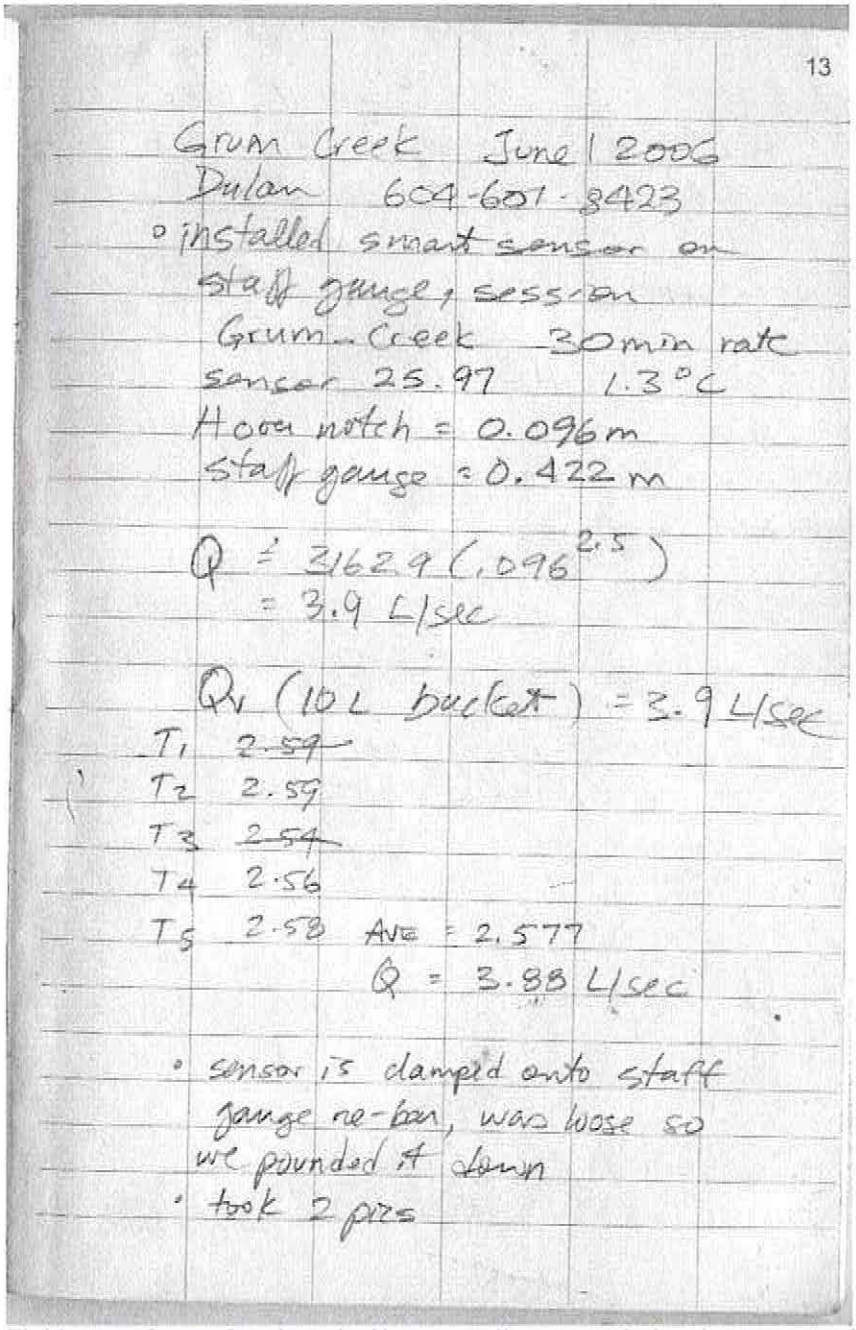
To: Dylan McGregor June2, 2006
From: Ken Nordin LES

Re: Grum Creek Datalogger

An INW smart sensor recording temperature and water level in cm H20 was set up at the Grum Creek weir on June 1, 2006. A copy of the field note and pictures follow.

Grum Creek weir looking downstream June 1 2006

Grum Creek weir looking upstream June 1 2006



13

Grum Creek June 1 2006

Dulan 604-601-8423

- installed smart sensor on staff gauge, session Grum Creek 30 min rate

sensor 25.97 1.3°C

H on notch = 0.096 m

staff gauge = 0.422 m

$Q \doteq 31629(.096^{2.5})$

$= 3.9$ L/sec

Q_v (10 L bucket) = 3.9 L/sec

T_1 ~~2.59~~

T_2 2.59

T_3 ~~2.54~~

T_4 2.56

T_5 2.58 Ave = 2.577

Q = 3.88 L/sec

- sensor is clamped onto staff gauge re-bar, was loose so we pounded it down
- took 2 pics

Field note Grum Creek weir. Note excellent correlation between weir calculation and volumetric flow rate. Note the "offset" between the sensor and the H value is -0.1637m. There is a 10.0 L bucket on site for volumetric measurements.

Appendix B
Water Quality Monitoring Results

Appendix B1

2002-2006 Waste Rock Seepage Survey Results

Sample ID	Date Sampled	Field Parameters pH (WTW)	Cond (uS/cm)	Temp (C)	ORP (mV)	Flow (L/min)	Physical Tests Cond (uS/cm)	Lab pH	Dissolved Anions Acidity (to pH 8.3) CaCO3	Alkalinity-Total CaCO3	Chloride Cl	Sulphate SO4
Min. detection level							2.0	0.010	1.0	1.0	0.50	0.50
Units		s.u.	uS/cm	0C	mV	L/min	uS/cm	s.u.	mg/L	mg/L	mg/L	mg/L
SRK-GD01	6/11/2002	6.69	2170	1.8	272	100	2080	7.66	38	337	1.7	1220
SRK-GD01	9/11/2002	6.91	2490	2.5	272	340	2460	7.27	69	497	1.5	1200
SRK-GD01	6/4/2003	6.93	2670	2.4	488	105	2530	7.82	25	534	2.2	1320
SRK-GD01	9/14/2003	7.26	2610	2.5	459	150	2530	8.09	16	559	2.4	1210
SRK-GD01	5/28/2004	7.71	2110	2.1	414	400	2030	7.44	44.2	255	1.17	1080
SRK-GD01	9/23/2004	7.06	2780	3.6	285	180	2700	7.77	23	583	<5	1270
SRK-GD01	5/15/2005	7.06	2220	1.6	460		2170	7.69	21.8	290	<5.0	1100
SRK-GD01	9/16/2005	7.63	2540	2.9	402	100	2730	7.79	19.1	566	<5.0	1390
SRK-GD01	5/26/2006	6.76	2360	2.5	317	30	3130	7.85	34.9	588	<5	1630
SRK-GD01	9/19/2006	7.17	2420	3	187	30	2620	7.63	22.5	552	1.23	1320
SRK-GD05	6/11/2002	7.74	2670	3.1	273	7.5	2570	8.14	13	527	2.2	1220
SRK-GD05	9/11/2002	7.45	2550	3.7	292	30	2470	7.88	28	600	1.9	1080
SRK-GD05B	6/4/2003	7.8	2550	3.9	421	20	2480	8.04	15	638	2.4	1230
SRK-GD05B	9/14/2003	7.84	2610	1.7	402	21	2510	8.11	14	627	2.8	1180
SRK-GD05	5/28/2004	7.83	3180	4.9	399	20	2960	8.03	19.9	583	2.09	1680
SRK-GD05	9/24/2004	7.64	3010	4.7	577	10	2930	8.01	4.8	609	<5	1440
SRK-GD05	5/15/2005	7.96	2520	3.7	413	8	3240	8.14	10.3	541	<0.50	1760
SRK-GD05	9/16/2005	7.86	2550	6	386	3.5573	3010	8.1	9.6	610	<5.0	1620
SRK-GD05	5/25/2006	7.71	2350	5.2	97	3.7	2950	8.07	22.3	586	<2.5	1550
SRK-GD05	9/19/2006	8.06	2420	4.7	174	4	2820	8	10.4	589	<5.0	1460
SRK-GD06	6/11/2002	7.62	2640	3.5	269	15	2540	8.1	17	557	2.5	947
SRK-GD06	9/11/2002	7.35	2540	3.1	314	30	2480	8	26	700	1.8	1040
SRK-GD06	6/4/2003	7.67	2510	3.1	473	-	2430	8.02	18	643	2.6	1150
SRK-GD06	9/14/2003	7.74	2540	3.1	486	15	2500	8.28	1	646	2.5	1120
SRK-GD16	5/28/2004	7.47	3280	3.4	504	30	3040	7.72	43	619	2.14	1680
SRK-GD16	5/18/2005	7.28			439	2.1	3480	7.62	93.2	602	<5.0	2090
SRK-GD04	6/11/2002	7.6	3260	2.5	248	1.5	3220	8.06	18	477	1.9	1350
SRK-GD21	5/28/2004	7.47	3390	3.4	394	7.5	3140	7.86	27.6	393	1.26	1990
SRK-GD21	9/24/2004	7.1	3860	4	536	Trace	3770	8.1	6.3	628	<5	2170
SRK-GD21	5/15/2005	7.74	2490	2.7	438	6	2950	8.10	7.9	356	<5.0	1770
SRK-GD21	5/25/2006	7.85	2370	10.5	118	trace	2890	8.08	9.8	400	<2.5	1670

Sample ID	Date Sampled	Dissolved Metals Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co	Cu	Fe	Pb	Li	Mg
Min. detection level		0.20	0.20	0.20	0.010	0.0050	0.20	0.10	0.010	0.050	0.010	0.010	0.010	0.030	0.050	0.010	0.10
Units		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
SRK-GD01	6/11/2002	<0.2	<0.2	<0.2	0.03	<0.005	<0.2	<0.1	<0.01	283	<0.01	<0.01	<0.01	<0.03	<0.05	0.02	141
SRK-GD01	9/11/2002	<0.2	<0.2	<0.2	0.06	<0.005	<0.4	<0.1	<0.01	351	<0.01	<0.01	<0.01	<0.03	<0.05	0.02	216
SRK-GD01	6/4/2003	<0.2	<0.2	<0.2	0.05	<0.005	<0.2	<0.1	<0.01	316	<0.01	<0.01	<0.01	<0.03	<0.05	0.03	223
SRK-GD01	9/14/2003	<0.2	<0.2	<0.2	0.05	<0.005	<0.2	<0.1	<0.01	367	<0.01	<0.01	<0.01	<0.03	<0.05	0.02	233
SRK-GD01	5/28/2004	<0.2	<0.2	<0.2	0.037	<0.005	<0.2	<0.1	<0.01	259	<0.01	0.05	<0.01	<0.03	<0.05	0.018	146
SRK-GD01	9/23/2004	<0.2	<0.2	<0.2	0.043	<0.005	<0.2	<0.1	<0.01	348	<0.01	<0.01	<0.01	<0.03	<0.05	0.027	239
SRK-GD01	5/15/2005	<0.20	<0.20	<0.20	0.051	<0.0050	<0.20	<0.10	<0.010	291	<0.010	0.016	<0.010	<0.030	<0.050	0.022	173
SRK-GD01	9/16/2005	<0.20	<0.20	<0.20	0.035	<0.0050	<0.20	<0.10	<0.010	332	<0.010	<0.010	<0.010	<0.030	<0.050	0.022	248
SRK-GD01	5/26/2006	<0.2	<0.2	<0.2	0.040	<0.005	<0.2	<0.1	<0.01	343	<0.01	<0.01	<0.01	0.038	<0.05	0.015	289
SRK-GD01	9/19/2006	<0.20	<0.20	<0.20	0.043	<0.0050	<0.20	<0.10	<0.010	317	<0.010	<0.010	<0.010	<0.030	<0.050	0.030	253
SRK-GD05	6/11/2002	<0.2	<0.2	<0.2	0.03	<0.005	<0.2	<0.1	<0.01	358	<0.01	<0.01	<0.01	<0.03	<0.05	0.04	211
SRK-GD05	9/11/2002	<0.2	<0.2	<0.2	0.02	<0.005	<0.3	<0.1	<0.01	349	<0.01	<0.01	<0.01	<0.03	<0.05	0.03	199
SRK-GD05B	6/4/2003	<0.2	<0.2	<0.2	0.03	<0.005	<0.2	<0.1	<0.01	312	<0.01	<0.01	<0.01	<0.03	<0.05	0.03	199
SRK-GD05B	9/14/2003	<0.2	<0.2	<0.2	0.03	<0.005	<0.2	<0.1	<0.01	337	<0.01	<0.01	<0.01	<0.03	<0.05	0.03	212
SRK-GD05	5/28/2004	<0.2	<0.2	<0.2	0.038	<0.005	<0.2	<0.1	<0.01	392	<0.01	<0.01	<0.01	<0.03	<0.05	0.043	269
SRK-GD05	9/24/2004	<0.2	<0.2	<0.2	0.034	0.0056	<0.2	<0.1	<0.01	361	<0.01	<0.01	<0.01	<0.03	<0.05	0.052	263
SRK-GD05	5/15/2005	<0.2	<0.2	<0.2	0.026	<0.005	<0.2	<0.1	<0.01	363	<0.01	<0.01	<0.01	<0.03	<0.05	0.044	298
SRK-GD05	9/16/2005	<0.2	<0.2	<0.2	0.029	<0.005	<0.2	<0.1	<0.01	477	<0.01	<0.01	<0.01	<0.03	<0.05	0.056	341
SRK-GD05	5/25/2006	<0.2	<0.2	<0.2	0.029	<0.005	<0.2	<0.1	<0.01	391	<0.01	<0.01	<0.01	<0.03	<0.05	0.034	302
SRK-GD05	9/19/2006	<0.2	<0.2	<0.2	0.017	<0.005	<0.2	<0.1	<0.01	310	<0.01	<0.01	<0.01	<0.03	<0.05	0.034	234
SRK-GD06	6/11/2002	<0.2	<0.2	<0.2	0.03	<0.005	<0.3	<0.1	<0.01	361	<0.01	<0.01	<0.01	<0.03	<0.05	0.04	209
SRK-GD06	9/11/2002	<0.2	<0.2	<0.2	0.03	<0.005	<0.3	<0.1	<0.01	348	<0.01	<0.01	<0.01	<0.03	<0.05	0.02	196
SRK-GD06	6/4/2003	<0.2	<0.2	<0.2	0.03	<0.005	<0.2	<0.1	<0.01	337	<0.01	<0.01	<0.01	<0.03	<0.05	0.03	214
SRK-GD06	9/14/2003	<0.2	<0.2	<0.2	0.03	<0.005	<0.2	<0.1	<0.01	325	<0.01	<0.01	<0.01	<0.03	<0.05	0.03	199
SRK-GD16	5/28/2004	<0.2	<0.2	<0.2	0.041	<0.005	<0.2	<0.1	<0.01	382	<0.01	0.03	<0.01	<0.03	<0.05	0.048	253
SRK-GD16	5/18/2005	<0.20	<0.20	<0.20	0.032	<0.0050	<0.20	<0.10	0.089	416	<0.010	0.096	0.026	<0.030	<0.050	0.045	338
SRK-GD04	6/11/2002	<0.2	<0.2	<0.2	0.02	<0.005	<0.2	<0.1	<0.01	352	<0.01	0.03	<0.01	<0.03	<0.05	0.04	347
SRK-GD21	5/28/2004	<0.2	<0.2	<0.2	0.036	<0.005	<0.2	<0.1	<0.01	315	<0.01	0.026	<0.01	<0.03	<0.05	0.066	403
SRK-GD21	9/24/2004	<0.2	<0.2	<0.2	0.016	<0.005	<0.2	<0.1	<0.01	365	<0.01	<0.01	<0.01	<0.03	<0.05	0.041	438
SRK-GD21	5/15/2005	<0.20	<0.20	<0.20	0.025	<0.0050	<0.20	<0.10	<0.010	277	<0.010	0.012	<0.010	<0.030	<0.050	0.047	340
SRK-GD21	5/25/2006	<0.2	<0.2	<0.2	0.018	<0.005	<0.2	<0.1	<0.01	287	<0.01	0.014	<0.01	<0.03	<0.05	0.043	342

Sample ID	Date Sampled	Mn	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	Tl	Sn	Ti	V	Zn
Min. detection level		0.0050	0.030	0.050	0.30	2.0	0.20	0.050	0.010	2.0	0.0050	0.20	0.030	0.010	0.030	0.0050
Units		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
SRK-GD01	6/11/2002	0.059	<0.03	0.26	<0.3	5	<0.2	3.98	<0.01	7	0.914	<0.2	<0.03	<0.01	<0.03	5.07
SRK-GD01	9/11/2002	0.062	<0.03	0.29	<0.3	8	<0.2	4.09	<0.01	9	1.31	<0.2	<0.03	<0.01	<0.03	2.48
SRK-GD01	6/4/2003	0.044	<0.03	0.43	<0.3	8	<0.2	4.36	<0.01	10	1.3	<0.2	<0.03	<0.01	<0.03	4.58
SRK-GD01	9/14/2003	0.053	<0.03	0.34	<0.3	8	<0.2	4.46	<0.01	10	1.48	<0.2	<0.03	<0.01	<0.03	2.98
SRK-GD01	5/28/2004	0.998	<0.03	0.43	<0.3	5.4	<0.2	2.83	<0.01	5	0.912	<0.2	<0.03	<0.01	<0.03	17.2
SRK-GD01	9/23/2004	0.056	<0.03	0.351	<0.3	8.3	<0.2	4.08	<0.01	10.1	1.36	<0.2	<0.03	<0.01	<0.03	3.69
SRK-GD01	5/15/2005	0.353	<0.030	0.295	<0.30	4.2	<0.20	2.93	<0.010	5.3	0.897	<0.20	<0.030	<0.010	0.037	10.7
SRK-GD01	9/16/2005	0.0502	<0.030	0.355	<0.30	5.7	<0.20	3.90	<0.010	9.1	1.14	<0.20	<0.030	<0.010	<0.050	3.11
SRK-GD01	5/26/2006	0.0828	<0.03	0.336	<0.3	8.0	<0.2	3.23	<0.01	11.1	1.19	<0.2	<0.03	<0.01	<0.03	3.10
SRK-GD01	9/19/2006	0.0449	<0.030	0.334	<0.30	6.9	<0.20	3.83	<0.010	10.0	1.23	<0.20	0.099	<0.010	<0.030	2.76
SRK-GD05	6/11/2002	0.189	<0.03	0.59	<0.3	8	<0.2	5.66	<0.01	14	1.52	<0.2	<0.03	<0.01	<0.03	3.54
SRK-GD05	9/11/2002	0.008	<0.03	0.51	<0.3	7	<0.2	6.06	<0.01	11	1.41	<0.2	<0.03	<0.01	<0.03	2.65
SRK-GD05B	6/4/2003	0.007	<0.03	0.38	<0.3	7	<0.2	5.51	<0.01	12	1.36	<0.2	<0.03	<0.01	<0.03	1.73
SRK-GD05B	9/14/2003	0.013	<0.03	0.44	<0.3	7	<0.2	5.66	<0.01	11	1.48	<0.2	<0.03	<0.01	<0.03	2.02
SRK-GD05	5/28/2004	0.0931	<0.03	0.644	<0.3	7.8	<0.2	5.48	<0.01	12.8	1.68	<0.2	0.033	<0.01	<0.03	4.92
SRK-GD05	9/24/2004	0.009	<0.03	0.705	<0.3	8.3	<0.2	5.07	<0.01	13.5	1.6	<0.2	<0.03	<0.01	<0.03	4.21
SRK-GD05	5/15/2005	0.013	<0.03	0.54	<0.3	6.4	<0.2	3.9	<0.01	12.8	1.42	<0.2	<0.03	<0.01	0.059	2.99
SRK-GD05	9/16/2005	0.0127	<0.03	0.917	<0.3	8.9	<0.2	6.25	<0.01	17.9	1.81	<0.2	<0.03	<0.01	<0.07	5.16
SRK-GD05	5/25/2006	0.0064	<0.03	0.493	<0.3	7.5	<0.2	4.74	<0.01	16	1.7	<0.2	<0.03	<0.01	<0.03	2.35
SRK-GD05	9/19/2006	<0.005	<0.03	0.448	<0.3	5.5	<0.2	4.29	<0.01	11.2	1.17	<0.2	<0.03	<0.01	<0.03	2.13
SRK-GD06	6/11/2002	0.23	<0.03	0.52	<0.3	9	<0.2	5.87	<0.01	14	1.56	<0.2	0.04	<0.01	<0.03	3.94
SRK-GD06	9/11/2002	0.008	<0.03	0.42	<0.3	7	<0.2	6.07	<0.01	11	1.39	<0.2	<0.03	<0.01	<0.03	2.73
SRK-GD06	6/4/2003	0.011	<0.03	0.38	<0.3	7	<0.2	6.15	<0.01	13	1.49	<0.2	<0.03	<0.01	<0.03	2.39
SRK-GD06	9/14/2003	0.008	<0.03	0.41	<0.3	7	<0.2	5.64	<0.01	11	1.41	<0.2	<0.03	<0.01	<0.03	2.34
SRK-GD16	5/28/2004	1.75	<0.03	0.701	<0.3	7	<0.2	4.59	<0.01	12	1.67	<0.2	<0.03	<0.01	<0.03	10.4
SRK-GD16	5/18/2005	4.93	<0.030	0.501	<0.30	6.1	<0.20	6.71	<0.010	15.4	1.69	<0.20	<0.030	<0.010	<0.030	59.9
SRK-GD04	6/11/2002	0.207	<0.03	0.42	<0.3	10	<0.2	3.65	<0.01	16	1.59	<0.2	<0.03	<0.01	<0.03	3.68
SRK-GD21	5/28/2004	0.271	<0.03	0.345	<0.3	12.3	<0.2	2.3	<0.01	14.9	1.53	<0.2	<0.03	<0.01	<0.03	2.52
SRK-GD21	9/24/2004	0.0619	<0.03	0.409	<0.3	10	<0.2	3.89	<0.01	17.1	1.63	<0.2	<0.03	<0.01	<0.03	1.82
SRK-GD21	5/15/2005	0.0983	<0.030	0.290	<0.30	8.2	<0.20	1.66	<0.010	11.4	1.16	<0.20	<0.030	<0.010	0.053	2.63
SRK-GD21	5/25/2006	0.0643	<0.03	0.330	<0.3	10.0	<0.2	2.18	<0.01	12.2	1.28	<0.2	<0.03	<0.01	<0.03	3.42

Appendix B2
2003-2006 Downgradient Seepage Pathways Monitoring Results

Sample ID Date Sampled	Moose Seep 9/15/2003	Moose Seep 5/28/2004	Moose Seep 9/22/2004	Moose Seep 5/18/2005	Moose Seep 9/17/2005
Field Parameters					
pH	7.61	7.79	7.32	7.7	7.12
Conductivity (uS/cm)	1310	465	1573		1680
Temperature (C)	3.4	3.6	6.4		6.2
ORP (mV)	406	167	48	415	432
Flow (L/min)	1	Trace	1	Trace	Trace
Physical Tests					
Conductivity (uS/cm)	1280	1120	1540	1240	1590
pH	8.2	8.08	8.08	8.2	8.05
Dissolved Anions					
Acidity (to pH 8.3) CaCO3	5	5.2	5.4	3	6.8
Alkalinity-Total CaCO3	288	236	296	245	320
Chloride Cl	1.5	1.52	<5.0	0.79	<5.0
Sulphate SO4	522	427	728	494	748
Dissolved Metals					
Aluminum D-Al	<0.2	<0.2	<0.2	<0.2	<0.20
Antimony D-Sb	<0.2	<0.2	<0.2	<0.2	<0.20
Arsenic D-As	<0.2	<0.2	<0.2	<0.2	<0.20
Barium D-Ba	0.05	0.057	0.078	0.048	0.087
Beryllium D-Be	<0.005	<0.005	<0.006	<0.005	<0.0050
Bismuth D-Bi	<0.2	<0.2	<0.2	<0.2	<0.20
Boron D-B	<0.1	<0.1	<0.1	<0.1	<0.10
Cadmium D-Cd	<0.01	<0.01	<0.01	<0.01	<0.010
Calcium D-Ca	174	157	235	168	293
Chromium D-Cr	<0.01	<0.01	<0.01	<0.01	<0.010
Cobalt D-Co	<0.01	<0.01	<0.01	<0.01	<0.010
Copper D-Cu	<0.01	<0.01	<0.01	<0.01	<0.010
Iron D-Fe	<0.03	<0.03	<0.03	<0.03	<0.030
Lead D-Pb	<0.05	<0.05	<0.05	<0.05	<0.050
Lithium D-Li	<0.01	<0.01	<0.01	<0.01	<0.010
Magnesium D-Mg	72.9	62.6	97.6	69.2	117
Manganese D-Mn	<0.005	<0.005	<0.005	<0.005	0.0055
Molybdenum D-Mo	<0.03	<0.03	<0.03	<0.03	<0.030
Nickel D-Ni	<0.05	<0.05	<0.05	<0.05	<0.050
Phosphorus D-P	<0.3	<0.3	<0.3	<0.3	<0.30
Potassium D-K	2	2.1	2.1	<2	2.3
Selenium D-Se	<0.2	<0.2	<0.3	<0.2	<0.20
Silicon D-Si	4.84	4.38	5.45	3.81	6.1
Silver D-Ag	<0.01	<0.01	<0.02	<0.01	<0.010
Sodium D-Na	7	6.1	7.8	5	8.3
Strontium D-Sr	0.491	0.453	0.679	0.433	0.73
Thallium D-Tl	<0.2	<0.2	<0.2	<0.2	<0.20
Tin D-Sn	<0.03	<0.03	<0.03	<0.03	<0.030
Titanium D-Ti	<0.01	<0.01	<0.01	<0.01	<0.010
Vanadium D-V	<0.03	<0.03	<0.03	<0.03	<0.040
Zinc D-Zn	0.006	<0.005	0.0064	<0.005	0.0081

Results are expressed as milligrams per litre except where noted.
< = Less than the detection limit indicated.

Sample ID Date Sampled	GD05 D/S 9/15/2003	GD05 D/S 5/28/2004	GD05 D/S 9/23/2004	GD05 D/S 5/15/2005	GD05 D/S 9/17/2005	GD05 D/S 5/26/2006	GD05 D/S 9/23/2006
Field Parameters							
pH	7.66	7.79	6.9	7.94	7.78	7.71	8.02
Conductivity (uS/cm)	2140	1884	2430	2170	2510	2350	2480
Temperature (C)	3.7	2.9	4.3	3.6	5.5	5.2	4.3
ORP (mV)	424	190	69	478	637	97	
Flow (L/min)	60	30	2.25		9.6	3.7	1
Physical Tests							
Conductivity (uS/cm)	2070	1760	2390	2200	2480	2290	2510
pH	8.11	8.13	8.07	8.10	8.07	8.17	8.15
Dissolved Anions							
Acidity (to pH 8.3) CaCO3	15	6.6	8.0	7.5	8.8	7.4	8.4
Alkalinity-Total CaCO3	421	373	434	406	449	416	466
Chloride Cl	2.4	2.03	<5.0	<5	<5.0	1.58	3.4
Sulphate SO4	972	823	1300	1080	1360	1090	1230
Dissolved Metals							
Aluminum D-Al	<0.2	<0.2	<0.2	<0.2	<0.20	<0.2	<0.20
Antimony D-Sb	<0.2	<0.2	<0.2	<0.2	<0.20	<0.2	<0.20
Arsenic D-As	<0.2	<0.2	<0.2	<0.2	<0.20	<0.2	<0.20
Barium D-Ba	0.06	0.052	0.060	0.048	0.057	0.034	0.043
Beryllium D-Be	<0.005	<0.005	<0.006	<0.005	<0.0050	<0.005	<0.0050
Bismuth D-Bi	<0.2	<0.2	<0.2	<0.2	<0.20	<0.2	<0.20
Boron D-B	<0.1	<0.1	<0.1	<0.1	<0.10	<0.1	<0.10
Cadmium D-Cd	<0.01	<0.01	<0.01	<0.01	<0.010	<0.01	<0.010
Calcium D-Ca	277	264	330	305	340	332	301
Chromium D-Cr	<0.01	<0.01	<0.01	<0.01	<0.010	<0.01	<0.010
Cobalt D-Co	<0.01	<0.01	<0.01	<0.01	<0.010	<0.01	<0.010
Copper D-Cu	<0.01	<0.01	<0.01	<0.01	<0.010	<0.01	<0.010
Iron D-Fe	<0.03	<0.03	<0.03	<0.03	<0.030	<0.03	<0.030
Lead D-Pb	<0.05	<0.05	<0.05	<0.05	<0.050	<0.05	<0.050
Lithium D-Li	0.01	<0.01	0.013	0.011	0.015	<0.01	0.017
Magnesium D-Mg	166	129	192	171	217	184	191
Manganese D-Mn	<0.005	<0.005	<0.005	<0.005	<0.0050	0.0056	<0.0050
Molybdenum D-Mo	<0.03	<0.03	<0.03	<0.03	<0.030	<0.03	<0.030
Nickel D-Ni	<0.05	<0.05	<0.05	<0.05	<0.050	<0.05	<0.050
Phosphorus D-P	<0.3	<0.3	<0.3	<0.3	<0.30	<0.3	<0.30
Potassium D-K	3	2.6	2.6	2.3	2.9	3.5	2.8
Selenium D-Se	<0.2	<0.2	<0.3	<0.2	<0.20	<0.2	<0.20
Silicon D-Si	5.84	5.4	6.06	5.00	5.94	5.43	5.32
Silver D-Ag	<0.01	<0.01	<0.02	<0.01	<0.010	<0.01	<0.010
Sodium D-Na	10	8.4	11.7	09.8	12.3	11.0	10.9
Strontium D-Sr	1.04	0.985	1.21	1.03	1.17	0.98	0.98
Thallium D-Tl	<0.2	<0.2	<0.2	<0.2	<0.20	<0.2	<0.20
Tin D-Sn	<0.03	<0.03	<0.03	<0.03	<0.030	<0.03	0.079
Titanium D-Ti	<0.01	<0.01	<0.01	<0.01	<0.010	<0.01	<0.010
Vanadium D-V	<0.03	<0.03	<0.03	0.046	0.055	<0.03	<0.030
Zinc D-Zn	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.005	<0.0050

Results are expressed as milligrams per litre except where noted.

< = Less than the detection limit indicated.

Sample ID Date Sampled	SWEET CREEK 9/23/2004	SWEET CREEK 5/15/2005	SWEET CREEK 9/17/2005	SWEET CREEK 5/26/2006	SWEET CREEK 9/23/2006
Time Sampled					
ALS Sample ID	U9027-7				
Nature	Water				
Field Parameters					
pH	8.03	8.11	8.11	7.85	8.31
Conductivity (uS/cm)	2260	1935	2440	2230	2450
Temperature (C)	4.3	3	4.1	4.3	3
ORP (mV)	114	474	597	141	
Flow (L/min)	90		60	39.25	40.8
Physical Tests					
Conductivity (uS/cm)	2180	1930	2300	2210	2330
pH	8.10	8.12	8.1	8.14	8.04
Dissolved Anions					
Acidity (to pH 8.3) CaCO3	7.4	6.5	8	10.4	12.9
Alkalinity-Total CaCO3	418	417	390	428	448
Chloride Cl	<5.0	<5	<5.0	<0.5	1.68
Sulphate SO4	1030	847	1190	1080	1190
Dissolved Metals					
Aluminum D-Al	<0.20	<0.2	<0.20	<0.2	<0.20
Antimony D-Sb	<0.20	<0.2	<0.20	<0.2	<0.20
Arsenic D-As	<0.20	<0.2	<0.20	<0.2	<0.20
Barium D-Ba	0.071	0.055	0.065	0.043	0.055
Beryllium D-Be	<0.0050	<0.005	<0.0050	<0.005	<0.0050
Bismuth D-Bi	<0.20	<0.2	<0.20	<0.2	<0.20
Boron D-B	<0.10	<0.1	<0.10	<0.1	<0.10
Cadmium D-Cd	<0.010	<0.01	<0.010	<0.01	<0.010
Calcium D-Ca	336	305	349	329	351
Chromium D-Cr	<0.010	<0.01	<0.010	<0.01	<0.010
Cobalt D-Co	<0.010	<0.01	<0.010	<0.01	<0.010
Copper D-Cu	<0.010	<0.01	<0.010	<0.01	<0.010
Iron D-Fe	<0.030	<0.03	<0.030	<0.03	<0.030
Lead D-Pb	<0.050	<0.05	<0.050	<0.05	<0.050
Lithium D-Li	<0.010	<0.01	<0.010	<0.01	0.015
Magnesium D-Mg	152	138	180	156	184
Manganese D-Mn	<0.0050	<0.005	<0.0050	<0.005	<0.0050
Molybdenum D-Mo	<0.030	<0.03	<0.030	<0.03	<0.030
Nickel D-Ni	<0.050	<0.05	<0.050	<0.05	<0.050
Phosphorus D-P	<0.30	<0.3	<0.30	<0.3	<0.30
Potassium D-K	<2.0	<2	<2.0	2.1	<2.0
Selenium D-Se	<0.20	<0.2	<0.20	<0.2	<0.20
Silicon D-Si	6.03	5.18	5.85	5.56	6.12
Silver D-Ag	<0.010	<0.01	<0.010	<0.01	<0.010
Sodium D-Na	9.6	8.1	10.3	9.9	11.1
Strontium D-Sr	1.14	0.989	1.1	0.945	1.06
Thallium D-Tl	<0.20	<0.2	<0.20	<0.2	<0.20
Tin D-Sn	<0.030	<0.03	<0.030	<0.03	0.074
Titanium D-Ti	<0.010	<0.01	<0.010	<0.01	<0.010
Vanadium D-V	<0.030	0.037	0.047	<0.03	<0.030
Zinc D-Zn	<0.0050	<0.005	<0.0050	<0.005	<0.0050

Results are expressed as milligrams per litre except where noted.
< = Less than the detection limit indicated.

Sample ID Date Sampled	Sheep Seep 09/15/2003	Sheep Seep 5/28/2004	Sheep Seep 9/23/2004	SHEEP CREEK 5/15/2005	SHEEP CREEK 9/17/2005	SHEEP CREEK 9/23/2006	SHEEP CREEK 5/26/2006
Field Parameters							
pH	7.3	7.51	8.02	8.34	8.22	8.35	7.83
Conductivity (uS/cm)	557	458	571	576	592	589	575
Temperature (C)	2.4	1.9	4.1	2.4	4.3	3.4	0.7
ORP (mV)	450	208	76	434	577		188
Flow (L/min)	45	270	4.5		6.8	3	1
Physical Tests							
Conductivity (uS/cm)	539	420	580	581	565	561	558
pH	8.36	8.24	8.36	8.34	8.28	8.23	8.32
Dissolved Anions							
Acidity (to pH 8.3) CaCO3	<1	1.6	<1.0	<1	<1.0	3.5	<1
Alkalinity-Total CaCO3	262	205	268	269	294	254	258
Chloride Cl	0.7	0.72	<2.5	<0.5	<0.50	<0.50	<0.5
Sulphate SO4	54	43.5	59.5	63.9	68.2	66.8	67.6
Dissolved Metals							
Aluminum D-Al	<0.2	<0.2	<0.2	<0.2	<0.20	<0.20	<0.2
Antimony D-Sb	<0.2	<0.2	<0.2	<0.2	<0.20	<0.20	<0.2
Arsenic D-As	<0.2	<0.2	<0.2	<0.2	<0.20	<0.20	<0.2
Barium D-Ba	0.17	0.135	0.171	0.176	0.195	0.197	0.144
Beryllium D-Be	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.0050	<0.005
Bismuth D-Bi	<0.2	<0.2	<0.2	<0.2	<0.20	<0.20	<0.2
Boron D-B	<0.1	<0.1	<0.1	<0.1	<0.10	<0.10	<0.1
Cadmium D-Cd	<0.01	<0.01	<0.01	<0.01	<0.010	<0.010	<0.01
Calcium D-Ca	88.5	72	89.0	96.2	105	101	92.9
Chromium D-Cr	<0.01	<0.01	<0.01	<0.01	<0.010	<0.010	<0.01
Cobalt D-Co	<0.01	<0.01	<0.01	<0.01	<0.010	<0.010	<0.01
Copper D-Cu	<0.01	<0.01	<0.01	<0.01	<0.010	<0.010	<0.01
Iron D-Fe	<0.03	<0.03	<0.03	<0.03	<0.030	<0.030	<0.03
Lead D-Pb	<0.05	<0.05	<0.05	<0.05	<0.050	<0.050	<0.05
Lithium D-Li	<0.01	<0.01	<0.01	<0.01	<0.010	<0.010	<0.01
Magnesium D-Mg	21	15.9	19.7	23.3	23.6	22.8	21
Manganese D-Mn	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.0050	<0.005
Molybdenum D-Mo	<0.03	<0.03	<0.03	<0.03	<0.030	<0.030	<0.03
Nickel D-Ni	<0.05	<0.05	<0.05	<0.05	<0.050	<0.050	<0.05
Phosphorus D-P	<0.3	<0.3	<0.3	<0.3	<0.30	<0.30	<0.3
Potassium D-K	<2	<2	<3	<2	<2.0	<2.0	<2
Selenium D-Se	<0.2	<0.2	<0.3	<0.2	<0.20	<0.20	<0.2
Silicon D-Si	4.73	4.48	4.61	3.77	4.9	4.78	4.04
Silver D-Ag	<0.01	<0.01	<0.02	<0.01	<0.010	<0.010	<0.01
Sodium D-Na	2	<2	2.4	<2	2.2	2.1	2.1
Strontium D-Sr	0.369	0.297	0.364	0.394	0.414	0.395	0.331
Thallium D-Tl	<0.2	<0.2	<0.2	<0.2	<0.20	<0.20	<0.2
Tin D-Sn	<0.03	<0.03	<0.03	<0.03	<0.030	<0.030	<0.03
Titanium D-Ti	<0.01	<0.01	<0.01	<0.01	<0.010	<0.010	<0.01
Vanadium D-V	<0.03	<0.03	<0.03	<0.03	<0.030	<0.030	<0.03
Zinc D-Zn	0.006	<0.005	<0.005	<0.005	<0.0050	0.0065	<0.005

Results are expressed as milligrams per litre except where noted.
< = Less than the detection limit indicated.

Sample ID Date Sampled	WTA02 9/23/2004	WTA02 5/18/2005	WTA02 5/26/2006	WTA02 9/24/2006
Field Parameters				
pH	8.05	7.55	8.00	8.16
Conductivity (uS/cm)	450		413	427
Temperature (C)	5.0		13.8	0.4
ORP (mV)	69	389	160	
Flow (L/min)	1		trace	2
Physical Tests				
Conductivity (uS/cm)	447	931	414	412
pH	8.39	8.2	7.17	8.24
Dissolved Anions				
Acidity (to pH 8.3) CaCO3	<1.0	3.3	34.5	3
Alkalinity-Total CaCO3	232	258	203	220
Chloride Cl	<2.5	0.55	<0.5	<0.50
Sulphate SO4	18.0	286	19.8	19.4
Dissolved Metals				
Aluminum D-Al	<0.20	<0.2	<0.2	<0.20
Antimony D-Sb	<0.20	<0.2	<0.2	<0.20
Arsenic D-As	<0.20	<0.2	<0.2	<0.20
Barium D-Ba	0.093	0.126	0.123	0.088
Beryllium D-Be	<0.0050	<0.005	<0.005	<0.0050
Bismuth D-Bi	<0.20	<0.2	<0.2	<0.20
Boron D-B	<0.10	<0.1	<0.1	<0.10
Cadmium D-Cd	<0.010	<0.01	<0.01	<0.010
Calcium D-Ca	81.3	152	85.1	76.7
Chromium D-Cr	<0.010	<0.01	<0.01	<0.010
Cobalt D-Co	<0.010	<0.01	<0.01	<0.010
Copper D-Cu	<0.010	<0.01	<0.01	<0.010
Iron D-Fe	<0.030	<0.03	<0.03	<0.030
Lead D-Pb	<0.050	<0.05	<0.05	<0.050
Lithium D-Li	<0.010	<0.01	<0.01	<0.010
Magnesium D-Mg	9.52	37.9	11.10	10.3
Manganese D-Mn	<0.0050	<0.005	<0.005	0.0182
Molybdenum D-Mo	<0.030	<0.03	<0.03	<0.030
Nickel D-Ni	<0.050	<0.05	<0.05	<0.050
Phosphorus D-P	<0.30	<0.3	<0.3	<0.30
Potassium D-K	<2.0	<2	<2	<2.0
Selenium D-Se	<0.20	<0.2	<0.2	<0.20
Silicon D-Si	4.40	4.31	4.20	3.97
Silver D-Ag	<0.010	<0.01	<0.01	<0.010
Sodium D-Na	<2.0	3.1	<2	<2.0
Strontium D-Sr	0.291	0.677	0.324	0.294
Thallium D-Tl	<0.20	<0.2	<0.2	<0.20
Tin D-Sn	<0.030	<0.03	<0.03	<0.030
Titanium D-Ti	<0.010	<0.01	<0.01	<0.010
Vanadium D-V	<0.030	<0.03	<0.03	<0.030
Zinc D-Zn	<0.0050	<0.005	<0.005	0.0375

Results are expressed as milligrams per litre except where noted.
< = Less than the detection limit indicated.

Sample ID Date Sampled	WGD01 9/23/2004	WGD01 9/16/2005	WGD01 5/26/2006	WGD01 9/23/2006
Field Parameters				
pH	7.71	7.92	7.62	8.14
Conductivity (uS/cm)	1115	1149	1008	1144
Temperature (C)	6.8	8.8	8.1	4.5
ORP (mV)	64	380	282	
Flow (L/min)	2	0.1	trace	2
Physical Tests				
Conductivity (uS/cm)	1120	1100	1010	1130
pH	8.18	8.13	8.07	8.21
Dissolved Anions				
Acidity (to pH 8.3) CaCO3	2.6	3.8	10.1	4.5
Alkalinity-Total CaCO3	277	286	278	278
Chloride Cl	<5.0	0.82	0.62	0.89
Sulphate SO4	384	380	308	358
Dissolved Metals				
Aluminum D-Al	<0.20	<0.20	<0.2	<0.20
Antimony D-Sb	<0.20	<0.20	<0.2	<0.20
Arsenic D-As	<0.20	<0.20	<0.2	<0.20
Barium D-Ba	0.165	0.173	0.102	0.13
Beryllium D-Be	<0.0050	<0.0050	<0.005	<0.0050
Bismuth D-Bi	<0.20	<0.20	<0.2	<0.20
Boron D-B	<0.10	<0.10	<0.1	<0.10
Cadmium D-Cd	<0.010	<0.010	<0.01	<0.010
Calcium D-Ca	172	186	158	190
Chromium D-Cr	<0.010	<0.010	<0.01	<0.010
Cobalt D-Co	<0.010	<0.010	<0.01	<0.010
Copper D-Cu	<0.010	<0.010	<0.01	<0.010
Iron D-Fe	<0.030	<0.030	0.09	<0.030
Lead D-Pb	<0.050	<0.050	<0.05	<0.050
Lithium D-Li	0.012	<0.010	<0.01	<0.010
Magnesium D-Mg	54.1	56	44.0	58.4
Manganese D-Mn	<0.0050	<0.0050	0.0813	<0.0050
Molybdenum D-Mo	<0.030	<0.030	<0.03	<0.030
Nickel D-Ni	<0.050	<0.050	<0.05	<0.050
Phosphorus D-P	<0.30	<0.30	<0.3	<0.30
Potassium D-K	<2.0	<2.0	<2	<2.0
Selenium D-Se	<0.20	<0.20	<0.2	<0.20
Silicon D-Si	5.09	5.03	4.79	5.17
Silver D-Ag	<0.010	<0.010	<0.01	<0.010
Sodium D-Na	3.8	3.4	3.7	3.6
Strontium D-Sr	0.957	0.89	0.711	0.856
Thallium D-Tl	<0.20	<0.20	<0.2	<0.20
Tin D-Sn	<0.030	<0.030	<0.03	<0.030
Titanium D-Ti	<0.010	<0.010	<0.01	<0.010
Vanadium D-V	<0.030	<0.030	<0.03	<0.030
Zinc D-Zn	<0.0050	<0.0050	<0.005	0.0059

Results are expressed as milligrams per litre except where noted.
< = Less than the detection limit indicated.