Giant Mine Arsenic Trioxide Management Plan

Groundwater Monitoring System: 2003 Monitoring Update

Report Prepared for

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Groundwater Monitoring System: October 2003 Monitoring Update

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1 Introduction

This report reviews the results from monitoring of the five Westbay Multiport (MP) monitoring wells and available open drillholes at the Giant Mine from March through September, 2003. Results from the on-going monitoring include pressure profiles and water chemistry data from the MP wells, in addition to water level data collected from both open historic exploration drill holes, and cased shallow installations installed as part of the Miramar A&R program in 2001.

These data are compared with previously collected data, interpretations presented regarding changes and possible causes, and comments provided regarding modifications of the existing conceptual model.

1.1 Outline of the report

This report is divided into three main sections, Background, Objectives and Work Program, and Program Results. Background reviews well locations and installation records. Objectives and Work Program describes the primary goals of this work and data collected, as well as briefly covering important methods. Program Results presents the data and provides observations and interpretations. The report ends with Recommendations and Conclusions.

2 Background

2.1 Westbay Monitoring System

Groundwater flow at the Giant mine site is within the bedrock flow system. To help identify potential preferential groundwater flow pathways, the groundwater monitoring system was positioned to collect data on the hydrogeological system as water enters and leaves the zone of interest: the mine envelope (see Groundwater Monitoring System Installation Report (SRK, 2002) for full description). The monitoring wells were installed to assess the hydrogeological conditions in the bedrock mass on the periphery of the site. These conditions are required to improve the establishment of the probable flow system in a flooded mine scenario, which will strongly influence migration of dissolved chemical constituents.

Five Westbay MP multi-level monitoring systems were installed during January 2002: S-1857, S-1860, S 1955, S DIAND-001 and S-DIAND-002. The three "S-XXXX" systems were installed utilizing existing, historic exploration drillholes, while the two "S-DIAND" systems were installed in drillholes completed specifically for this project. Locations of the MP wells are illustrated in Figure 1.

Monitoring zones within these wells were identified from core logging and positioned to monitor possible lithological and/or structural features believed to impart control on groundwater flow. A complete description of the installations, including geologic/structural target features is available in the installation report (SRK, 2002). Completion details are included as necessary in the following sections.

2.2 Previously Collected Data

Table 1 summarizes dates and types of data collected since installation of the MP monitoring systems. Pressure profile and water chemistry data collected during previous sampling events (winter, spring and summer, 2002) are included on the same charts as data from the spring 2003 sampling events. This allows for direct comparison and trend assessment.

Table 1: Summary of MP well activities and data collection

MONITORING WELL	DATE	COMMENTS
S-1857	19-Jan-02	installed, pressure profile
	Jan 21 – 22, 2002	Zones 1 and 3 sampled
	19-Apr-02	pressure profile and K testing
	June/July, 2002	pressure profile
	Oct, 2002	pressure profile
	March, 03	Zones 1, 3, 5, 10 sampled
	May, 03	"Diver" stuck at 90 m- no profile taken
	June, 03	"Diver" removed (blockage thawed), vented casing to Zone 1 to increase pressure differential between casing and Zone 3; pressure profile
	July, 31	Zone 3,5,10 sampled
	Sept, 03	full profile - sampled zones 1,3,5,10
S-1860	Jan ?, 2002	installed, pressure profile
	30-Jan-02	Zone 1 and 3 sampled
	20-Apr-02	pressure profile and K testing
	June/July, 2002	pressure profile
	Oct, 2002	pressure profile
	March, 03	**Could not access - frozen**
	May, 03	**Could not access - frozen**
	June 16, 2003	**Could not access - frozen**
	June 26, 2003	Blockage thawed. Leak test only.
	July, 03	pressure profile, zones 1, 3,7 sampled
	Sept, 03	pressure profile, zones 1, 3,7 sampled
S-1955	Jan 24 - 25, 2002	installed, pressure profile
	19-Apr-02	pressure profile (K testing unsuccessful)
	June/July, 2002	pressure profile
	Oct, 2002	pressure profile
	March, 03	Zones 2, 3, 6 sampled (no water in Zone 1)
	May, 03	pressure profile
	June 18, 2003	pressure profile and samples collected at Zones 2, 3 and 6
	Sept, 03	pressure profile, zones 2 and 6 sampled
S-DIAND-001	13-Jan-02	installed, pressure profile
	Jan 28 - 29, 2002	Zone 1 and 3 sampled
	17-Apr-02	pressure profile and K testing
	June/July, 2002	pressure profile
	Oct, 2002	pressure profile
	March, 03	Zones 4, 8 sampled (dup from Zone 4)
	May, 03	pressure profile, leak test
	June 17, 2003	pressure profile, 2 attempts at closure of Zone 4
	June 18, 2003	leak test at Zone 4, Zones 4 & 8 sampled (duplicate at zone 4)
	June 27, 2003	"Diver" pulled from well; pressure profile
	Sept, 03	pressure profile; zones 4,8,10 sampled
S-DIAND-002	Jan 15 - 18, 2002	installed, pressure profile
	Jan 28 - 29, 2002	Zone 1 and 3 sampled
	18-Apr-02	pressure profile
	20-Apr-02	pressure profile and K testing
	June/July, 2002	pressure profile
	Oct, 2002	pressure profile
	March, 03	Zones 4 sampled (metals only) before MP casing disconnected at approximately 6m? - no access
	May, 03	pressure profile; MP casing disconnected near surface (3 and 9 m??)
	24-Jun-03	Top 3m section of MP casing pulled out. O-rings inspected and cleaned. Casing reattached. MP casing bailed down. Coupling at 3m needs to be glued or annulus filled with cement to prevent casing parting again.
	25-Jun-03	pressure profile, purged, and sampling (Zones 4, 5 and inside MP casing)
	Sept, 03	pressure profile; zones 4,5,6,9 sampled

Notes: "Diver" = transducer/datalogger installed inside MP casing to measure water fluctuations through open pumping port

2.3 Open Drillhole Data (Exploration Drillholes)

Table 2 summarizes water level data collected from open exploration drillholes on the site. Locations for open drillholes are shown on Figure 2 and 3. Polyethylene (PE) tubing was installed down open drillholes to a maximum of 75 meters, through which the water level tape was installed. Grease along the sides of the boreholes restricts the use of the water level tape to very shallow levels only. The PE tubing was perforated along the lower 15 – 20 metres and the end taped off, allowing water to enter the tubing without the end getting plugged. PE tubing was removed and wiped off after recording data. Water level data from this survey have been used to plot a water table map of the site. The drawdown has been interpreted between monitoring points, and to take into account the variation in both open hole piezometric levels and discrete zone piezometric levels (ie: MP wells).

Table 2: Open drillhole water level data

Drillhole #	Piezometric surface (m.a.s.l.)
S-1848	1801.6
S-1853	1837.3
S-1858B	>1769.5
S-1859	1836.9
S-1956	>1798.9
S-2136	1844.6
S-2137	1844.4
S-2138	1843.4
S-2141	1843.5
S-2143	1844.5
S-2223	1831.7
S-2224	1834.6
NB 94-10	1849.5
NB 94-11	1849.2

Note: m.a.s.l. = metres above sea level
>1769.5 = indicates that water level is deeper than tabulated value.

2.4 Shallow Monitoring Well Data

Table 3 summarizes data from the shallow wells installed during the 2001 Miramar A&R investigation program. These wells are shown on figure 3. The wells were installed by Golder Associates and have been monitored as part of the SRK groundwater program.

Table 3: Shallow well water level data

Observation Well ID#	Piezometric surface (m.a.s.l.)
MW01-1a	1820.0
MW01-1b	1822.1
MW01-1c	1822.3
MW01-2a	1819.7
MW01-2b	1820.4
MW01-2c	1821.1
MW00-2	1823.6
MW00-3a	1850.0
MW00-3b	1851.9
MW00-4a	1834.7
MW00-4b	1834.7

2.5 Water Table Maps

Two water table maps were constructed using data from shallow and deep monitoring wells (Figure 2 and 3). These include both open drillholes and MP well data. Water level values comprising this database represent both detailed and general data. MP well data represents, dominantly, detailed data from specific zones, for which there is geology information available. Open drillhole data represents an average water level for the entire open length of the drillhole, which may reach 1000's of feet. Very little geology data is available for these holes, relative to the MP well drillholes, that can be used to interpret potential high porosity zones. In addition, grease or other blockages may exist in these drillholes that is not recognized due to the short length of the water level measuring tape relative to the length of the drillhole. Vertical flow, which is very likely to exist in many of the open drillholes, has not been assessed.

Water level data in open drillholes was assumed to represent the elevation of the water table at the location where the measurement was made, with no vertical flow. For the majority of drillholes, the water level was close to the collar, and water levels were assigned to a location on the map corresponding with the collar location. For drillholes in which water levels were deeper, the horizontal distance from the collar location was determined and the water level data assigned to that location on the map. In no case was there a water level at a depth that corresponded to a horizontal distance of greater than 10 metres from the collar location except, possibly, drillholes with water levels at unreachable depths using the available water level tape. Water level contours of different value were allowed to cross the same drillhole trace (see Figure 2) if considered reasonable based on the conceptual understanding of the water table. As there is some information available from the MP well data regarding vertical flow, this is considered reasonable.

3 Objectives and Work Program

3.1 Objectives

The objectives of the spring 2003 and subsequent sampling events included collection of complete pressure profiles from each well, water samples from specified zones, and (during the March monitoring round) installation of automatic water level recorders (Divers) at specified open pumping ports to monitor transient changes during the freshet. The primary objective of the water sampling program is to establish current baseline concentrations in the groundwater. This may be required in the future if the mine is ever flooded to a level where the regional gradient is allowed to re establish, and water from within the mine envelope is allowed to move towards the monitoring wells.

Water chemistry sampling was expanded in the September round in order to address the suggestion made during the groundwater review meeting in July that greater spatial coverage would be prudent.

3.2 Work Program

Tasks at each well were undertaken during a single visit, typically lasting no longer than a single day, allowing for improved efficiency of setup and break down of required equipment (*e.g.*, tripod, wireline assembly, heaters, etc.).

3.2.1 Pressure Profiles

Pressure profiles were collected at each well and recorded on pre-formatted datasheets. Pressure profiles followed standard Westbay procedures, as documented in the equipment operation manuals. In March and May, all wells were profiled except S 1860 due to an ice blockage in the well casing. All wells were profiled in June/July and in September as the ice blockage had thawed by that point.

Water inside the S-1860 MP casing was found to be frozen at a depth of 3.8m and access by the wireline system was not possible during both March and May, 2003. The frozen water level corresponds to the piezometric level in Zone 3, which was opened in April, 2002 to allow for continuous monitoring. All pumping ports are reported closed, so water in the casing is probably the remains from before the Diver was removed and pumping port in zone 3 closed in June/July, 2002. This water level has been pumped down to ensure it does not refreeze during the 2003/2004 winter season.

The ice blockage indicates the need to ensure that all casing water levels be lowered to below expected frozen ground conditions during the winter months. A minimum casing water depth for winter operation for each well is listed in Table 4 below:

Table 4: Minimum Depth to Water in MP Casing for Winter Operation

MP Well ID	Minimum Depth to Water in MP Casing for Winter Operation (m)	Interior Water Depth at end of September Monitoring (m)
S-1857	120	~140*
S-1860	50	49.5
S-1955	50	>100**
S-DIAND-01	50	25.9
S-DIAND-02	50	41.8

Note: all depths referenced to top of MP casing
* depth measured using cable counter on bailer system
** depth exceeds water level tape (100 m)

3.2.2 Water Sampling

Water samples were collected from select zones in the monitoring systems using methods approved and instructed by Westbay personnel, with additional modifications to conform to SRK's standard water sampling QA/QC procedures. Sample collection equipment was de-contaminated between monitoring zones by rinsing twice with deionised water. Field parameters were collected in standard lab-provided containers (including acid-washed when appropriate), and duplicates and field blanks included in the sample suite submitted to Taiga Labs for analysis.

Zones sampled during the monitoring rounds are listed on Table 5. As discussed below, samples could not be collected from desired zones in well S 1860, due to the presence of frozen water inside the MP casing, during the March and May sampling rounds. Additionally, a complete sample suite could not be collected from well S-DIAND-002 due to the MP casing disconnecting after sampling the lower-most targeted zone (zone 4). Samples were collected in June/July after S-1860 had thawed out and S-DIAND-002 had been reattached.

All targeted sample zones were collected in September.

Table 5: Zones samples for water chemistry

Well	Sampling Dates	Zones sampled	Zones Purged
S-1857	March, 2003 July, 2003 Sept, 2003	1, 3, 5, 10 3, 5 and 10 1, 3, 5, 10	none #3 none
S-1860	March, 2003 July, 2003 Sept, 2003	Frozen – no samples 1,3 and 7 1, 3 and 7	all closed #3 none
S-1955	March, 2003 June, 2003 Sept, 2003	1, 2, 3, and 6 2, 3, and 6 2 and 6	none none none
S-DIAND-001	March, 2003 June, 2003 Sept, 2003	4, 8; duplicate from zone 4 4, 8; duplicate from zone 4 4, 8, 10; duplicate from zone 4	none #4 none
S-DIAND-002	March, 2003 June, 2003 Sept, 2003	4* 4, 5, and MP Casing ** 4, 5, 6 and 9	none #4,5 none

* = disconnect in casing barred sampling other zones

** = sample collected from inside of MP Casing to compare inside/outside chemistry (see section 3.1.3.3 for discussion.

A brief summary of the three sampling rounds is given below:

<u>March 2003</u>

Samples were collected from all targeted zones in MP wells S-1857, S-1955, and S-DIAND-001.

Pressure profiling was completed in S-DIAND-002 without difficultly. However, after completing the first sampling run for zone 4, it was not possible to get the sampling assembly back down the well. Investigation indicated that the MP casing had separated at approximately 6 meters down the pipe, at the location of the second coupling from the top. Upon further inspection, ice was found in the space between the MP casing (45 mm OD) and the HW (106 mm ID) surface casing. Based on the observations, it is thought that expansion of the ice during annular freezing jacked the upper, free moving, portion of the MP casing apart from the lower, anchored section. This caused the coupling at 3 meters depth to partially separate, and that movement of the sampling probe, appears to have caused the joint to completely separate. Further sampling was impractical after this time as jamming the probe in the separated casing was a risk. No equipment was damaged or lost due to this problem.

S-1860 was found to be frozen at 2.8 metres below the top of the MP casing. Therefore, no samples were collected

<u>June/July 2003</u>

Samples were collected from all targeted zones in all wells. S-1860 was found to have thawed and the separated casing in S DIAND-002 was removed, o-rings cleaned and inspected, and the casing reattached, thus allowing access to the entire casing length. Water inside the MP casing will have mixed with the annular water. This mixed water was partially evacuated by bailing the well casing down to 42 m, which also served to prevent any casing water entering lower pressure zones during subsequent sampling and pressure profiling events.

September 2003

Pressure data and water samples were collected from all targeted zones in all wells.

All interior water levels were bailed down to prevent freezing during the winter season. These levels will be maintained for future operations to prevent freezing in the future.

3.2.3 Sample Zone Purging and/or Interior Pressure Differential

3.2.3.1 Purging

The MP Casing is a closed sampling system; therefore, purging is not required between sampling rounds once initial purging has been carried out to remove drilling fluids and drillhole water that mixed during installation. Prior to installing the MP casing, all of the drillholes were developed using a straddle-surge block system and swabbing cups run by the drill rig. This system was able to remove 10s to 100s of litres of water per stroke, with great hydraulic force, from each zone, as opposed to far smaller volumes and hydraulic force through the MP casing. Because of the relative ineffectiveness of purging through the MP casing after installation, especially considering that the historic drillholes were open for almost 20 years, it was decided at the beginning of the monitoring program that no further well development or purging would be carried out. Therefore, while it was expected that some mixing of drillhole water would occur during installation, it was decided that water chemistry would naturally equilibrate due to groundwater movement through the zones over time. This is observed in several of the zones, and will be discussed further in the results section 4.2.2.

S-1955 does not require purging as none of the pumping ports have been opened, and the drillhole was "dry" when the casing installed, so no water was trapped in the zones during installation.

Subsequent to the installation activities, several of the zones have been used as long-term monitoring zones by opening the "pumping ports". This converts the normally sealed MP casing into a quasi-standpipe, and therefore, allows the interior and exterior water to mix. Because of this, these zones were purged prior to sample collection. All zones are currently sealed and so no further purging is required.

3.2.3.2 Interior Pressure Differential

In order to ensure that water samples are not contaminated by interior water, the standard operating procedure is to maintain the interior water pressure below that of all of the exterior zone pressures.

This ensures that exterior water flushes the sampler faceplate as the valve opens, displacing interior water that would otherwise enter the sample container.

All wells are now operating with the interior piezometric levels below the exterior pressures.

3.2.3.3 Leakage

Separation of the MP casing 6m below the surface in well S-DIAND-002 presented a potential problem with chemistry integrity, as the surface water chemistry was shown to be elevated in arsenic during recent testing. Because the piezometric pressure inside the disconnected MP Casing exceeded the pressure in Zone 4, and as it was not certain that the pumping port in S-DIAND-002, Zone 4 was properly closed (leak testing had not been carried out after closing in the previous monitoring round), there was a possibility the water had flowed from the surface pond into Zone 4. Therefore, after resealing the separated casing, a sample of the interior casing water, at the depth of Zone 4, was collected prior to purging for comparison.

Test results showed that the arsenic levels inside the MP Casing at the same depth were significantly lower than in Zone 4 (Appendix 1). Furthermore, leak testing following the purging indicated that the Zone 4 pumping port was in fact closed. Therefore, it was shown that the disconnected casing did not contaminate the exterior water in Zone 4 and lead to elevated arsenic concentrations observed (see below for chemical results). Therefore, arsenic levels in Zone 4 are representative of the outside water chemistry.

3.2.4 Transducer Installation

After completing pressure profiling and water sampling during the March 2003 monitoring, “Diver”, integrated transducer/datalogger units (manufactured by Van Essen Instruments) were installed in the following wells and zones:

S-1857	zone 3
S-DIAND-01	zone 4

Divers were not installed in S-1860 and S-DIAND-002 due to frozen water in the top of S 1860 and a disconnected casing at the top of S-DIAND-002 (due to frozen water in the steel surface casing annulus “jacking” the PVC casing out of the coupling). A barometric logger was installed in S-1857. Divers were suspended to specific depths on 30-lb test fishing line firmly affixed at the surface in the steel boxes protecting the casing stick-ups. Divers were programmed before installation to allow high resolution long-term data recovery without data storage problems. Table 6 lists Diver installation and programming details.

Table 6: Diver Installation Details

Well #	Date	Open Pumping port	Logger Depth (meters below TOC)	S/N	Sampling rate
S-1857	Mar 31, 03 8am	Zone 3	90	30223	every 3 hours
S-1857 (barometric)	Mar 31, 03 8am	None	15 (above water) barometric	32851	every 3 hours
S-DIAND-001	Mar 31, 03 3pm	Zone 4	32	30230	every 3 hours

The Divers were retrieved in May and July and all pumping ports closed and tested for leaks. Data plots are presented in Figures 4 to 6. It should be noted that all historic Diver data has been presented for comparison, including data for S-DIAND-002 from 2002.

Due to the need for purging zones following long term monitoring using the Divers, and the potential for ice forming if water levels are near surface in the open MP System, it was decided to discontinue this monitoring style. All pumping ports are now closed and have been tested for leaks. All ports are confirmed watertight.

4 Program Results and Interpretation

4.1 Pressure Profiles

Spring 2003 data, and past pressure profile data are displayed in Figures 7 through 16. Piezometric levels in each monitoring zone are plotted as the "equivalent depth to water" on the plots. This refers to the depth the water would be observed in an open standpipe if screened across the MP zone. The equivalent depth to water is calculated by adding the pressure head (height of water column calculated from the zone pressure measured) to the depth of the measurement port where the pressure was measured.

Any zone that has an equivalent depth to water greater than ground surface would have water flowing from the open standpipe and is classified as flowing artesian. The atmospheric line plotted with the data indicates a pressure head of zero (ie: a dry zone) at that depth. Any zone that plots above that line is saturated, and along, or below, that line is unsaturated. A zone that plots below that line is under negative pressure, or suction (as in S-1955), thus indicating a confined aquifer condition with drainage out the bottom (ie: into the underlying mine workings).

Pressure measurements have been corrected for atmospheric effects and in all of the plots the vertical depth (corrected for drillhole dip and curvature) is illustrated. The general geology/lithology features and the corresponding MP casing design (i.e., packer locations) are shown to indicate where the zones are situated. The "error bars" illustrated are for presentation purposes and indicate the zone length monitored (section between hydraulic packers) and not calculated error.

4.1.1 S-1857

Pressure data from the spring 2003 sampling events (Figures 7 and 8) show a significant difference from that of previous years sampling events. In Zones 1 to 3 (at or below Westbay Fault), the 2002 data show a decreasing trend until freshet, when water levels increased as expected. This pattern then repeats itself in 2003.

However, above the fault (Zones 4 to 10), the water levels increased until the fall of 2002, dropped, and then again rose in the freshet. This is probably due to the upper zones, which had previously been draining to the dewatered side of the fault through the open drillhole, taking approximately 8 months to repressurize to "normal" levels. In 2003, however, the upper zones show the expected pattern of decreasing piezometric levels up to the freshet and then an increase after that.

The Westbay Fault (see geologic log in Figure 7) remains the primary control on pressure variation with depth at this location. The only anomaly from the sampling event in July, 2002 is the increase in pressure in zone 3 (Westbay Fault zone). This difference, as well as the higher pressure during March, 2003 vs. either the January, 2002 or April, 2002 data, suggests seasonal fluctuation in water pressure. A similar trend is not observed in other monitoring zones, possibly indicating an interaction of structural control (Westbay Fault) with seasonal and yearly water level fluctuation.

The groundwater elevations in Zones 1 to 3 are similar to that observed in the open hole prior to installing the MP system. This indicates that the drillhole was influenced by the dewatered side of the fault, and consequently, that the flow was impeded across the structure.

4.1.2 S-1860

No pressure data are available for March and May 2003 due to frozen water in casing. However, data from June and September 2003 can be compared to data from April, July, and October 2002 monitoring events in Figures 9 and 10. Without the March and May 2003 data, it is difficult to compare seasonal trends, but it appears that the rising trend observed over the freshet in 2002 was not continuing into the June to September period in 2003.

Piezometric levels are all similar to the 2002 levels for June, but show a significant decrease between September 2002 and 2003. This is probably due to the fact that 2003 was drier than 2002 based on precipitation data collected at Yellowknife Airport by Environment Canada (Figure 11).

Zone 3 (breccia zone) still dominates the pressure profile, and is equal to the original open hole groundwater elevation.

4.1.3 S-1955

During MP casing installation in January 2002, the water level in the drillhole was below 150m (extent of measuring tape available), and subsequently below the bottom of the installed MP casing (located at 144m). Following installation and inflation of the hydraulic packers, Zones 1 to 5 showed negative pressure heads. Based on the observed pressures, it was postulated that the drillhole had been draining to the underlying 2000 Level mine workings, and that the lower zones were still seeing this influence. As the drillhole is in potentially very low K rock, it appeared that drainage exceeded inflow to the drillhole. However, it was thought that the sealed zones would eventually begin to saturate due to slow seepage over time.

Alternatively, the upper part of the drillhole (Zones 6 and 7) was observed to be saturated during pressure monitoring immediately following installation of the MP Casing. The pressures were collected approximately 24 to 30 hours after upper packers had sealed these zones, which indicated that water was collecting in the sealed sections of the drillhole. It is thought that these zones are connected to surficial water or shallow aquifer sources via fractures in the overlying bedrock, etc., and thus are assumed to represent a perched water table. A review of the geology log of the drillhole does not indicate an obvious aquitard that would cause a perched condition. The bottom packer in Zone 6 is located in a mafic flow layer, but the presence of jointing and hematite staining would appear to suggest it would not be a good barrier to flow. At this time it is not known what the controlling factor for the pressure differential between the saturated Zone 6 and the underlying, unsaturated Zone 5 consists of.

Prior to spring 2003, pressure heads (Figures 12 and 13) in Zones 1 to 5 remained slightly negative, while Zones 6 and 7 showed a positive pressure. However, data collected from March 2003 onwards indicates that all of the lower zones, except Zone 1, may be re-saturating as pressure heads are above atmospheric. Fluid samples have been collected from Zones 2 and 3, thus confirming saturation as expected once the drillhole was segregated by the MP packers.

Note: contrary to earlier reports, the lowest zone (Zone 1), does not appear to be saturating. Although the zone, which consists of the open drillhole (continues to 1352 m) below the lowermost packer, has consistently shown a pressure head greater than atmospheric since March 2003, it was not possible to collect a water sample (ie: sample container was dry after attempting to collect a sample) from this zone during the March, June, or September sampling round. Therefore, while the pressure head has increased, it is still uncertain where the water level is in the zone/open drillhole.

The reason for the increasing pressure head may be due to either gas pressure, or a pressure pulse moving in front of the 2003 freshet infiltration. This would still agree with the theory that the drillhole was draining to the mine workings, and will need to be carefully monitored in future pressure profiles and sampling rounds to determine what is controlling the pressure change in this part of the rock mass.

No significant changes were observed in the upper zones (6 and 7) since March other than a slight rise (<3m) in water level during the freshet as expected. This had started to dissipate slightly (~0.1 to 0.15m) by the time of the September measurements.

4.1.4 S-DIAND-001

There appears to be only one significant variation between the 2003 data and previous measurements (Figures 14 and 15). At depth, specifically zones 1, 2 and 3, July and October, 2002 data show higher piezometric levels than the March, 2003 values. At these measurement ports, all data other than April, 2002 shows pressures higher than March data. The variation in data, particularly between the July, October, 2002 and Feb, April, 2002, March, 2003 data suggests some sort of complex control at depth not clearly obvious on well logs alone, possibly related to seasonal fluctuations such as the movement of a wetting front through the system after frozen ground has thawed. Zones 1 to 3 are on the non-mine side of the Townsite Fault. It is possible that there is an increase in water levels on the non-dewatered side of the fault during the spring thaw and summer rains, which dissipates over the winter.

4.1.5 S-DIAND-002

Pressure values, in general, show variation that is likely attributable to seasonal or short-term fluctuations in water levels (Figures 16 and 17). Over the course of sampling, all zones except zone 2 show very consistent variation relative to other sampling events. Zone 2 shows slightly greater variation, but this may be a result of low permeability, and not directly water input, as suggested by the high pressures at the time of drilling during Feb. 2002. Readers are referred to the initial installation report (SRK, 2002) for a complete discussion of the effects of drilling on pressure.

One other significant difference between 2002 and 2003 is the downwards trend in Zones 1 to 4 (see Figure 16) after the March sampling round, while all of the zones above the Rudolph Fault (Zone 4) show an increasing trend. This may show that the upper zones are getting more recharge, whereas in the lower zones the drainage to the mine exceeds the recharge getting through the fault.

4.1.6 Overall Interpretation

The 2003 monitoring indicates that the most significant source of variation in the data is likely due to seasonal fluctuations in water pressures, caused by changes in precipitation and infiltration. These variations are influenced to some degree by the effects of local structural controls. A possible significant control on timing of infiltration may be ground thaw. Variations in at least one well, S-DIAND-001 (July, 2002) could be explained by the presence of a wetting front moving down gradient after spring ground thaw. However, this is not observed in 2003. Not all increases in water pressure at depth can be explained by this mechanism. March, 2003 data for S-1955 show an increase in pressure at depth, indicating significant change from previous events that recorded deeper zones as “dry”. The relative timing of this compared to S DIAND-001 indicates that alternative mechanisms exist to ground thaw capable of causing increases in water pressure. This could be due to zones in S-1955 slowly saturating over time (, very low inflow to zones in previously dry drillhole). It should be noted that the historic exploration drillholes are potentially caked with rod grease, which may impede already low K flow.

4.2 Water Sampling

Results of water analyses with comparison to CCME guidelines for aquatic life, and comparison to Baker Creek upstream of the mine workings, are presented in Appendix 1.

4.2.1 QA/QC Results

Three duplicates, two field blanks and one equipment blank were collected during the groundwater monitoring program (Appendix 1).

Duplicate samples were collected at DIAND-001-Z4 and generally indicated good reproducibility. Poor reproducibility of aluminum and silver was noted on one occasion and cobalt reproducibility was poor on two occasions.

Ion balances were generally good (ie. +/-10%). However, most samples collected during the January 2002 sampling round had very poor ion balances. This may have been due to a problem with the reported alkalinity data, which was anomalously low compared to data from other sampling rounds.

Poor balances were also obtained for field and equipment blanks because most results for these samples were at, or near, detection limits. This is not considered to be a problem. Four other samples had ion balances with percent differences slightly greater than 10, indicating a potential problem. This could be due to sample variability or could reflect inaccuracies in the lab results. Field blanks were generally free from contamination, with most values at or near detection limits. However, antimony and copper were significantly above detection limits in the June 19 field blank, and antimony was above detection limits in the March 31 field blank.

The equipment blank collected on September 13 indicated slight contamination with several metals (arsenic, antimony, cobalt, copper, lead, lithium, manganese, molybdenum, nickel, rubidium, strontium, titanium, uranium and zinc). This indicates that field decontamination procedures will need to be improved and should be verified with a second or third equipment blank on the next sampling round in March 2004.

4.2.2 Water Chemistry Results

Groundwater monitoring results are provided in Appendix 1. The appendix tables include comparisons to CCME guidelines for freshwater aquatic life and a surface water sample collected from Baker Creek upstream of the mine site (surveillance network program station SNP 43-11). A summary of selected parameters is presented in Table 7. It should be emphasized that the monitoring wells are located outside of the mine envelope within the assumed draw down cone of the mine and; therefore, do not reflect any influence from the underground mine workings. The samples were collected to establish current baseline conditions prior to any remediation measures, including any measures that could lead to movement of water from the mine towards these wells such as reflooding the mine to the point where groundwater gradients are reversed (ie: flows away from mine workings).

Arsenic, copper, iron and ammonia concentrations in most samples exceeded CCME criteria for aquatic life. Selenium was greater than CCME guidelines in zones 4 and 6 of S-DIAND-002, and at S DIAND 001 (zone 10). Silver exceeded CCME criteria on one occasion at S-1857 (zone 10). Aluminum, chromium, lead, selenium, silver and thallium were all above CCME guidelines at S-1955 (zone 6) on one occasion. Arsenic and ammonia concentrations were also above CCME criteria in samples from Baker Creek, indicating that the elevated concentrations may be due to regional effects.

A comparison of monitoring well results with the Baker Creek sample (for parameters that have CCME guidelines) indicates that aluminum, chromium, copper, iron, lead, molybdenum and nickel were commonly above values reported for the Baker Creek sample.

Elevated concentrations of sulphate (600 to 1200 mg/L), chloride (150 to 180 mg/L) and arsenic (0.4 to 5 mg/L) were noted at S-DIAND-002 and S-1955 (zone 6), compared to results from the other monitoring wells.

Increases in arsenic concentrations were evident in some of the wells (S-DIAND-002 zone 4, S-1857 zones 1,3,5 and 10, S-1860 zone 7 and S-1955 zones 2 and 6) since the start of monitoring. These increases were also accompanied by increases in other parameters such as sulphate in some instances.

Table 7: Summary of Groundwater Results for Selected Parameters

Sample ID	Stat	Ca mg/L	Mg mg/L	Na mg/L	K mg/L	SO4 mg/L	Cl mg/L	As-D mg/L	Sb-D mg/L	Cu-D mg/L	Zn-D mg/L
S-DIAND-001 (n = 10)	max	218	87	133	7.1	624	37	0.12	0.0037	0.0066	0.011
	min	47	24	26	2.3	63	17	0.005	0.0003	0.0003	-0.01
	average	123	50	70	4.0	296	29	0.027	0.0014	0.0034	0.0039
S-DIAND-002 (n = 8)	max	275	130	146	15	1190	249	5	0.31	0.0082	0.027
	min	155	32	45	5.7	414	3.3	0.39	0.0022	0.0027	0.0078
	average	222	82	111	10.6	837	161	2.1	0.095	0.0060	0.018
S-1857 (n = 15)	max	114	24	167	49.5	212	70	0.17	0.0029	0.0082	0.0127
	min	24	6.3	1	0.3	24	0.5	0.0078	0.0010	0.0005	-0.01
	average	62	13	67	6.0	134	19	0.077	0.0019	0.0039	0.0028
S-1860 (n = 8)	max	155	41	35	4.8	250	10	0.054	0.0015	0.0047	0.0065
	min	74	21.7	13	3.7	90	2.1	0.017	0.0005	-0.0002	-0.01
	average	104	31	19	4.4	157	6	0.039	0.0008	0.0016	0.0013
S-1955 (n = 8)	max	226	73	106	9.1	609	149	2	0.0025	0.44	0.083
	min	12	3.0	38	1.2	105	3.4	0.01	0.0008	0.0015	0.0042
	average	79	25	75	3.4	228	31	0.36	0.0015	0.059	0.019

4.2.3 Discussion

Because the hydraulic gradient surrounding the mine is directed towards the mine, results from the groundwater monitoring program are not considered to be impacted by water from the underground mine. The samples collected from the monitoring wells are intended to establish baseline conditions prior to any remediation measures, including any measures that could lead to movement of water from the mine towards these wells (ie: at full reflood levels).

The results indicate that concentrations of some parameters were above CCME criteria for freshwater aquatic life. Concentrations of some of these parameters (including arsenic) in samples from Baker Creek were also above CCME criteria. Therefore, it is possible that the elevated concentrations could be due to a regional effect, such as natural enrichment of arsenic in the soil and bedrock or enrichment due to atmospheric deposition of arsenic during operation of the roaster.

Concentrations of several other parameters (eg. major ions, arsenic, aluminum, copper, iron) were higher in the groundwater samples compared to the sample from Baker Creek. This is likely due to the long residence time of groundwater and increased contact with the bedrock. Concentrations of some parameters, such as dissolved iron, would also be expected to be higher under the reducing conditions found in many of the groundwater monitoring zones, compared to surface water.

Anomalous concentrations of sulphate, chloride, arsenic and other metals, such as molybdenum and selenium at S-DIAND-002 at Zones 4, 5 and 9 and S-1955, Zone 6 (particularly on September 13), are similar to samples collected from the tailings ponds, and may be explained by proximity of these wells to the tailings areas. S DIAND-002 is located between the South Pound tailings impoundment and mine envelope (Figure 1), while S-1955 is located near a site of historic tailings deposition in Back Bay. The relatively shallow depths at which this tailings water signature is encountered (~60m at S-1955 and as shallow as 10m at S DIAND 002) are also consistent with a near-surface source..

The rising trend in concentrations such as arsenic in some of the zones could be an indication that zone chemistry is equilibrating to natural chemistry following the initial purging at the start of the program.

4.3 Water Table Maps

Two maps were produced from the available water level data to produce a shallow and a deep water surface map. The majority of available data was used to construct the deep water surface map, which shows the effects of dewatering in the mine envelope (Figure 2). The shallow water surface map (Figure 3) integrates much of the same data, but is based primarily on results from the MP wells S-1955 and S-DIAND-002, as well as other shallow wells on site.

4.3.1 Deep Water Table Map

The deep water table map is dominated by the mine envelope, an area representing the mine workings, and the dewatered "cone of depression" around the mine workings. The mine envelope and immediate surroundings are shown by a hatched region on the map, as the contours would be so tightly packed as to confuse the drawing. Additionally, there is no data available for the exact position of the water table within the mine envelope. Outside of the mine envelope, water level data indicates local and regional flow towards the mine workings from all directions, including from the lake. This supports the concept of the mine site being a regional sink. Open drillhole water levels in S-1955 and S-1956 were at depths beyond the reach of the available water level tape, suggesting that water may be draining towards the mine workings, as discussed in section 4.1.3 for S-1955.

Open drillhole and MP well data in the vicinity of the Westbay Fault supports the interpretation that the fault acts as a lateral barrier to flow, at least in the area of the available data (see section 4.1.1). The one anomalous open drillhole water level is found at S-1853, indicating a water level that appears more representative of water levels on the west side of the fault than the east, where the collar location is currently mapped as being. This is probably due to shallow infiltrating water ponding on top of a blockage that was identified at a depth of 15.9 metres.

4.3.2 Shallow Water Table Map

Equilibrated water level data from shallow zones in S-1955 and S-DIAND-002 (Figures 12 and 16 respectively) indicate that shallow groundwater is present. This shallow groundwater is interpreted to represent perched conditions relative to data from deeper zones in these same wells that suggest mine envelope conditions (e.g., zones 1 to 5 in S-1955 described in section 4.1.3).

Perched conditions could be expected if the hydraulic conductivity and porosity of shallow bedrock was significantly higher than that of deeper bedrock. The topographic high in the area of S-DIAND-02 and the North, Central and South Ponds could act as a local recharge area at the site, further providing input to the possible perched zones. Geochemical data suggests concentrations indicative of near-surface sources, further supporting the conclusion that a perched zone exists. At this time, no conclusive mechanism has been identified.

The extent and dynamics of the perched zone are relatively unknown. The map has been drawn in such a way as to incorporate the entire topographically high area, though this may over estimate the area. Away from the two MP wells discussed here, and the topographic high, the contours of the shallow map match those of the deep water table map, indicating the systems are merged. Away from areas that have been affected by the mine dewatering, there is no indication of perched conditions.

5 Conclusions and Recommendations

5.1.1 MP Monitoring Wells

5.1.2 Maintenance

As part of the September sampling event, all MP wells were bailed down to prevent interior water from freezing. However, permanent repair to the disconnected upper casing section at S-DIAND-002 has not been carried out.

As standard Westbay casing connectors cannot be repaired or re-installed without removing the entire system, in the short term it is recommended that a section of Westbay casing be used to extend the top of the S-DIAND-002 system to contact the closed lid of the metal box that protects the well head. The extension could be cut to a length that allows the metal box lid, when closed and locked, to rest directly on the extension, thus preventing it from moving upwards if ice jacking is again a problem. Since the annulus between the HW and MP casings would be open at the top, the ice should move up freely without damaging the casing.

The recommended long term solution will be to pull the separated casing section from the hole this summer when the annular ice has melted, apply a PVC cement to the coupling, and reattach. The PVC cement will cure under water and provide a permanent seal. PVC cement will not adversely affect the geochemistry samples as it will be above the top-most packer, and interior water pressures will be maintained below zone pressures, thereby preventing any solvents from entering zone waters during port operation. Following cementing of the casing, it is recommended that the annular space be filled with bentonite to displace water in the steel casing annulus.

5.2 Continued Operation

Pressure profiling and sampling should continue along the same schedule, with specific attention paid to anomalous zones identified in this report.

Pressure profiling was scheduled for January, 2004; however, heavy snow falls prevented this work to be carried out. This work will be carried out as soon as practical.

Pressure sampling and sample collection will be carried out in March 2004 to collect the pre-freshet samples.

5.3 Open Drillhole Water Levels

Continuing to update and improve the water table maps will be important to improving understanding of the hydrogeology at the Giant site. Open drillhole water levels should be re-measured quarterly until such time as any trends can be identified. Bi-annual measurements should suffice after any trends have been identified.

It is recommended that polyethylene tubing be installed in each open drillhole to facilitate groundwater level monitoring using a water level tape. If water levels are found to be beyond the limit of the current 100 m tape supplied to the project, a longer water level tape should be used to increase the potential for reaching water in drillholes.

Michael Royle, M.App. Sci, P.Geo.
Senior Hydrogeologist

Dan Mackie, M.Sc.

Danette Schwab, B.Sc., G.I.T.

6 References

SRK, June 2002: Giant Mine Arsenic Trioxide Management Plan – Groundwater monitoring System Installation Report (1CI005.07.318).

Canadian Council of Ministers of the Environment, *Canadian Environmental Quality Guidelines*, Canadian Council of Ministers of the Environment, Winnipeg, 1999.

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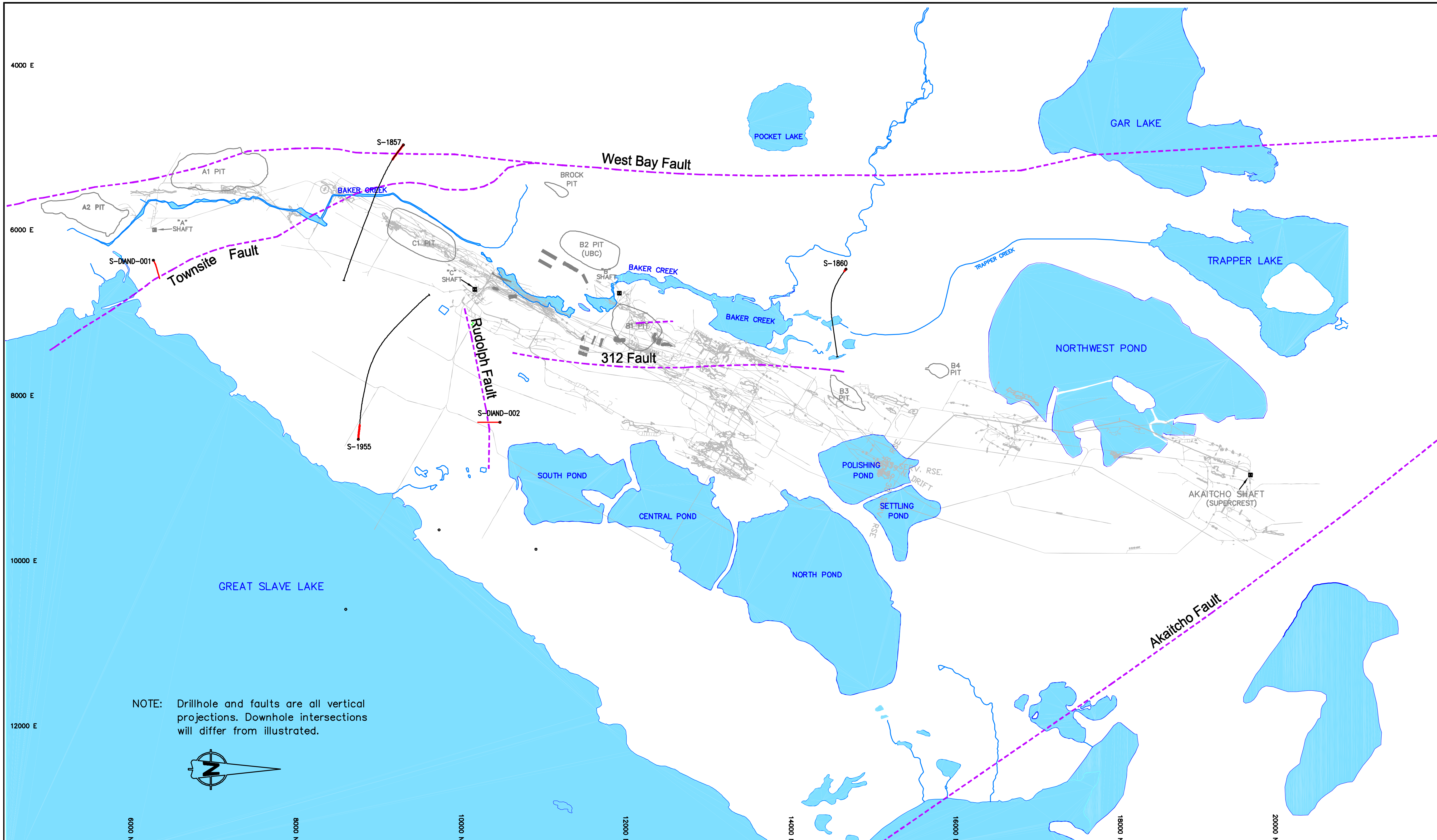
Figures



Multilevel Monitoring Well (red section)

0	500	1000	1500	2000	2500	FEET

1"=1000'

0	100	200	300	400	500	METRES

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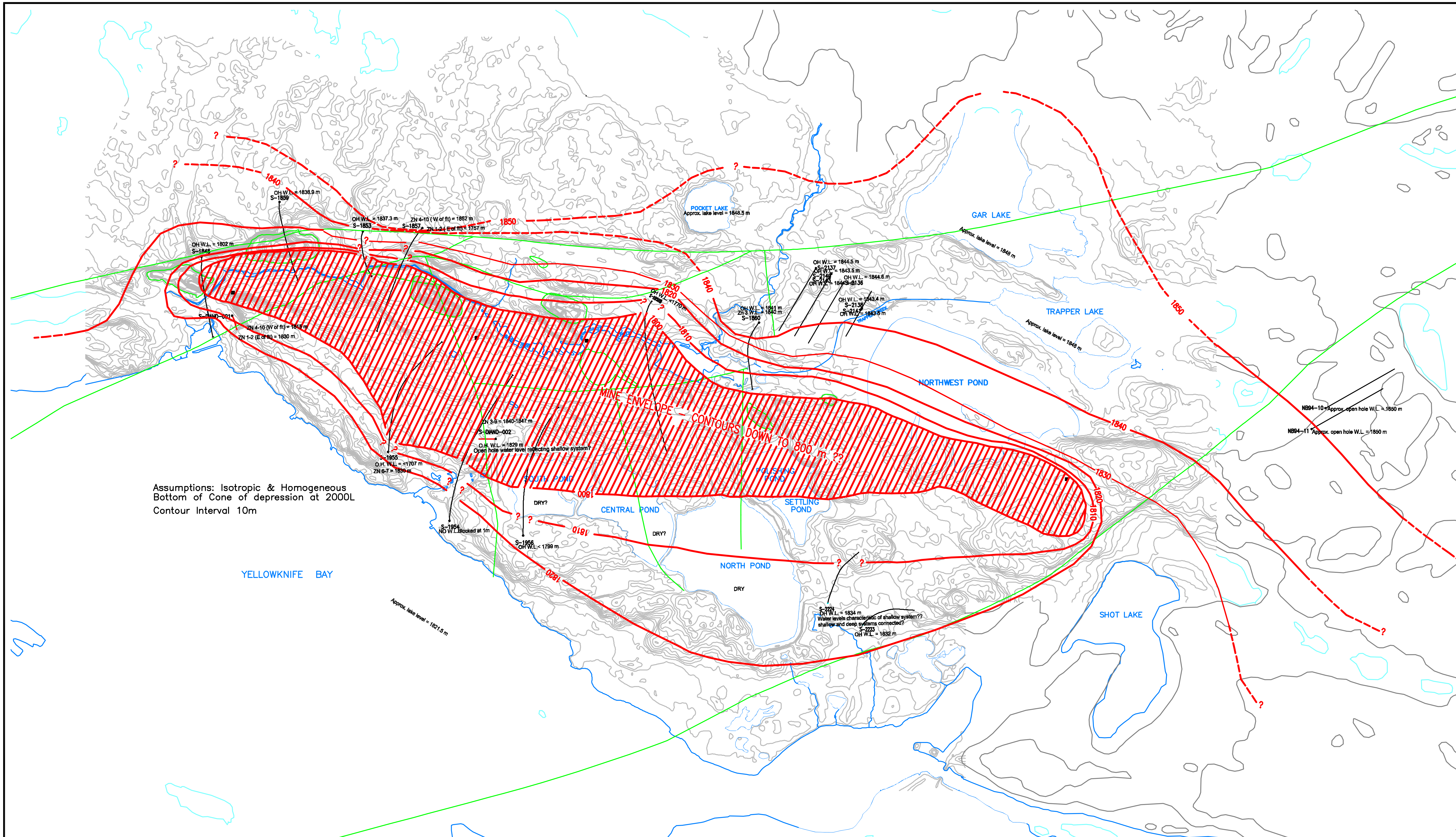
GIANT MINE ARSENIC TRIOXIDE MANAGEMENT

Location Map for MP observation wells

DRAWING NO. 1



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SCALE

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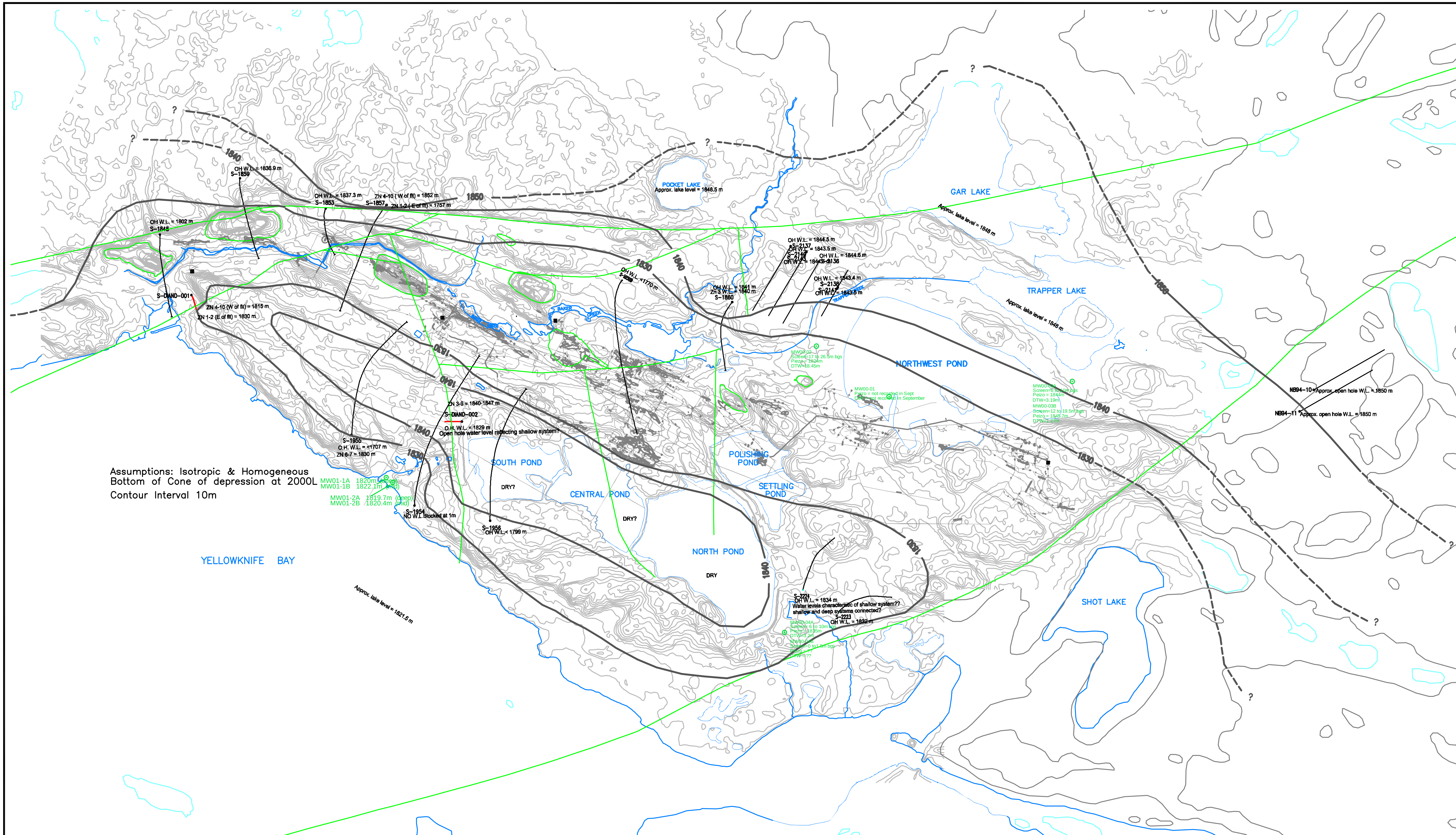
Giant Mine

DEEP WATER

PROJECT NO.	DATE	APPROVED	FIGURE
1CI001.10	Nov. 2003		2

File Ref: Site Plan 2002.dwg



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SCALE

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Giant Mine

SHALLOW WATER

PROJECT NO.	DATE	APPROVED	FIGURE
1CI001.12	Nov. 2003		3

File Ref: Site Plan 2002.dwg

S-1857 Levelogger Data

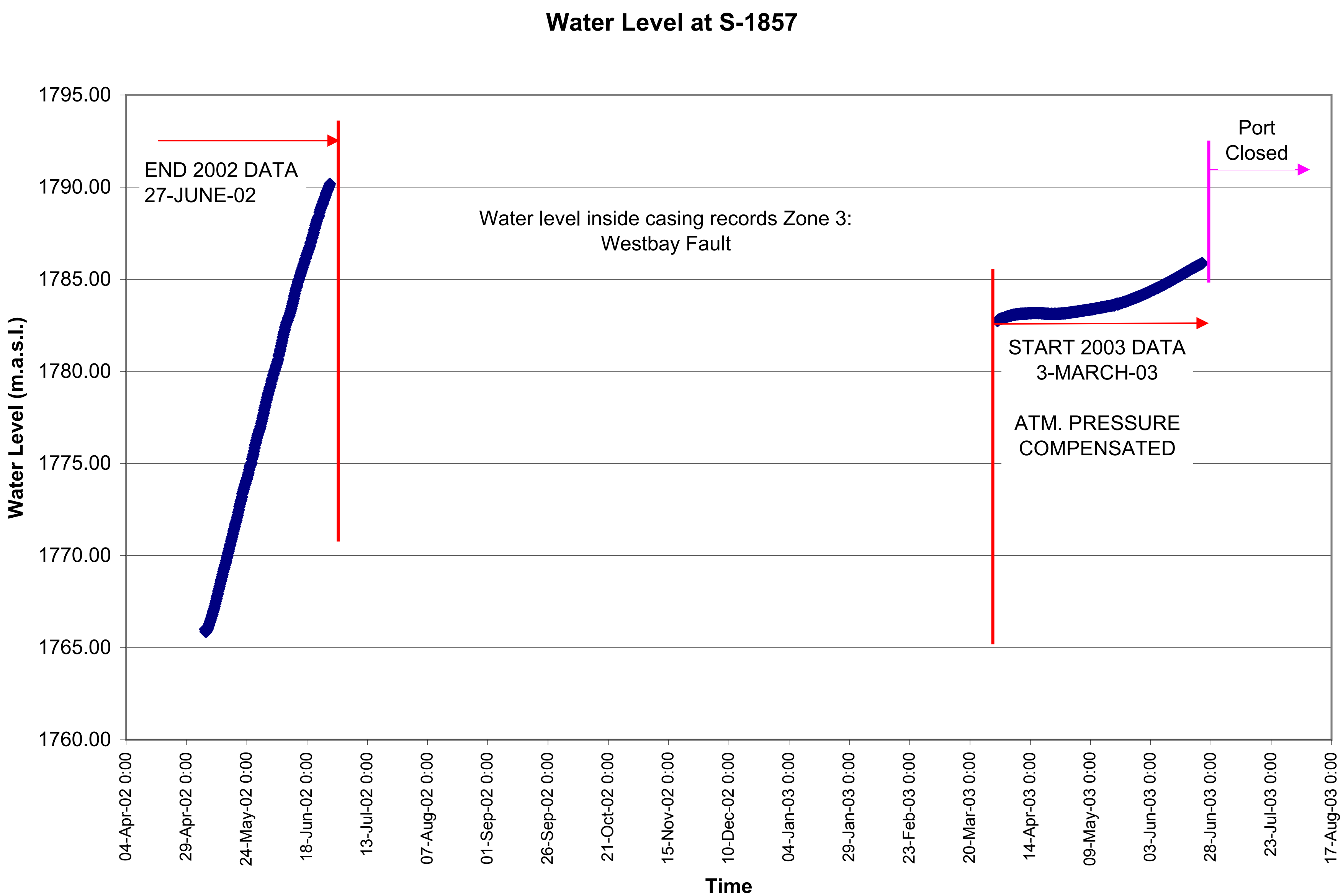
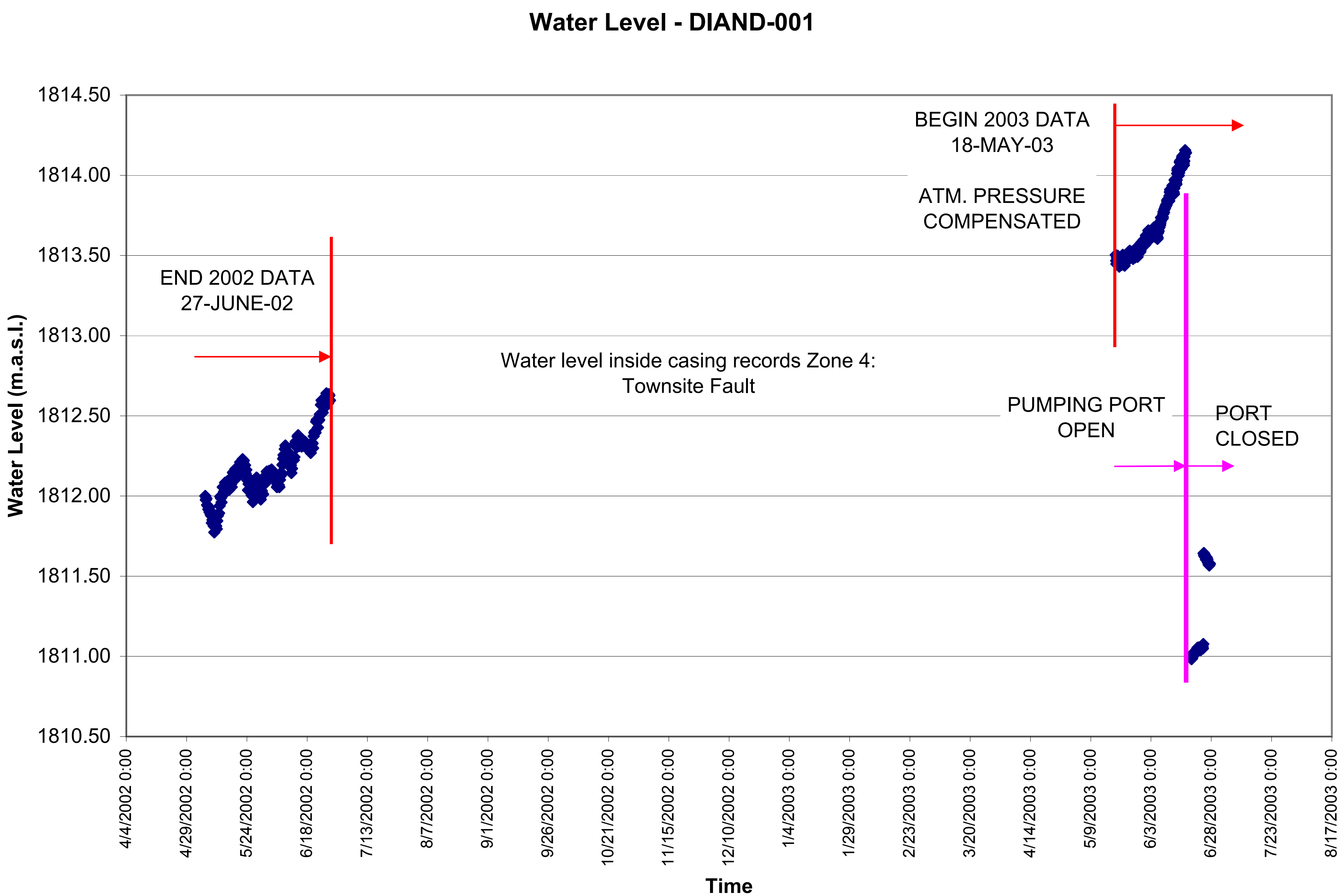


Figure 4

combined_2002-2003_leveloggerdata_June27.xls

S-DIAND-001 Levelogger Data



combined_2002-2003_leveloggerdata_June27.xls

Figure 5

S-DIAND-002 Levelogger Data

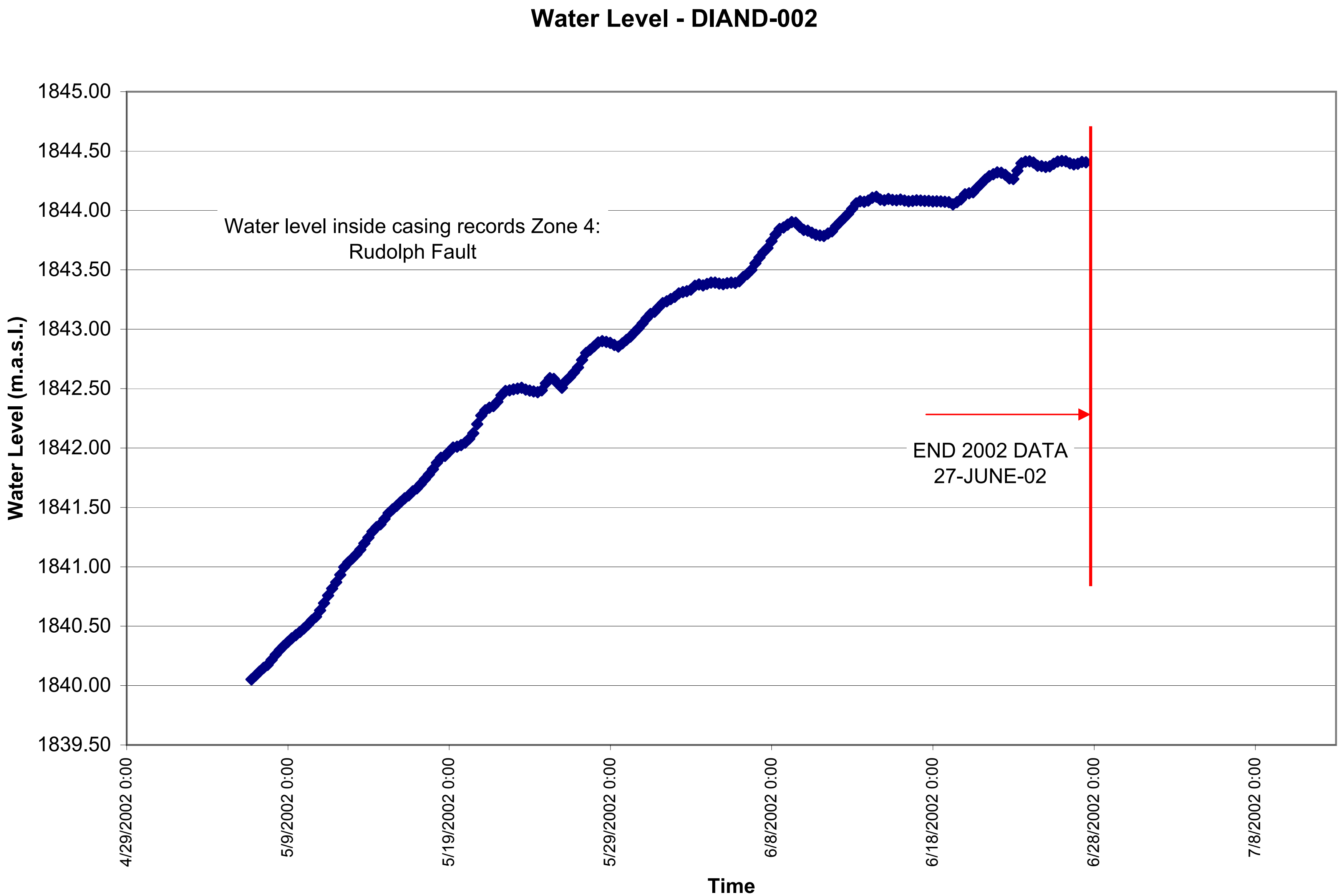
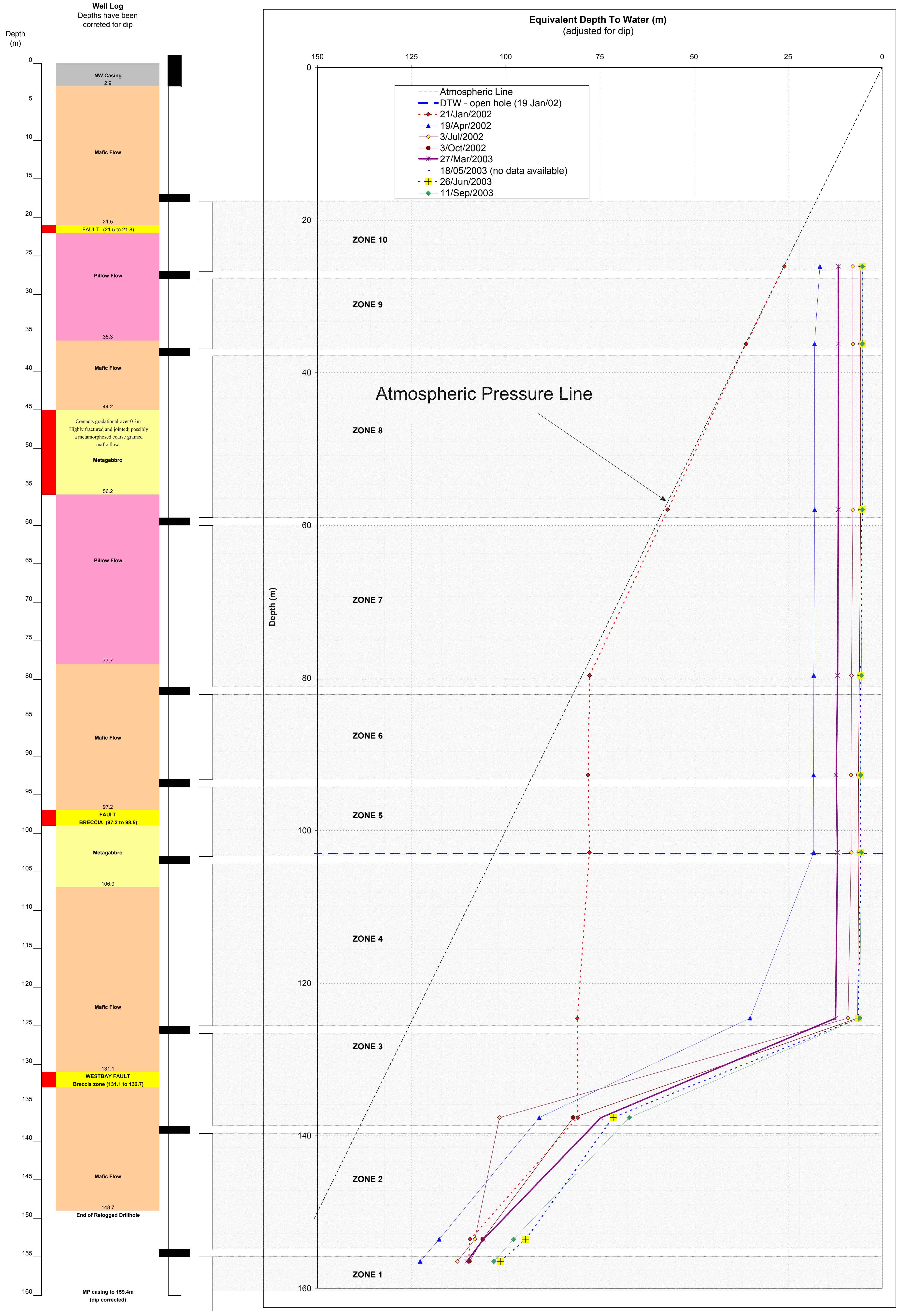


Figure 6

combined_2002-2003_leveloggerdata_June27.xls

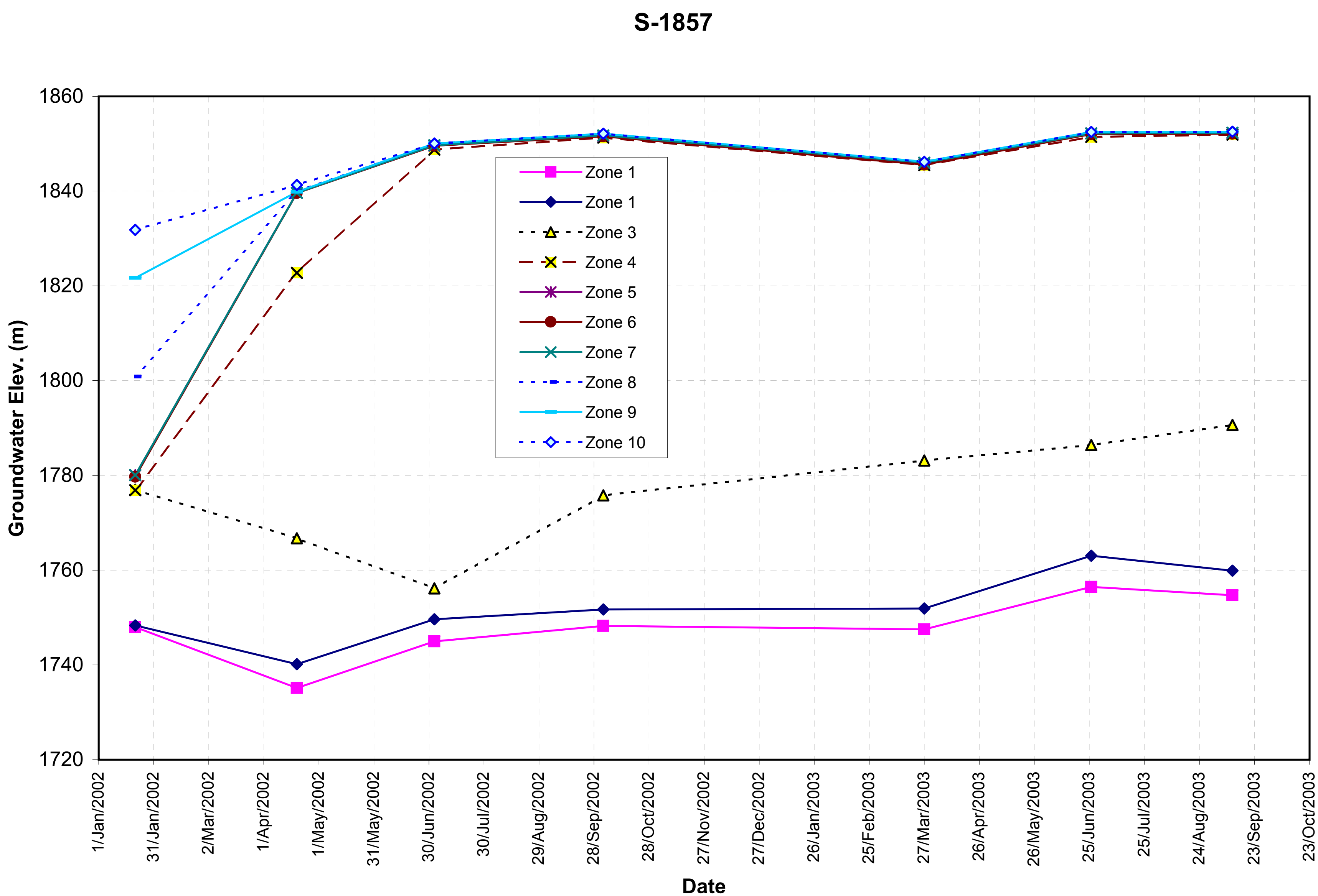
S-1857 Pressure Log



S-1857_Pressure_Log_sept_2003.xls

Figure 7

S-1857 Groundwater Level vs. Time



S-1857_Pressure_Log_sept_2003.xls

Figure 8

S-1860 Pressure Log

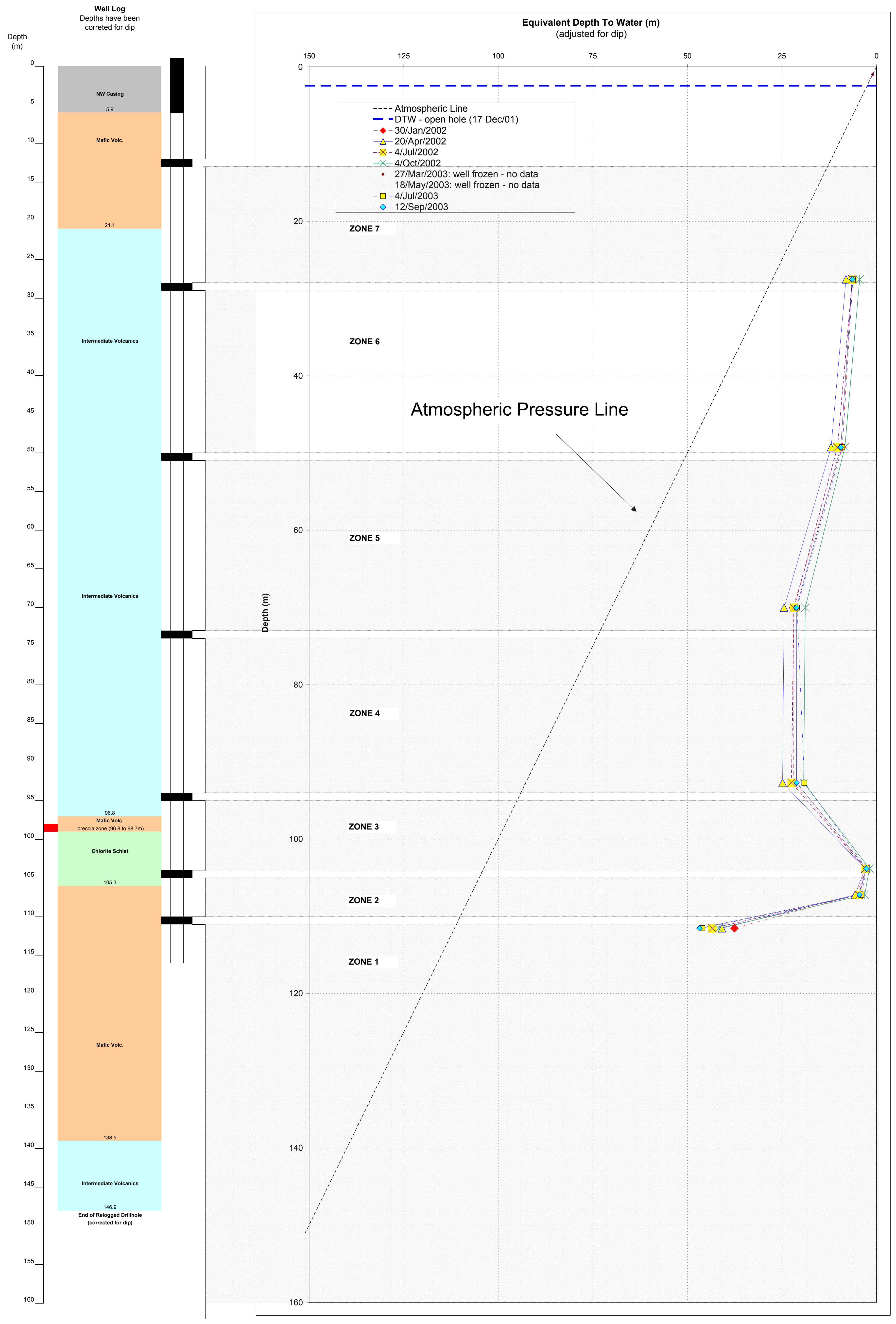
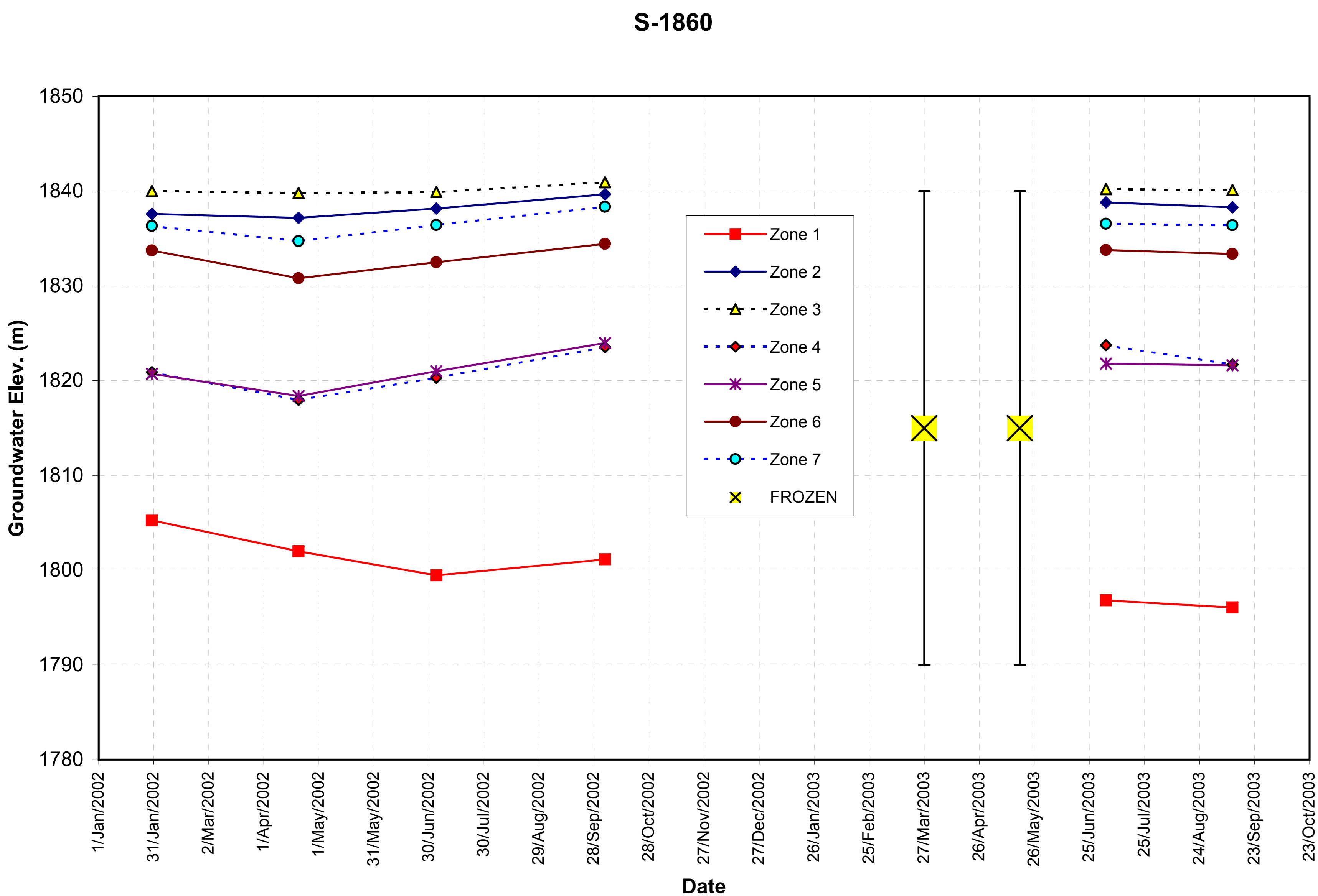


Figure 9

S-1860_Pressure_Log_Sept_2003.xls

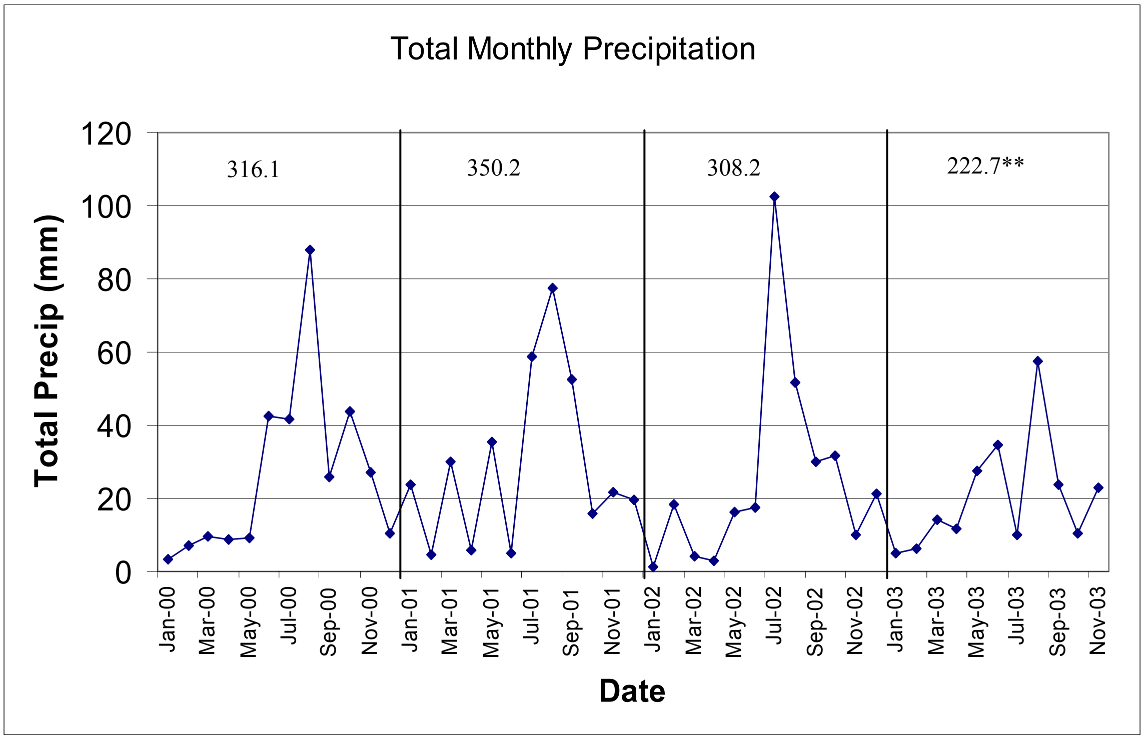
S-1860 Groundwater Level vs. Time



S-1860_Pressure_Log_Sept_2003.xls

Figure 10

Yellowknife Airport Precipitation Data (2000-2003)



Total precipitation = rainfall + snow equivalent

222.7** -- Does not include December 2003 data, but total December precipitation for 2000 – 2002 is not significantly greater than 20 mm.

Figure 11

S-1955 Pressure Log

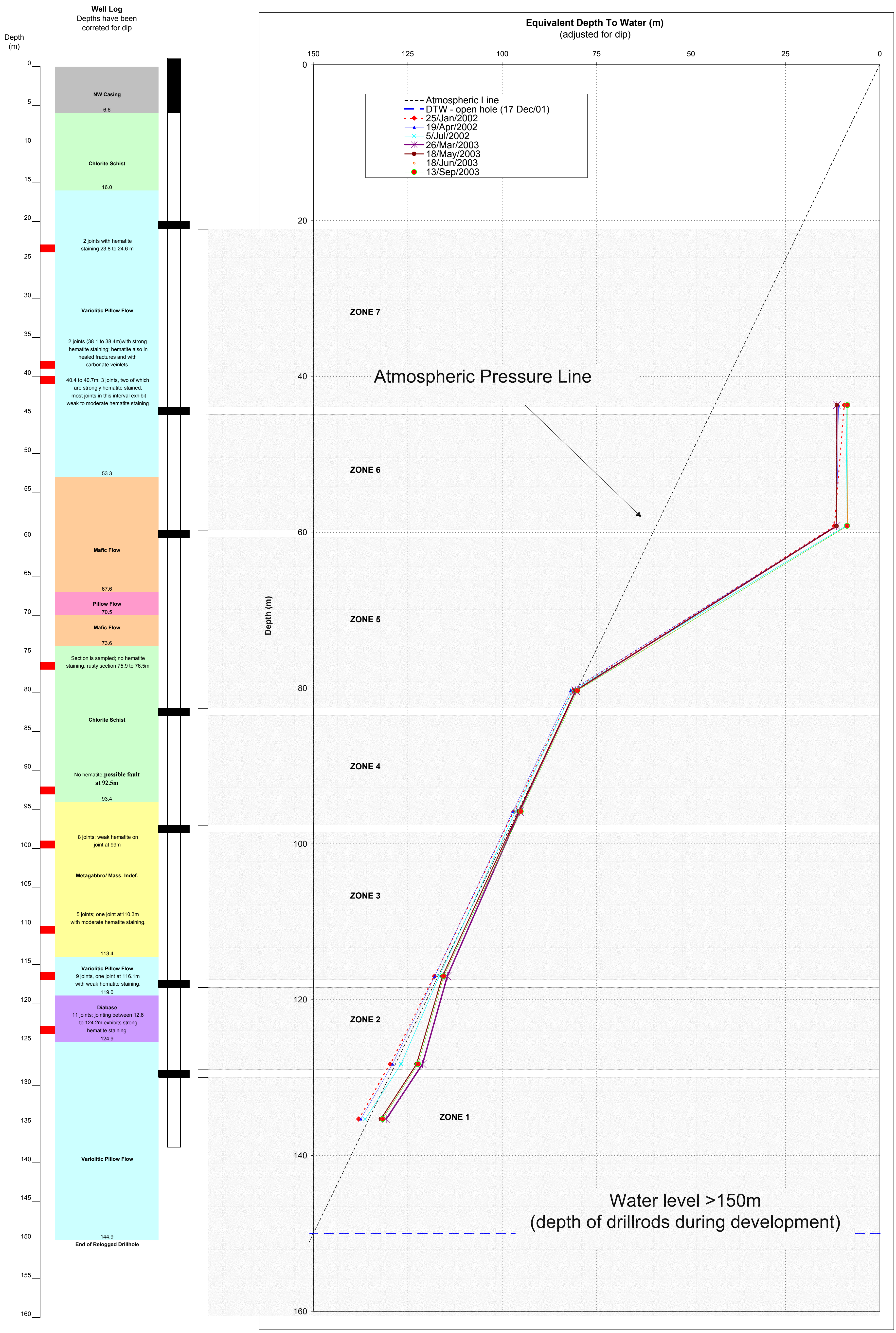
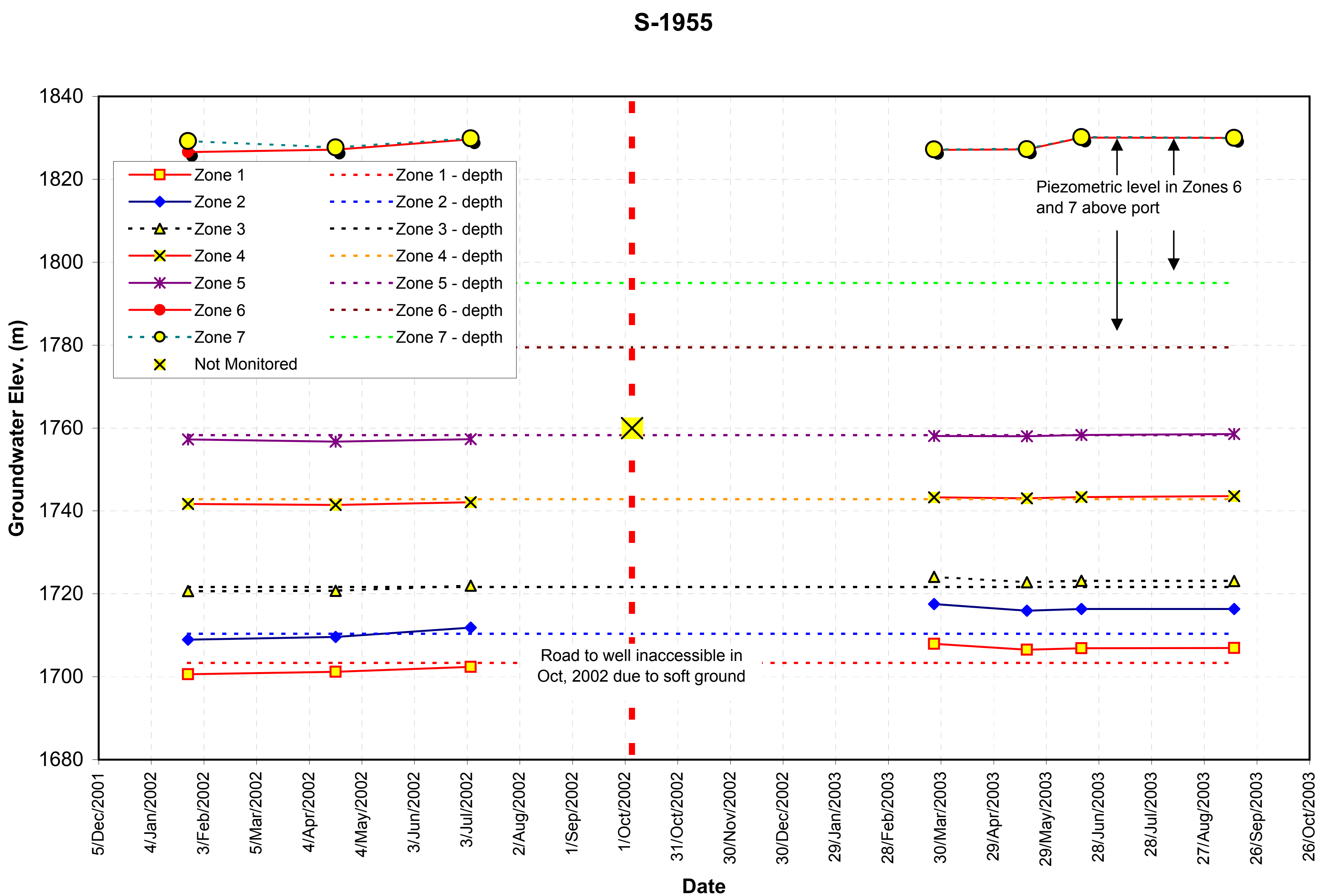


Figure 12

S-1955_Pressure_Log_Sept_2003.xls

S-1955 Groundwater Level vs. Time



S-1955_Pressure_Log_Sept_2003.xls

Figure 13

S-DIAND-001 Pressure Log

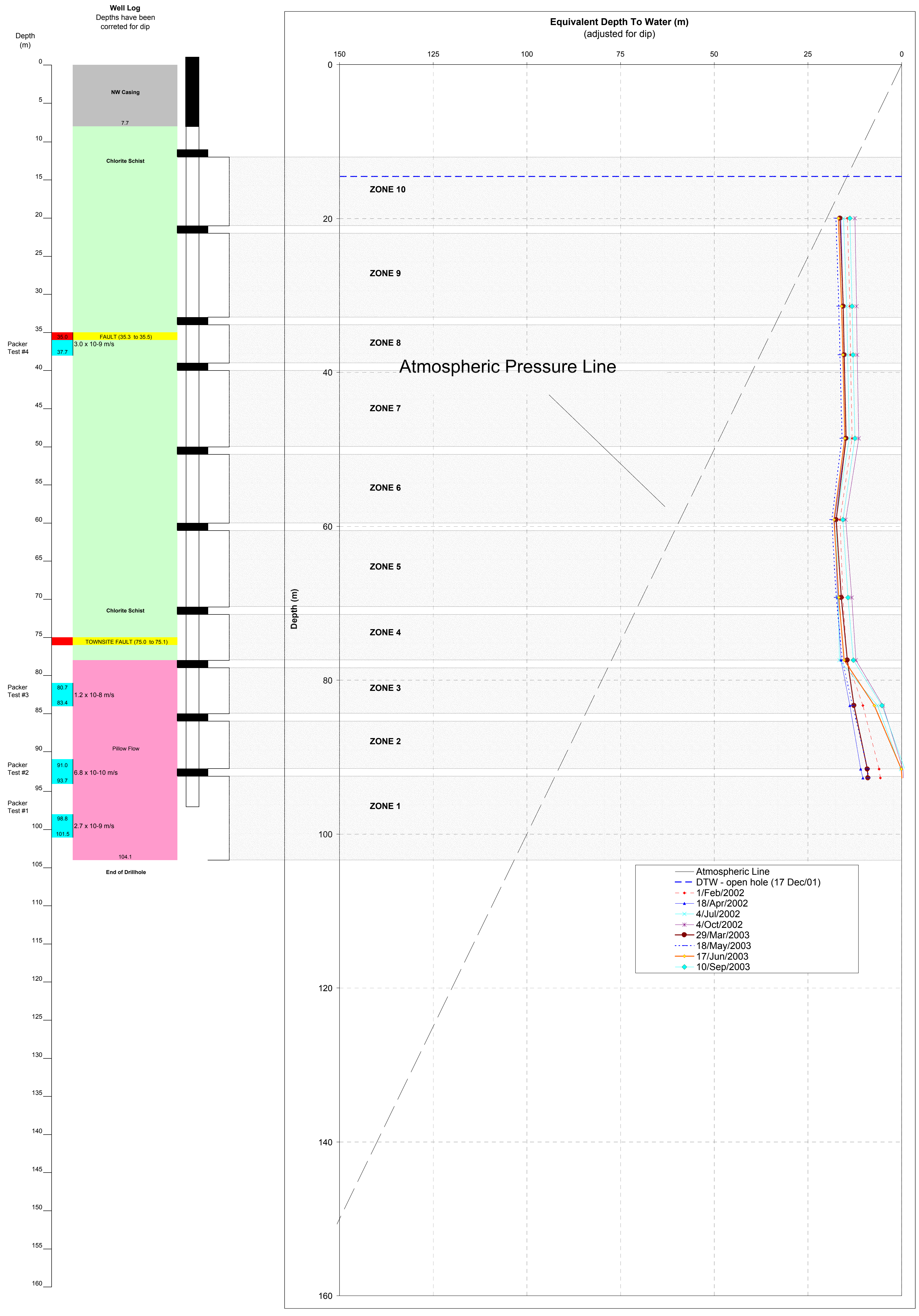


Figure 14

S-DIAND-001 Groundwater Level vs. Time

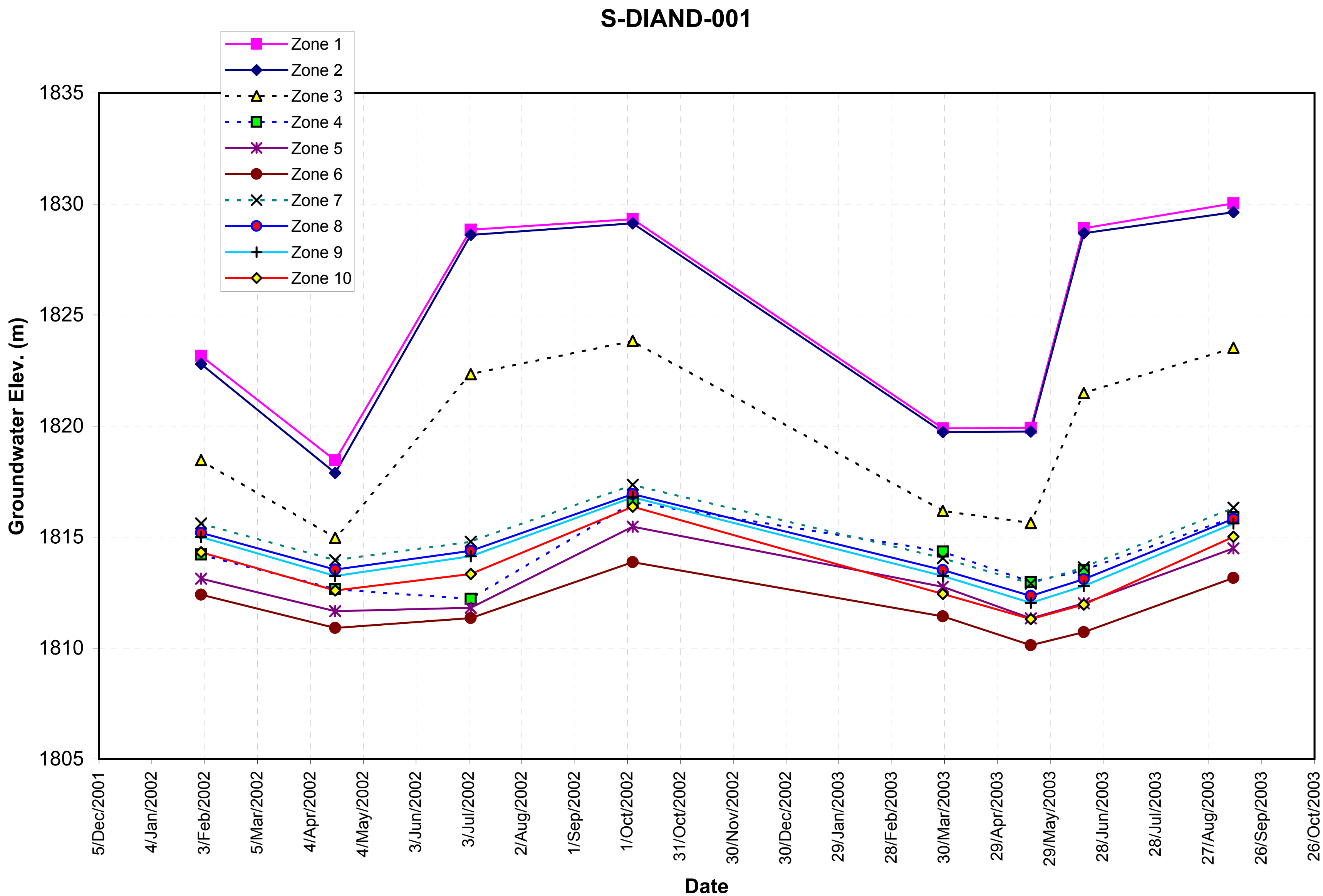


Figure 15

S-DIAND-001_Pressure_Log_Sept_2003.xls

S-DIAND-002 Pressure Log

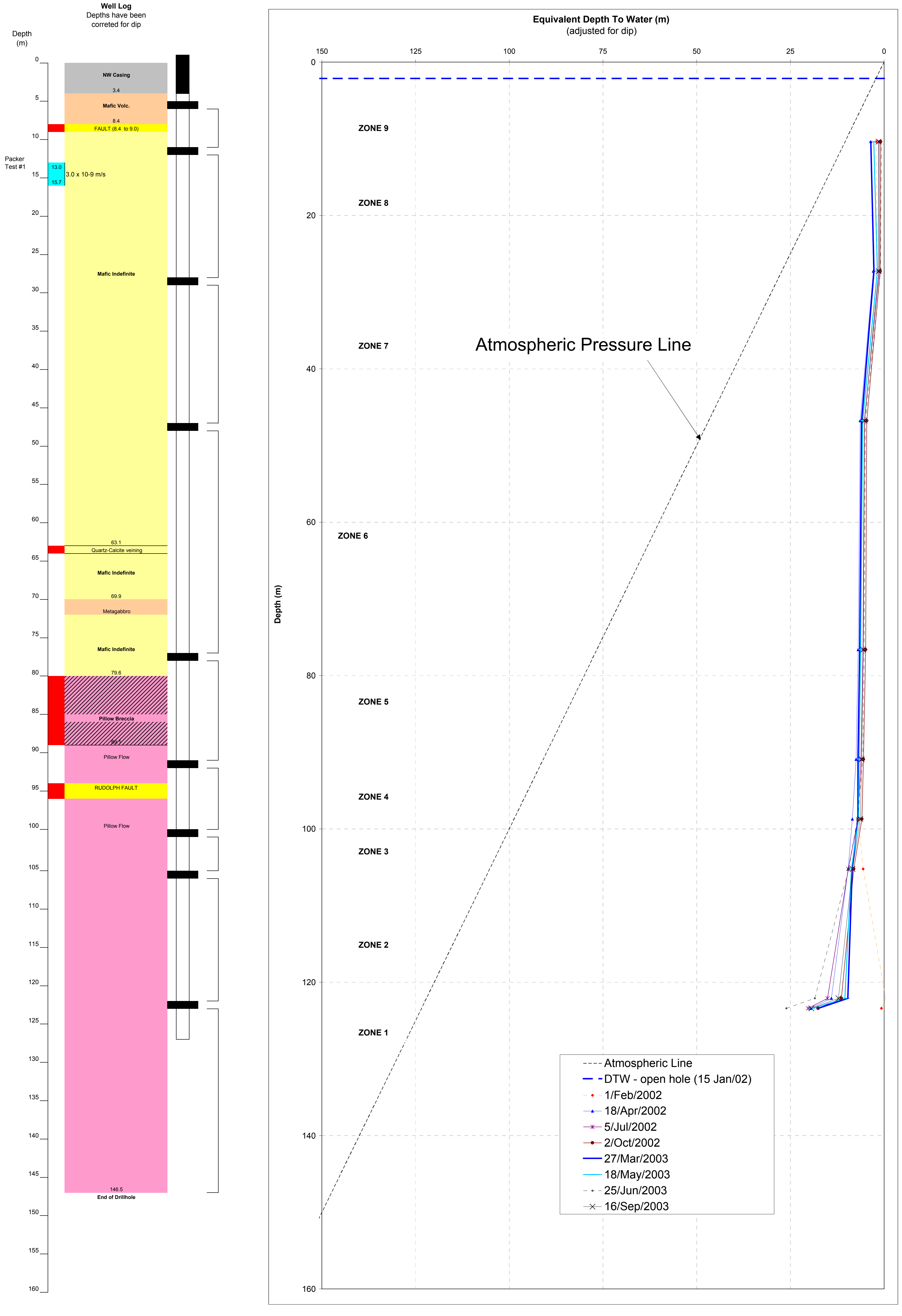
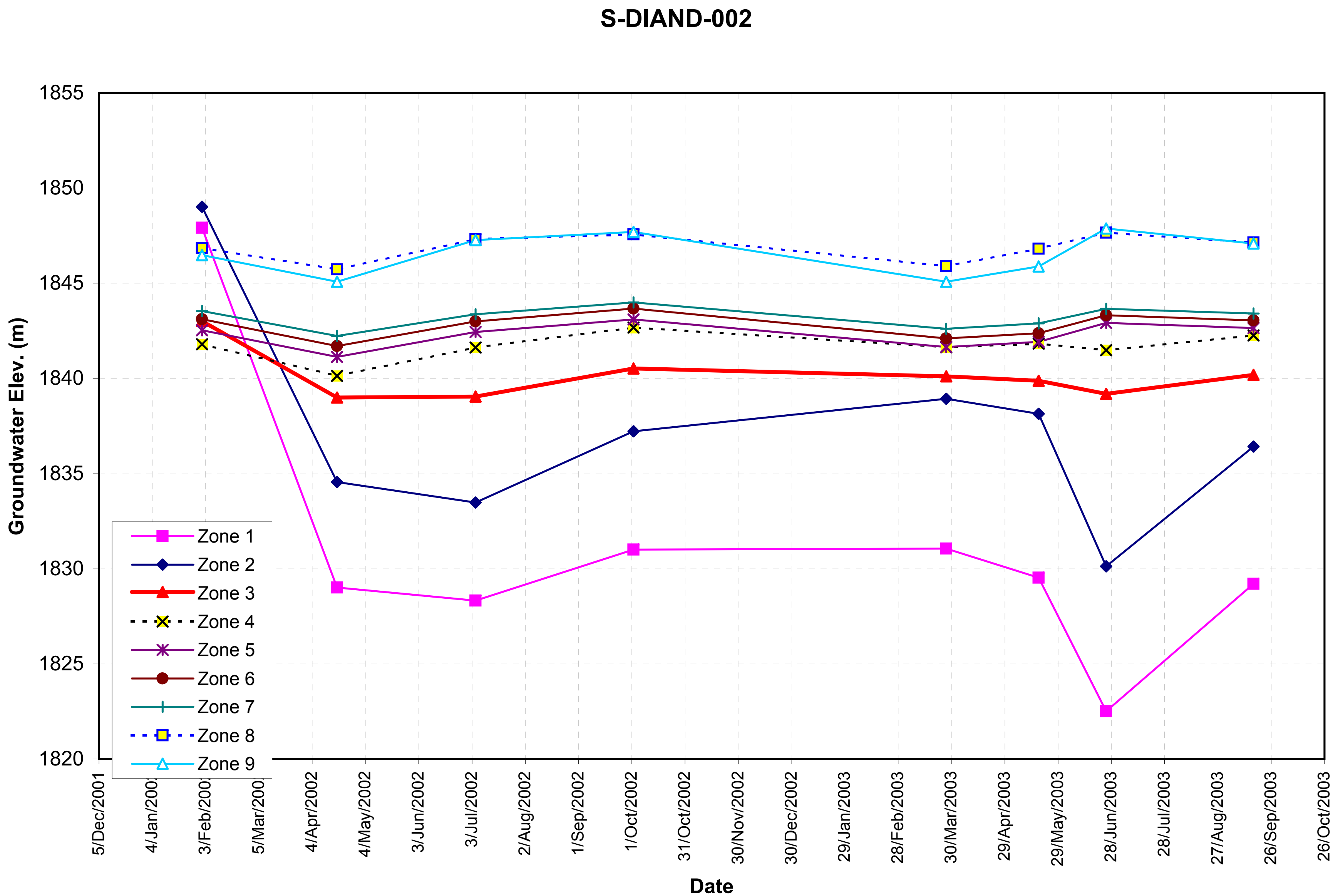


Figure 16

S-DIAND-002 Groundwater Level vs. Time



S-DIAND-002_Pressure_Log_Sept_2003.xls

Figure 17

Appendix 1

Giant Monitoring Well Results with Comparison to CCME Guidelines and Baker Creek Upstream of the Mine

APPENDIX 1. Giant Monitoring Well Results with Comparison to CCME Guidelines and Baker Creek Upstream of the Mine

Sample ID	Date	Lab Tag	Field Parameters																												
			p	EC	ORP	Temp	Turbidity	TSS	TDS	EC	p	Alk	ard	DIC	DOC	Ca	Mg	Na	K	SO4	Cl	N 3-N	3-N NO	As-D	As-T	Arsenate	Arsenite	Al-D	Sb-D	Ba-D	Be-D
				uS/cm	m	^{0}C	NTU	mg/L	mg/L	uS/cm		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
CCME guidelines for aquatic life (mg/L)			*6.5-9*																			*0.015*		*0.005*	*0.005*			*0.1*			
Baker Cr. Upstream of mi	*7-May-03*	*230768*	*7.51*	*110*	*273*	*3.8*			*104*	*123*	*7.6*	*51*		*12*		*17*	*4.8*	*3.2*	*1.3*	*7*	*4*	*0.06*	*0.26*	*0.0197*		*0.015*	*-0.005*	*-0.03*	*0.0021*	*0.0115*	*-0.0001*
S-DIAND-001																															
DIAND-001@Z4	28-Jan-02	220298	6.73	1157	74	4.9	8.8	10	860	1130	7.6	15.8	519	-	16.1	123	51.3	84.6	4.32	272	30.2	**0.439**	-0.008	**0.0313**	-	0.00023	0.00004	-0.03	0.0018	0.0892	-0.0002
DIAND-001@Z4	4-Oct-02	223645	7.2	951	53	2.2	-	-3	632	964	7.97	306	242	75	4.8	51	28	132	2.3	205	32	**0.262**	0.021	**0.0099**	-	0.0158	-0.0002	-0.03	0.0011	0.0322	-0.0002
DIAND-001@Z4	31-Mar-03	230546	7.52	1000	21	7	-	-	650	959	8.28	356	-	68.5	54.5	60.3	29.6	109	2.55	196	37.3	-	-	**0.0089**	-	0.0222	0.0045	0.00396	0.000713	0.0306	0.00002
DIAND-001@Z4dup	31-Mar-03	230543	7.95	1100	-6	5	-	-	644	964	8.23	363	-	70.1	56.1	60.4	30.8	113	2.31	193	37.3	-	-	**0.0175**	-	0.0194	0.0002	0.03	0.0005	0.0295	0.0002
DIAND-001@Z4	19-Jun-03	231525	7.24	568	-15	2.4	-	-	-	1000	7.78	319	248	-	-	58.6	24.8	133	2.26	195	33	-	-	0.005	-	0.0055	-0.005	-	0.0006	-	-
DIAND-001@Z4dup	19-Jun-03	231527	7.68	501	-20		-	-	-	1000	7.92	318	235	-	-	54	24.4	129	2.25	195	32.3	-	-	**0.007**	-	-0.005	-0.005	-	0.0006	-	-
DIAND-001@Z4	10-Sep-03	233826	7.56	810	38		-	-	-	957	8.08	288	216	-	-	46.7	24.1	104	2.46	230	33.2	-	-	**0.023**	-	0.026	-0.005	0.0045	0.00139	0.0306	-0.00002
DIAND-001@Z4dup	10-Sep-03	233828	7.89	833	-13		-	-	-	959	8.06	286	226	-	-	53.5	22.5	107	2.42	239	33	-	-	**0.024**	-	0.025	-0.005	0.0045	0.00108	0.0302	-0.00002
DIAND-001@Z8	29-Jan-02	220299	**5.9**	1110	64	5.1	15.1	12	861	1140	7.49	15.8	620	-	16.4	150	59.6	34.8	5.6	63	30.1	**0.518**	-0.008	**0.0216**	-	0.00015	0.00001	-0.03	0.0016	0.102	-0.0002
DIAND-001@Z8	31-Mar-03	230547	7.62	1300	36	5	-	-	960	1210	8.23	393	-	74.7	57.9	178	65.1	25.6	4.21	409	24.3	-	-	**0.0223**	-	0.0194	0.0129	0.00386	0.00101	0.062	0.00002
DIAND-001@Z8	19-Jun-03	231526	7.12	648	-23	1.9	-	-	-	1280	7.38	341	717	-	-	182	63.4	26.5	4.35	416	25.8	-	-	**0.014**	-	0.0126	-0.005	-	0.0003	-	-
DIAND-001@Z8	10-Sep-03	233827	7.3	1118	-16		-	-	-	1320	7.84	338	673	-	-	165	63.5	25.9	4.4	353	25.2	-	-	**0.014**	-	0.016	-0.005	0.0052	0.00147	0.0788	-0.00002
DIAND-001@Z10	10-Sep-03	233825	7.54	1325	-61		-	-	-	1610	8.07	292	901	-	-	218	86.7	26	7.1	624	17.1	-	-	**0.12**	-	-	-	0.0051	0.0037	0.0641	-0.00002
S-DIAND-002																															
DIAND-002@Z4	4-Oct-02	223643	7.16	1822	1	2.7	-	4	1580	2050	7.96	212	902	49	5.9	233	78	115	12	674	178	**2.13**	-0.008	**1.26**	-	0.261	1.17	-0.03	0.0675	0.0866	-0.0002
DIAND-002@Z4	31-Mar-03	230545	7.63	2200	53	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**1.68**	-	-	-	0.00289	0.0443	0.06	0.00002
DIAND-002@Z4	25-Jun-03	231630	7.56	NA	-9	13.7	-	-	-	-	7.9	-	1040	-	-	275	86	116	11	1120	184	-	-	**1.95**	-	1.14	0.536	0.0067	0.305	0.0828	-0.00002
DIAND-002@Z4	16-Sep-03	234020	7.26	1954	20	5.4	-	-	-	2010	7.64	218	898	-	-	231	76.4	120	9.62	680	166	-	-	**2**	-	1.21	1.08	0.0058	0.0247	0.0753	-0.00002
DIAND-002@Z5	25-Jun-03	231628	7.87	NA	154	21.3	-	-	-	2090	7.89	219	872	-	-	232	71.5	114	9.55	664	168	-	-	**2**	-	0.628	1.45	0.0052	0.0381	0.0668	-0.00002
DIAND-002@Z5	16-Sep-03	234021	7.54	2000	83	5.6	-	-	-	2220	7.72	222	1090	-	-	271	101	118	12	1120	177	-	-	**2**	-	1.62	0.606	0.0089	0.243	0.0888	-0.00002
DIAND-002@Z6	16-Sep-03	234022	7.26	1832	-4	5.5	-	-	-	1120	7.71	311	517	-	-	155	31.7	44.9	5.66	414	3.3	-	-	**0.388**	-	0.37	-0.005	0.0065	0.00218	0.0809	-0.00002
DIAND-002@Z9	16-Sep-03	234023	7.52	2590	-29	7	-	-	-	2730	7.55	272	1400	-	-	155	130	146	14.5	1190	249	-	-	**5**	-	1.12	2.14	0.0092	0.0365	0.125	-0.00002
S-DIAND-002 MP CASING	25-Jun-03	231629	-	-	-	-	-	-	-	-	-	-	-	-	-							-	-	0.546	-	0.158	0.242	0.01	0.126	0.0566	-0.00002
S-1857																															
S-1857@Z1	22-Jan-02	220195	6.85	705	21	4.4	8	11	493	733	7.86	170	383	-	6.1	114	23.9	1.36	23.4	212	4	-0.005	0.008	**0.0078**	0.0202	0.01	-0.01	-0.03	0.0025	0.0308	-0.0001
S-1857@Z1	4-Oct-02	223647	7.41	795	65	0.3	-	8	524	774	7.65	218	357	51	4.2	107	22	29	1.3	196	4	**0.023**	0.012	**0.0096**	-	0.0213	0.0022	-0.03	0.0028	0.0175	-0.0002
S-1857@Z1	31-Mar-03	230549	7.17	700	86	1.7	-	-	488	715	8.2	263	-	51.7	33.2	96.6	20.2	38.3	1.06	153	7.1	-	-	**0.0116**	-	0.0157	0.0069	0.00253	0.00141	0.0165	0.00002
S-1857@Z1	11-Sep-03	233920	7.28	580	117		-	-	-	756	7.85	222	368	-	-	114	20.2	27.4	1.15	196	3	-	-	**0.028**	-	0.022	-0.005	0.003	0.00196	0.0182	-0.00002
S-1857@Z3	21-Jan-02	220194	7.15	665	123	7.24	1.3	4	402	658	8.27	170	135	-	3.4	35.5	11.3	2.88	49.5	194	19.4	**0.096**	0.031	**0.0079**	0.0119	0.01	-0.01	-0.03	0.0017	0.025	-0.0001
S-1857@Z3	4-Oct-02	223646	8.18	977	-6	1.96	-	5	621	942	8.2	161	113	40	4.3	30	9.4	167	1.8	193	69	**0.355**	-0.008	**0.104**	-	0.0629	0.0425	-0.03	0.0016	0.367	-0.0002
S-1857@Z3	31-Mar-03	230551	8.71	900	25	2	-	-	590	908	8.57	192	-	36.1	22.7	29.2	8.31	147	1.52	184	69.8	-	-	**0.115**	-	0.128	0.0002	0.00229	0.00174	0.325	0.00002
S-1857@Z3	31-Jul-03	232507	8.54	871	-83	19.1	-	-	-	892	8.46	175	91.7	-	-	24.8	7.22	132	1.57	149	59.9	-	-	**0.075**	-	0.054	0.0126	0.0064	0.000954	0.382	-0.00002
S-1857@Z3	11-Sep-03	233917	7.87	708	-63		-	-	-	844	8.46	187	86.8	-	-	24.4	6.28	134	1.82	140	2.3	-	-	**0.088**	-	0.065	-0.005	0.012	0.00148	0.238	-0.00002
S-1857@Z5	31-Mar-03	230548	7.82	800	78	1.8	-	-	432	640	8.38	243	-	47.5	33.5	38.6	10.3	86.8	1.69	111	19	-	-	**0.164**	-	0.135	0.0002	0.00177	0.00178	0.521	0.00002
S-1857@Z5	31-Jul-03	232508	8.15	676	82	22.9	-	-	-	699	8.36	245	137	-	-	37.6	10.6	94.4	1.9	117	19.3	-	-	**0.157**	-	0.134	0.0451	0.0052	0.00167	0.736	-0.00002
S-1857@Z5	11-Sep-03	233918	8.11	603	89		-	-	-	693	8.39	242	155	-	-	45.2	10.3	93.3	2	91	0.7	-	-	**0.167**	-	0.099	0.066	0.0078	0.00156	0.776	-0.00002
S-1857@Z10	31-Mar-03	230550	7.42	400	65	3.2	-	-	282	419	8.3	232	-	45.8	27.6	56.8	9.11	21.7	0.34	26	0.5	-	-	**0.0533**	-	0.0562	0.0002	0.00354	0.0017	0.181	0.00002
S-1857@Z10	31-Jul-03	232509	7.88	491	129		-	-	-	484	8.04	238	219	-	-	70.8	10.3	14.5	0.55	28	0.6	-	-	**0.059**	-	0.075	0.0027	0.0053	0.0029	0.204	-0.00002
S-1857@Z10	11-Sep-03	233919	7.79	522	115		-	-	-	617	7.8	307	314	-	-	103	13.7	17.9	0.65	24	0.6	-	-	**0.11**	-	0.052	0.008	0.006	0.00244	0.314	-0.00002
S-1860																															
S-1860@Z1	31-Jul-03	232510	7.92	655	-46		-	-	-	682	7.72	232	273	-	-	73.5	21.7	28.1	4.37	134	10.3	-	-	**0.039**	-	0.0642	0.0015	0.0098	0.000461	0.0953	-0.00002
S-1860@Z1	12-Sep-03	233940	7.596	595	-22		-	-	-	684	8.02	222	279	-	-	74	22.8	35.1	4.77	117	10.1	-	-	**0.045**	-	0.037	0.007	0.005	0.000918	0.108	-0.00002
S-1860@Z3	31-Jul-03	232512	7.89	676	15	23.4	-	-	-	677	7.82	271	327	-	-	87.9	26.1	12.8	3.67	121	6.8	-	-	**0.031**	-	0.0381	0.0009	0.0075	0.000661	0.207	-0.00002
S-1860@Z3	12-Sep-03	233938	7.28	599	-65		-	-	-	672	7.93	264	342	-	-	94	26	13.8	4.61	90	6.7	-	-	**0.047**	-	0.038	-0.005	0.0193	0.000736	0.204	-0.00002
S-1860@Z7	30-Jan-02	220297	6.67	604	-45	4.2	43.3	13	430	612	7.46	15.8	334	-	7.1	84.3	29.9	14.3	4.35	96	6	**0.106**	-0.008	**0.0173**	-	0.00001	-0.00001	-0.03	0.001	0.0774	-0.0002
S-1860@Z7	4-Oct-02	223644	6.8	877	-47	4.1	-	5	615	871	7.64	288	436	68	5.3	112	38	17	4.8	204	3	**0.097**	-0.008	**0.0345**	0.0325	0.0256	0.014	-0.03	0.0015	0.062	-0.0002
S-1860@Z7	31-Jul-03	232511	8.1	958	-46	28.1	-	-	-	980	7.68	315	533	-	-	148	39.4	15.2	4.22	250	2.2	-	-	**0.042**	-	0.0129	0.0184	0.0069	0.000708	0.0706	-0.00002
S-1860@Z7	12-Sep-03	233939	7.71	859	-4		-	-	-	972	7.87	308	557	-	-	155	41.3	16.5	4.39	247	2.1	-	-	**0.054**	-	0.037	0.014	0.0014	0.000674	0.0699	-0.00002
S-1955																															
S1955@Z2	31-Mar-03	230540	8.4	500	130	3.5	-	-	348	536	8.27	164	-	35	15.6	12.3	30.1	38.4	1.17	105	17.6	-	-	**0.0217**	-	0.0257	-0.00015	0.03	0.0008	0.0334	0.0002
S1955@Z2	19-Jun-03	231522	8.13	274	109	6.3	-	-	-	573	8.3	157	71.5	-	-	15.8	7.79	97.6	1.39	106	18	-	-	**0.014**	-	0.0171	-0.005	-	0.0012	-	-
S1955@Z2	13-Sep-03	234024	7.65	517	200		-	-	-	596	8.37	156	68.4	-	-	12.7	8.93	98.6	1.44	129	17.6	-	-	**0.029**	-	0.021	-0.005	0.0047	0.00143	0.0406	-0.00002
S1955@Z3	31-Mar-03	230542	7.04	700	430	3.3	-	-	338	537	8.29	166	-	34.8	15.9	12.2	8.49	89.2	1.2	105	17.7	-	-	**0.0112**	-	0.0249	0.0005	0.03	0.0023	0.032	0.0002
S1955@Z3	19-Jun-03	231524	8.33	277	143	4.4	-	-	-	566	8.33	155	68.9	-	-	14.9	7.7	92.3	1.37	105	18	-	-	**0.01**	-	0.0129	-0.005	-	0.0008	-	-
S1955@Z6	31-Mar-03	230541	7.64	500	2	2.8	-	-	788	1030	8.23	367	-	69.8	51.9	160	2.99	38.6	5.51	330	3.4	-	-	**0.428**	-	0.416	0.0002	0.03	0.0015	0.0587	0.0002
S1955@Z6	19-Jun-03	231523	7.56	520	67	3.6	-	-	-	1080	7.85	311	692	-	-	179	59.4	42.2	5.76	336	3.8	-	-	**0.385**	-	0.174	-0.005	-	0.0013	-	-
S1955@Z6	13-Sep-03	234025	7.1	978	-21		-	-	-	1910	7.71	248	874	-	-	226	73.3	106	9.09	609	149	-	-	**2**	-	0.725	0.627	**12**	0.00249	0.0393	0.00594
Quality Control Blanks																															
Equip Blank	13-Sep-03	234026	-	-	-	-	-	-	-	1.4	5.68	1.8	0.5	-	-	0.15	0.02	-0.02	-0.01	-3	-0.2	-	-	***0.016***	-	-	-	0.0837	***0.000483***	***0.0268***	-0.00002
Field Blank	31-Mar-03	230544	-	-	-	-	-	-	14	1.4	5.54	2.4	-	0.5	0.5	0.05	0.02	0.02	0.03	3	0.2	-	-	0.0019	-	0.0031	0.0002	0.03	***0.0007***	0.0001	0.0002
Field Blank	19-Jun-03	231528	-	-	-	-	-	-	-	1.3	5.54	1.7	-0.17	-	-	-0.05	-0.02	-0.02	-0.03	-3	0.3	-	-	-0.001	-	-0.005	-0.005	-	***0.0004***	-	-

Notes:
some metals were not analyzed for samples collected on June 19, as a result of an error on the sample submission form
Baker Cr. upstream sample was collected at SNP-11
Bold values are greater than CCME criteria
Highlighted values are greater than Baker Cr. upstream values (for parameters with CCME guidelines)
Bold italicized QAQC values are >10X minimum detection limits
CCME guidelines from Canadian Council of Ministers of the Environment, 1999
less than signs have been replaced with negatives
"-" = not analysed, dup = duplicate sample, Z = zone

Sample ID	Date	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	-D mg/L	Zn-D mg/L	Anions	Cations	difference
CCME guidelines for aquatic life (mg/L)		$=10^{(0.86(log(hardness))-3}$		*0.0089*		*0.004*	*0.3*	*0.007*			*0.073*	*0.15*		*0.001*	*0.0001*		*0.0008*				*0.03*			
Baker Cr. Upstream of mi	*7-May-03*	*-0.0001*	*-0.0001*	*-3E-04*	*0.0001*	*0.0028*	*0.12*	*0.0002*	*0.0027*	*0.047*	*0.0004*	*0.0004*	*0.0024*	*-0.001*	*-0.0001*	*0.057*	*-0.0001*	*-0.0001*	*0.0002*	*-0.0001*	*-0.01*	*1.3*	*1.4*	*-0.05*
S-DIAND-001																								
DIAND-001@Z4	28-Jan-02	-0.0001	0.0002	-0.0003	0.0093	0.001	0.428	-0.0001	0.0258	0.349	0.0031	0.0115	0.0025	-0.001	-0.0001	0.547	-0.0001	0.0034	0.0062	0.0003	0.011	-6.8	14.2	34.9
DIAND-001@Z4	4-Oct-02	-0.0001	-0.0001	-0.0003	0.0008	0.0066	0.164	0.0002	0.0407	0.0479	0.0008	0.0005	0.0015	-0.001	-0.0001	0.751	0.0001	0.0004	0.0005	0.0004	-0.01	-11.3	10.7	-2.9
DIAND-001@Z4	31-Mar-03	0.00003	0.00009	0.0003	0.00116	0.00558	0.177	0.00033	0.0384	0.0592	0.00022	0.0008	0.00178	0.0007	0.000006	0.829	0.0001	0.00038	0.000396	0.00023	0.00524	-12.3	10.3	-8.9
DIAND-001@Z4dup	31-Mar-03	0.0001	0.0001	0.0004	0.0008	0.0052	0.17	0.0007	0.0377	0.0571	0.0001	0.0008	0.0018	0.001	0.0001	0.808	0.0001	0.0004	0.0004	0.0002	0.01	-12.3	10.5	-7.9
DIAND-001@Z4	19-Jun-03	-0.00002	-	0.0041	0.00075	0.00482	0.132	0.00029	-	0.0541	-	0.001	-	-	-	-	-	-	-	-	0.0022	-11.4	10.8	-2.5
DIAND-001@Z4dup	19-Jun-03	-0.00002	-	0.0047	0.000776	0.00566	0.111	0.00045	-	0.0548	-	0.0009	-	-	-	-	-	-	-	-	0.0029	-11.3	10.4	-4.4
DIAND-001@Z4	10-Sep-03	-0.00002	0.000089	0.0004	0.000585	0.00637	0.067	0.00095	0.0335	0.0356	0.00043	0.00076	0.0016	0.0005	-0.000006	0.707	-0.0001	0.0004	0.00022	0.00021	0.008	-11.5	8.9	-12.7
DIAND-001@Z4dup	10-Sep-03	-0.00002	0.000088	0.0006	0.00164	0.00638	0.047	0.00091	0.033	0.0406	0.00038	0.00083	0.00161	0.0006	-0.000006	0.724	-0.0001	0.00038	0.000223	0.00126	0.0046	-11.6	9.2	-11.4
DIAND-001@Z8	29-Jan-02	-0.0001	0.0001	0.0005	0.0081	0.0003	0.521	-0.0001	0.0268	0.398	0.0026	0.0125	0.0029	-0.001	-0.0001	0.671	-0.0001	0.0032	0.0066	0.0005	-0.01	-2.5	14.1	70.1
DIAND-001@Z8	31-Mar-03	0.00002	0.000071	0.0003	0.000649	0.00115	0.939	0.00009	0.0272	0.162	0.00078	0.00152	0.00232	0.0005	0.000006	1.29	0.0001	0.00038	0.00511	0.00042	0.00859	-17.1	15.5	-4.8
DIAND-001@Z8	19-Jun-03	-0.00002	-	0.0079	0.000486	0.00101	0.84	0.00017	-	0.157	-	0.0017	-	-	-	-	-	-	-	-	0.0034	-16.2	15.6	-1.9
DIAND-001@Z8	10-Sep-03	-0.00002	0.000071	0.0009	0.00118	0.0018	0.793	0.00045	0.0259	0.159	0.00016	0.00169	0.00236	0.001	-0.000006	1.34	-0.0001	0.00048	0.00591	0.00074	0.0097	-14.8	14.7	-0.3
DIAND-001@Z10	10-Sep-03	-0.00002	0.000068	0.0008	0.00526	0.00529	1.51	0.00145	0.0245	0.383	0.00214	0.0126	0.0028	0.0012	-0.000006	1.34	-0.0001	0.00043	0.011	0.00027	0.0105	-19.3	19.4	0.2
S-DIAND-002																								
DIAND-002@Z4	4-Oct-02	-0.0001	0.0004	-0.0003	0.0592	0.0064	2.62	0.0002	0.0302	0.577	0.0304	0.0105	0.0046	0.002	-0.0001	1.5	0.0002	0.0003	0.0224	0.0016	0.017	-23.3	23.5	0.4
DIAND-002@Z4	31-Mar-03	0.00002	0.000376	0.0002	0.0601	0.00503	1.83	0.00073	0.0292	0.578	0.0299	0.00654	0.00498	0.00264	0.000006	1.48	0.0001	0.00026	0.0184	0.00069	0.0147	NA	NA	NA
DIAND-002@Z4	25-Jun-03	-0.00002	0.000694	0.0004	0.0579	0.00644	0.619	0.00142	0.0327	0.547	0.0318	0.00667	0.0051	0.0026	-0.000006	2.03	-0.0001	0.00053	0.0221	0.00471	0.0173	NA	26.2	NA
DIAND-002@Z4	16-Sep-03	0.00006	0.000314	0.0005	0.0514	0.00654	3.32	0.00074	0.0243	0.62	0.028	0.00495	0.00467	0.0024	0.000057	1.46	-0.0001	0.00042	0.0188	0.00128	0.0255	-23.2	23.5	0.5
DIAND-002@Z5	25-Jun-03	-0.00002	0.000323	0.0003	0.052	0.00599	2.36	-0.00002	0.026	0.585	0.0289	0.0059	0.00457	0.0022	-0.000006	1.64	-0.0001	0.00044	0.0189	0.00096	0.0266	-22.9	22.8	-0.3
DIAND-002@Z5	16-Sep-03	0.00012	0.000804	0.0003	0.0546	0.00652	0.714	0.00076	0.0343	0.516	0.0336	0.00728	0.00555	0.0028	0.000037	1.87	-0.0001	0.00061	0.0255	0.00304	0.0202	-32.8	27.3	-9.1
DIAND-002@Z6	16-Sep-03	0.00007	0.000102	0.0005	0.000786	0.00268	3.66	0.00089	0.0243	0.272	0.00076	0.00144	0.00238	0.0008	0.000017	0.805	-0.0001	0.00071	0.00103	0.00116	0.0078	-14.9	12.6	-8.3
DIAND-002@Z9	16-Sep-03	0.00011	0.000108	0.001	0.0794	0.00815	4.24	0.00105	0.0296	1.24	0.0309	0.00951	0.0062	0.0039	0.000036	1.7	-0.0001	0.00056	0.0162	0.00137	0.0114	-37.2	25.4	-18.9
S-DIAND-002 MP CASING	25-Jun-03	0.00025	0.000278	0.0007	0.0354	0.00854	0.364	0.00112	0.0218	0.345	0.0182	0.00722	0.00358	0.0015	-0.000006	0.936	-0.0001	0.0004	0.0106	0.00085	1	NA	NA	NA
S-1857																								
S-1857@Z1	22-Jan-02	-0.0001	0.0001	-0.0003	0.0014	0.0005	-0.03	0.0001	0.01	0.0257	0.0044	0.0018	0.0008	-0.001	-0.0001	0.523	-0.0001	0.0019	0.0044	0.0003	-0.01	-7.9	8.3	2.4
S-1857@Z1	4-Oct-02	-0.0001	-0.0001	-0.0003	0.0007	0.0018	0.054	0.0001	0.0127	0.0241	0.0038	0.0011	0.0007	-0.001	-0.0001	0.655	0.0001	-0.0003	0.003	0.0004	-0.01	-8.6	8.4	-0.6
S-1857@Z1	31-Mar-03	0.00002	0.000022	0.0001	0.000442	0.0013	0.063	0.00104	0.0134	0.0228	0.00386	0.00089	0.0009	0.0003	0.000006	0.618	0.0001	0.00022	0.00288	0.00023	0.00824	-8.6	8.2	-2.8
S-1857@Z1	11-Sep-03	-0.00002	0.000023	0.0003	0.000541	0.00312	0.065	0.00107	0.0094	0.0256	0.0039	0.00112	0.00078	0.0005	0.00009	0.64	-0.0001	0.00025	0.00284	0.00038	0.0077	-8.6	8.6	-0.2
S-1857@Z3	21-Jan-02	-0.0001	0.0001	0.004	0.0004	0.0016	-0.03	-0.0001	0.011	0.0254	0.0033	0.0007	0.0011	-0.001	-0.0001	0.413	-0.0001	0.0013	0.0008	0.0015	-0.01	-8.0	4.1	-32.2
S-1857@Z3	4-Oct-02	-0.0001	-0.0001	0.0004	0.0005	0.0082	0.422	0.0001	0.0185	0.137	0.0071	0.0004	0.0015	-0.001	-0.0001	0.486	0.0001	0.0004	0.0002	0.0019	-0.01	-9.2	9.6	2.2
S-1857@Z3	31-Mar-03	0.00002	0.000039	0.0003	0.000585	0.00702	0.065	0.00094	0.0162	0.0563	0.00623	0.00035	0.00164	0.0003	0.000006	0.409	0.0001	0.00031	0.000148	0.00185	0.00386	-9.6	8.6	-5.8
S-1857@Z3	31-Jul-03	0.00005	0.00005	0.0039	0.000102	0.00632	0.063	0.00143	0.0133	0.0461	0.00417	0.00071	0.0014	0.0004	-0.000006	0.399	-0.0001	0.00005	0.000265	0.00179	0.0061	-8.3	7.6	-4.2
S-1857@Z3	11-Sep-03	-0.00002	0.00003	0.0007	0.000206	0.00769	0.064	0.00201	0.0127	0.0327	0.00292	0.00061	0.00119	0.0004	-0.000006	0.316	-0.0001	0.00062	0.000315	0.00195	0.0063	-6.7	7.6	6.2
S-1857@Z5	31-Mar-03	0.00002	0.000024	0.0001	0.000286	0.00402	0.979	0.00002	0.0113	0.351	0.00649	0.00038	0.00135	0.0004	0.000006	0.45	0.0001	0.00037	0.000401	0.0019	0.00387	-7.7	6.6	-7.4
S-1857@Z5	31-Jul-03	0.00002	0.000028	0.0033	0.00009	0.00342	0.437	0.0013	0.0098	0.304	0.00719	0.00053	0.0015	-0.0003	-0.000006	0.502	-0.0001	-0.00002	0.000488	0.00186	0.0073	-7.9	6.9	-6.4
S-1857@Z5	11-Sep-03	-0.00002	0.000028	0.0005	0.000141	0.0053	0.239	0.00107	0.0091	0.252	0.00653	0.00058	0.00133	0.0004	0.000044	0.462	-0.0001	0.00054	0.000567	0.00258	0.0054	-6.8	7.2	3.4
S-1857@Z10	31-Mar-03	0.00009	0.000008	0.0002	0.0111	0.00133	0.612	0.00097	0.00418	2.31	0.00227	0.00748	0.00036	0.0003	0.000006	0.288	0.0001	0.00026	0.00224	0.0004	0.00819	-5.2	4.6	-6.4
S-1857@Z10	31-Jul-03	0.00009	0.000013	0.0032	0.0177	0.00426	0.994	0.00136	0.0032	2.04	0.00229	0.00738	0.0004	-0.0003	-0.000006	0.368	-0.0001	-0.00002	0.00265	0.00056	0.0127	-5.4	5.1	-2.7
S-1857@Z10	11-Sep-03	0.00002	0.000012	0.0005	0.0343	0.00277	1.43	0.00082	0.0036	2.71	0.00153	0.00975	0.00039	0.0005	0.000265	0.412	-0.0001	0.0004	0.0034	0.00108	0.0124	-6.7	7.1	3.5
S-1860																								
S-1860@Z1	31-Jul-03	-0.00002	0.000056	0.0025	-0.000008	0.00132	0.353	0.00065	0.0229	0.19	0.00005	0.00037	0.00329	0.0003	-0.000006	0.595	-0.0001	0.0001	0.0036	-0.00003	0.0049	-7.7	6.8	-6.3
S-1860@Z1	12-Sep-03	-0.00002	0.00006	0.0003	0.000132	0.00474	0.127	0.00085	0.0234	0.206	0.00011	0.00049	0.00303	0.0004	0.000011	0.559	-0.0001	0.00042	0.00392	0.00034	0.0047	-7.2	7.2	0.4
S-1860@Z3	31-Jul-03	0.00002	0.000044	0.0026	0.000045	0.00101	0.152	0.00106	0.0242	0.178	0.00008	0.0005	0.00312	0.0004	-0.000006	0.896	-0.0001	0.00004	0.00467	-0.00003	0.0058	-8.1	7.2	-6.1
S-1860@Z3	12-Sep-03	-0.00002	0.00004	0.0005	0.000243	0.0019	0.078	0.00048	0.0229	0.162	0.00014	0.00083	0.00276	0.0006	0.000033	0.827	-0.0001	0.00054	0.00478	0.00044	0.0065	-7.3	7.6	1.4
S-1860@Z7	30-Jan-02	-0.0001	0.0001	-0.0003	0.0005	-0.0002	2.99	0.0001	0.0208	0.24	0.0011	0.001	0.0026	-0.001	-0.0001	0.561	-0.0001	0.0013	0.0036	0.0005	-0.01	-2.5	7.6	50.5
S-1860@Z7	4-Oct-02	-0.0001	-0.0001	-0.0003	0.0005	0.0013	1.15	0.0002	0.0234	0.345	0.0004	0.0009	0.002	-0.001	-0.0001	0.886	0.0001	0.0004	0.0107	0.0005	-0.01	-10.1	9.6	-2.3
S-1860@Z7	31-Jul-03	-0.00002	0.000029	0.0026	-0.000008	0.00101	0.628	0.00125	0.0181	0.337	0.00013	0.00076	0.00235	0.0004	-0.000006	1.03	-0.0001	-0.00002	0.0115	-0.00003	0.0043	-11.6	11.4	-0.6
S-1860@Z7	12-Sep-03	-0.00002	0.00003	0.0002	0.000125	0.0017	0.198	0.0006	0.0171	0.311	0.00015	0.0009	0.00213	0.0007	0.000006	0.965	-0.0001	0.00044	0.0124	0.00056	0.004	-11.4	12.0	2.6
S-1955																								
S1955@Z2	31-Mar-03	0.0001	0.0001	0.0003	0.0003	0.0041	0.173	0.0002	0.0293	0.0082	0.0019	0.0002	0.0011	0.001	0.0001	0.325	0.0001	0.0003	0.0001	0.0001	0.01	-6.0	4.8	-10.8
S1955@Z2	19-Jun-03	0.00012	-	0.001	0.000401	0.00345	-0.03	0.00006	-	0.00997	-	0.00035	-	-	-	-	-	-	-	-	0.0042	-5.9	5.7	-1.2
S1955@Z2	13-Sep-03	0.0001	0.000083	-0.0001	0.000664	0.00599	0.263	0.00067	0.0299	0.0106	0.00267	0.00158	0.00123	-0.0003	0.000008	0.356	-0.0001	0.00025	0.000074	-0.00003	0.0136	-6.3	5.7	-4.9
S1955@Z3	31-Mar-03	0.0001	0.0001	0.0003	0.0009	0.0063	0.039	0.0001	0.029	0.0103	0.0022	0.0014	0.0011	0.001	0.0001	0.301	0.0001	0.0003	0.0001	0.0001	0.01	-6.0	5.2	-7.0
S1955@Z3	19-Jun-03	0.00004	-	0.002	0.000296	0.00382	0.056	0.00117	-	0.0072	-	0.0006	-	-	-	-	-	-	-	-	0.0074	-5.8	5.4	-3.2
S1955@Z6	31-Mar-03	0.0001	0.0001	0.0006	0.0004	0.0015	4.72	0.0008	0.0251	0.261	0.0004	0.0009	0.0023	0.001	0.0001	0.753	0.0001	0.0006	0.0009	0.0015	0.01	-14.3	10.3	-16.3
S1955@Z6	19-Jun-03	0.00005	-	0.0043	0.000446	0.00193	3.65	-0.00002	-	0.265	-	0.0012	-	-	-	-	-	-	-	-	0.0114	-13.3	16.0	9.1
S1955@Z6	13-Sep-03	0.00222	0.023	0.0155	0.0101	0.443	3.55	0.0118	0.23	0.952	0.049	0.018	0.112	0.0033	0.00366	0.153	0.002	0.23	0.00431	0.0132	0.0825	-21.8	22.3	1.1
Quality Control Blanks																								
Equip Blank	13-Sep-03	0.00008	0.000094	0.0009	*0.000218*	*0.00307*	-0.03	*0.00123*	*0.006*	*0.019*	*0.00086*	*0.00791*	*0.00108*	0.0005	0.000017	*0.0692*	-0.0001	*0.00316*	*0.000644*	0.00023	*0.0155*	-0.1	0.0	-79.6
Field Blank	31-Mar-03	0.0001	0.0001	0.0003	0.000087	0.0002	0.03	-0.00002	0.0003	0.0001	0.0001	-0.0001	-0.0001	0.001	-0.000006	0.0001	0.0001	-0.0002	-0.000008	-0.00003	0.002	-0.1	0.0	-88.0
Field Blank	19-Jun-03	-0.00002	-	0.0003	0.000037	*0.00284*	-0.03	-0.00002	-	0.00023	-	-0.00001	-	-	-	-	-	-	-	-	0.0036	-0.1	0.0	-86.8