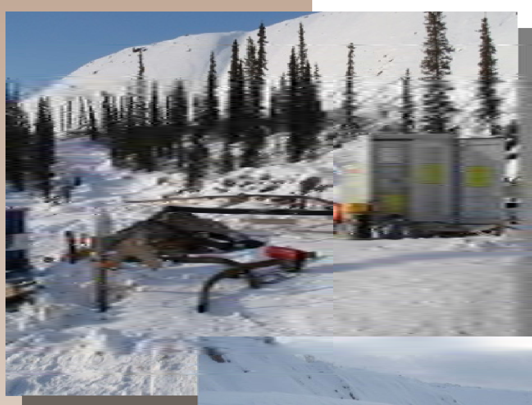
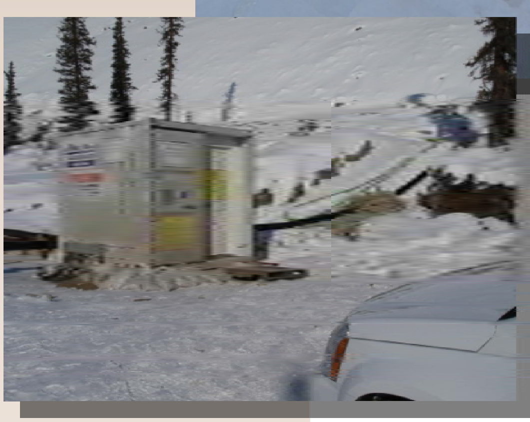
Deloitte & Touche

Faro Mine Complex

Design and Installation of a Seepage Interception and Pumping System at the S-wells Area





Prepared for

Deloitte and Touche Inc.

On behalf of

Faro Mine Closure Planning Office

Prepared by

SRK Consulting
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July 2009

Design and Installation of a Seepage Interception and Pumping System at the S-wells Area

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Executive Summary

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The objectives of the 2008/2009 S-wells interception and pumping system were to design and install a seepage interception system (SIS) for the Shallow and Deep Aquifer systems to capture poor quality groundwater emanating from the Intermediate waste rock dump prior and reporting to the North Fork of Rose Creek (NFRC). Previous investigations identified high concentrations of zinc (upwards of 400 mg/L) within groundwater of the Shallow and Deep Aquifers. Observations of increasing zinc loads within the NFRC as it passes through the S-wells area suggested this groundwater was providing additional load to the NFRC. Review of data by the Faro Technical Advisory Team (TAT) recommended that groundwater interception be initiated to minimize the risk of additional loading to the NFRC. The water licence has prohibited discharge of water exceeding 0.5 mg/L zinc to Rose Creek and specifically references "all points of entry", which would include diffuse surface discharge from the S-wells area.

Discussion of options, constructability and feasibility of installing said system during the 2008/2009 winter season occurred during the fall of 2008. Parties involved in these discussions included Deloitte & Touche, SRK and the Faro TAT. On October 31, 2009, a "go" decision was reached and design and implementation planning commenced on a "fast-track" basis.

Design and implementation was completed and overseen by Deloitte & Touche (overall site coordination), SRK (system requirements, design, site supervision and overall project supervision), Hatch Engineering (on behalf of SRK for pipeline and electrical issues) and the Faro TAT, with input from Precision Pumps and Services (pumping system components), Urecon (pipeline insulation and heat trace components) and Pelly Construction (interceptor trench construction, pipeline installation). Denison Environmental Services (DES) was present for some of the weekly calls to facilitate their awareness of the SIS since DES would be the SIS operator effective March 2009. The final system includes: a shallow, permeable trench with a central pumping sump for the Shallow Aquifer, two pumping wells in the Deep Aquifer discharging to the central sump, and a 2-inch, insulated, heat-traced pipeline conveying water to the Faro Pit, into which intercepted water is discharged. A central pumping and control housing was constructed by Precision Services at their shop in Abbotsford, BC and shipped to site. The pumping and control system provides an automatically controlled pumping system that self-regulates based on water levels, automatic shut-down controls in the case of heat trace failure, self-draining

capabilities and data capture for sensors monitoring pumping water levels and discharge rates. The datalogging/alarm system has been designed to allow future connection to remote telemetry systems. The central pumping and control housing is located on top of the central sump and has internal oxygen and temperature sensors, with a series of external beacon lights that indicate system operational status, alarm status and internal oxygen level alarms.

Power for the pumping system is provided by a diesel generator located on a waste rock dump haul road above the S-wells area. The electrical system is such that, in the future, it can be connected to the site's power grid.

Prior to verifying the system's operational status, a 48-hour operational test was performed, commencing on February 25, 2009. The system was declared operational on February 28, 2009, after running the operational test for approximately 72 hours. Extension of the operational test was related to multiple shut-downs caused by heat trace faults and generator mechanical issues. These faults were corrected and the system operated as designed. Shut-downs caused by heat trace failures allowed assessment of the self-draining components, which operated as designed.

A number of system deficiencies were identified during installation and the final system walk through with D&T, SRK, DES and Pelly Construction. These deficiencies were considered relatively minor in terms of significance to system performance and it was recommended that they be monitored and/or corrected during the spring/summer 2009. Specific deficiencies included: uncertainty regarding interceptor trench as-built dimensions, pipeline support at the crest of the waste rock dump, effectiveness of the current pipeline vacuum break setup, heat trace controller indicator lights, installation of a larger generator fuel tank, effectiveness of the pump control housing beacon status lighting.

Post-installation performance data indicate that the system has been working generally within design parameters. As of April 28, 2009, approximately 60 days after system activation, approximately 10,000 m^3 of water have been pumped to the Faro Pit, containing approximately 2 tonnes of dissolved zinc. Freshet-related surface water has caused the system to work less efficiently, but estimates of freshet-related loading suggests that the additional load is only on the order of 0.04 to 0.4 tonnes, much less than that intercepted from the Shallow and Deep Aquifers.

The pumping control system has seen some failures, related to heat trace faults and failure of the control system Programmable Logic Controller (PLC). Heat trace failures have been corrected or over-ridden and the PLC replaced. As of mid-May, the system was reported to be operating.

Recommendations for the system include correcting of pertinent system deficiencies, implementation of a regular monitoring program, a complete assessment of system performance, identification of potential system monitoring and operational upgrades that could be implemented during the 2009 summer season.

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1 Introduction

Groundwater quality in the S-wells area has, on average, deteriorated continuously over at least the past four years as a result of seepage from the Faro Intermediate waste rock dump (WRD), and is currently contributing zinc to the North Fork of Rose Creek (NFRC), which crosses through the S-wells area. In 2008, following an initial assessment of the costs and timing associated with the installation of a seepage interception and a pumping/piping system (SIS), Deloitte & Touche (D&T), the Interim Receiver, based on recommendations from the Faro Technical Advisory Team (TAT), and supported by the Faro project management team and DIAND, decided that such a system should be installed prior to their discharge as interim receiver on 28 February 2009. This report summarizes the design and installation of that system and provides some preliminary performance data.

Figure 1 shows the location of the S-wells area and the general arrangement of the recently constructed SIS.

2 Background

Since 2004, when poor groundwater quality was identified in the S-wells (or S-cluster) area as part of a review of groundwater quality (RGC, 2004), it was recognized that some level of remediation would likely be required to protect water in the nearby NFRC from zinc loading. During the 2007 and 2008 winter low-flow periods, zinc concentrations in the NFRC have increased (+/- 0.1 mg/l), relative to summer periods. Multiple field investigations were completed to characterize the groundwater system and develop options for seepage interception (SRK, 2006a, 2006b, 2009). A primary conclusion of these investigations was the presence of two aquifers, the shallow and deep aquifers, both of which indicated deteriorated water quality resulting from WRD seepage, with dissolved zinc concentrations as high as 400 mg/L. The water licence has prohibited discharge of water exceeding 0.5 mg/L zinc to Rose Creek and specifically references “all points of entry”, which would include diffuse surface discharge from the S-Wells area. Therefore, it was concluded that groundwater from the S-wells area is contributing zinc to the NFRC at levels which exceed the water licence criterion of 0.5 mg/L.

Following completion of the 2008 field program (SRK, 2009), the TAT provided conclusions and recommendations regarding how the S-wells area should be managed (Brodie Consulting, 2008). The TAT letter, dated October 3, 2008, is included in Appendix A.

Primary conclusions included:

- Water from the shallow aquifer contains up to 400 mg/L zinc and appears to discharge to surface and distribute over [the swampy] area [adjacent to the North Fork of Rose Creek].
- The [2008] work as a whole confirms that the upper (shallow) aquifer in the S Wells area is currently contributing zinc to North Fork Rose Creek, either directly or via the surface discharge.
- The deep aquifer is likely to be a more significant source at some time in the future.

The TAT recommended that:

- Collection of near surface aquifer water from the S-wells area should be implemented as soon as practicable.
- A conceptual S-wells capture system is expected to consist of:
  - An interim collection system installed in fall 2008, i.e. a sump/trench installed in the Shallow Aquifer; pumps installed in two existing Deep Aquifer wells so that water can be pumped to the sump; and a pump and pipeline system that enables water collected in the sump to be pumped to the Faro Pit.
  - This would constitute a first phase of groundwater collection system that would be expanded/improved as necessary in 2009.
  - Opportunities for alternate treatment methods which would complement the collection system should be investigated beginning in 2009.
- The water collected from the S-wells area should be directed to the Faro pit, for a period of up to two years. Thereafter, the impacts on the water quality in the Faro Pit would exceed the capacity of the current treatment system.

TAT conclusions and recommendations were discussed between the TAT, SRK, Hatch Engineering (pipeline and electrical advisor to SRK) and Denison Environmental Services (DES) with D&T (the design group), during a series of conference calls focused on methods, costs and implementation of a SIS that would potentially result in a "go" decision to initiate the SIS design and construction. Notes from these conference calls are included as Appendix B. Important issues and conclusions reviewed during these discussions included:

- Was passive treatment possible? ***Passive treatment ruled out due to the expected flow volumes***.
- Was immediate action required, or could activities wait until the summer 2009 season? ***Immediate action was recommended***.
- If a "go" decision was made, would it be possible to construct such a system during the winter and could the system be constructed prior to the discharge of D&T's role on February 28, 2009 and handover to DES? ***It was determined to be possible if tight schedules could be me****t*.
- Would a pipeline require insulation and heat tracing to protect against freezing during winter operations? ***It was concluded that it would be prudent to provide both insulation and heat tracing***.
- Could the pumping system be made self-sufficient in terms of control and have multiple alarm/automatic shut-down systems to avoid potential system damage? ***It was concluded this could be included in the system***.
- SRK provided preliminary design specifications for pumps and pipelines.
- Initial cost estimates for materials and initial equipment options were provided by suppliers.

On October 29, 2008, SRK conducted test excavations with Arctic Backhoe and D&T to assess constructability of an interceptor trench as well as investigating possible borrow sources for granular backfill. Results suggested construction was possible and that a borrow source for granular backfill materials was available on site and could be used to produce a suitable volume of processed material. A memorandum summarizing results of this field visit is included in Appendix C.

On October 31, 2008, the design group reached a "go" decision. D&T envisioned the following framework for this program:

- SRK would provide final design details.
- SRK would contact Pelly Construction and Golden Hills Ventures with a view to obtaining time and materials data, as well as availability and schedule information [for construction of an interceptor trench, installation of the pipeline and associated labour to make the system operational].
- D&T would undertake procurement.
- SRK would undertake field supervision.

John Brodie (of the TAT) would provide support to SRK in relation to these tasks.

Based on this decision, DIAND provided D&T with authorization to utilize funds held the Interim Receiver to complete the proposed remediation program.

On December 19, 2008, D&T presented a letter to the Yukon Water Board describing the course of action being taken at the S-wells area. This letter is included as Appendix D.

A preliminary construction schedule was then developed and actions taken to prepare final system design specifications, advance supplier quotations and finalize contractors. The design and installation was fast-tracked for completion in January/February of 2009.

3 Design

3.1 Objectives

The primary scope objectives of the S-wells collection system were:

1. Interception and transfer (to Faro Pit) of contaminated groundwater within the Shallow Aquifer, as defined during previous field investigations; and
2. Interception and transfer (to Faro Pit) of contaminated groundwater from the Deep Aquifer, using available Deep Aquifer pumping wells.

The extent of flow at the S-wells area containing elevated zinc levels was understood to consist almost entirely of groundwater within the Shallow and Deep Aquifers. Seepage discharging from the toe of the waste rock dump had been observed only rarely, and at very low discharge rates based on data collected since the seepage survey program commenced in 2004. As such, the SIS design criteria were confined to groundwater capture for at least the initial implementation of seepage control at the S-wells area.

3.2 Design Process

The design phase of the project was short and driven by a relatively aggressive implementation schedule aimed at having the system operational by the end of February 2009. The basic decisions on the location of the systems, the approximate routing and size of the pipe had to be taken early on and quickly as the purchase orders for the delivery of the pipe and the long delivery electrical system components had to be placed with sufficient leeway to meet the schedule. In the effort to facilitate the limited timeline, sketches and quick estimates, rather than detailed engineering drawings and elaborate schedules, were used to develop material take-offs.

Results of the October, 2008 site visit to assess constructability and borrow sources for granular backfill indicated that:

- Excavation into the shallow aquifer would encounter water inflow at relatively shallow depths.
- Standard sheet piling could not likely be driven directly into the ground due to the presence of cobbles and boulders.
- Appropriate granular backfill materials could be sourced from the Haul Road Borrow Pit.

Purchase orders for most of the materials and components were placed in November and December of 2008. Once the orders for the pipe, the pumps, the pump house, transformers and cables were placed, the design work continued in the electrical discipline. The crucial components of the system design, including the generator, the transformer, power supply system, heat tracing system and controls were developed in sufficient detail to ensure the parts of the system coming from different suppliers and the refurbished generator were going to work together.

Before ordering of the pump house, two alternative quotes were obtained from Precision Pump in Abbotsford, BC:

- Pump equipment supply only; and
- Pump equipment and a sea-can pump house enclosure design and supply.

The advantage of including the enclosure in the scope of supply was that most of the equipment would be shop pre-installed thus eliminating difficult, mid-winter installation site work. An additional benefit was that the responsibility for the detailed design of the pump house would rest with the Supplier. The overall construction process with this alternative would be shorter. The consensus of all parties involved was that the benefits of this alternative were well worth the price difference and the order was placed for the sea-can option.

The design issues were discussed and a path forward agreed on during the weekly Friday morning calls with all parties present and also in follow up calls and e-mails. The process was expedient and focused on practical solutions.

Specific responsibilities by design group were:

- SRK – Hydrogeological design criteria and geotechnical design;
- SRK – Interceptor system design;
- Hatch – Review of the work of other parties with regards to the piping, pumping and electrical design and construction;
- Hatch – Overall electrical design of the power supply system; and
- Precision Pumps and Services – pumping system control and equipment design based on SRK/Hatch design criteria and specifications.

Conference call notes related to design decisions subsequent to the project's authorization are included in Appendix E.

Final design drawings and sketches for the interceptor system, pipeline and electrical controls are provided in Appendix F.

3.3 Design Criteria

The basic objective for the SIS was to capture the contaminated water seeping from underneath the rock waste dump, with a primary focus on the Shallow Aquifer and capture from the Deep Aquifer using existing pumping wells (see Section 3.5.2 for design flows). Once captured within the sump, the water would be pumped to the nearby Faro Pit and then treated in the existing water treatment plant at the Faro Mill before release to the environment.

The design concepts considered various configurations of seepage well pumps and interception trenches located at the base of the rock dump. A system was envisioned, comprised of a single sump with a submersible pump located within a permeable trench for the Shallow Aquifer, and use of two existing pumping wells for collection from the Deep Aquifer, both discharging to the Faro Pit via an overland pipeline.

Early in the process it was determined that the pipeline from the pump to the pit would have to be insulated and possibly also heat traced. The electricity for the pumps, heat tracing and the associated equipment would initially come from a diesel generator but in the future have the option to be switched to the overhead power grid. Also, because of the remote location of the dump, remote monitoring and alarm features would need to be included. Ability to easily sample water was also required as was oxygen detection in the pump house enclosure.

3.4 Operational Life as a Function of Impacts to Faro Pit

Intercepted groundwater from the S-wells area was to be discharged to the Faro Pit via the pipeline. The TAT identified that the relatively high contaminant loads of the S-wells groundwater compared to those of the existing Faro Pit waters (at the time) could have implications for current and future water treatment options. Based on this point, as well as others, such as integration of capture from the ETA area (summarized in the TAT memo), the S-wells interception system pipeline was considered to have a two-year operational life, at which point alternative discharge options would be required.

3.5 Description of the Proposed System

3.5.1 SIS Trench

The location chosen for the interception system is downstream and down slope of the Intermediate WRD, in the area of a pre-mining surface drainage (the Shallow Aquifer). This drainage channels shallow groundwater, and probably some surface run-off water from the area of the Intermediate WRD towards the NFRC valley. A number of drill and pumping tests were performed in the area of the interception system location during the fall of 2008 (SRK, 2009). Based on the tests it was established that a combination of a ditch filled with drain rock could intercept the Shallow Aquifer seepage and the two existing Deep Aquifer pumping wells could be used to initiate collection of Deep Aquifer waters.

Several options of exact location size and depth of the “ditch” were considered. The diameter and the depth of the sump to be located within the ditch was also a subject of discussion. An existing piece of suitable diameter and length culvert to be used in vertical configuration as a sump was located at the site (reported as 7-foot diameter and 21-foot length). Sources of granular rock and suitable backfill materials were identified within reasonable distance to the preferred ditch alignment. It was decided that the sump bottom would be set directly on backfill material and the walls of the sump perforated to enable flow of groundwater into the sump.

3.5.2 Pump Capacity

The pumping system design flow rate was the most crucial and difficult to establish parameter of the system criteria. The outflow of seepage from underneath the waste rock dump is highly variable depending on the time of the year and the weather in a given year. The design flow rate affects the pump and the pipeline sizing. The size of the pump drives affects the electrical system requirements.

Because of the variability of the flow rate, it was decided that the pump would be variable speed and best controlled by a Variable Frequency Drive (VFD) so that the pumping rate could be adjusted. Also, the approach was that the pump be sized so that at its full speed it would be capable of the maximum estimated inflow rate into the interceptor sump. The site tests showed that the normal high inflow into the sump would be on the order of 35 US gallons per minute (USgpm) or 2.2 litres/second (l/s) range. It was estimated that in some circumstances this flow may be as high as

50 to 60 USgpm (3.2 to 3.9 l/s). It was therefore decided the pump should be capable of pumping at least 60 USgpm.

Once the pumping rate range was estimated, pump discharge heads for various pipe sizes and wall thicknesses were calculated. With the difference of elevations between the sump and the intended pipeline discharge point locations well known, and the length of the pipeline also established with good accuracy, the discharge heads for the various pipe choices were modeled.

Based on the design flow and head considerations a Grundfos 85S150 - 13 stainless steel submersible pump with a 15HP motor was selected for the primary sump pump. The pump is capable of 60 USgpm (3.9 l/s) at 610 ft (185 m) of head.

Pumps for the Deep Aquifer pumping wells were already available, purchased as part of the 2008 investigation. These pumps are 3-inch, stainless steel Grundfos 30SQ07B-90 type with 0.75 HP motors. These pumps are not variable speed but have built-in automatic low level shut-off and restart capacities.

3.5.3 Pipeline and Heat Specifications

Fused high density polyethylene (HDPE) pipe, available in 50-ft lengths, was selected as the most suitable for the intended overland application. HDPE pipe is relatively inexpensive, lightweight, durable and easy to install even in wintertime. The pipe is available in many standard sizes and within each size in several wall thicknesses and pressure ratings. Given the maximum design flow rate and the pipeline profile the choice was between a 2-inch (51 mm) and a 3-inch (76-mm) diameter pipe. Based on the flow and pressure considerations, a 2-inch diameter pump was selected for the job. Approximately 550 ft (170m) of DR11 (160psi rating) pipe for the high pressure section and 4,800 ft (1,460m) of DR17 (100psi rating) pipe for the remainder, lower pressure section of the pipeline were ordered. Some of the DR17 pipe was designated for the relatively short runs of pipe from the two wells to the sump.

It should be noted that operating the pipeline at flows higher than 50 USgpm is not recommended because of a possibility of overstressing the pipe. While operating at flow rates higher than 50 USgpm is possible for a short duration, it should not be done on a continuous and consistent basis.

Due to the relatively significant length and small pipe diameter there was no doubt that the pipe must be insulated. However the decision on whether the pipeline should be heat traced or not “hinged” on the following three issues:

- Can the pipeline be ensured to be self-draining?
- How long will the pipe take to drain?
- What is the minimum water temperature in the sump?

Due to uncertainty about the answers to these questions, especially the ground water temperature, it was agreed that the pipeline should be protected against freezing by means of heat tracing. <if it did freeze, it would be very difficult to get it to thaw out before spring time> Consequently, the pipe was ordered with 2-inch thick insulation and a single channel for heat tracing cable. The heat tracing was specified at 13 watts per meter along the main pipeline and 7 watts per meter along the short well pipes. It was established that, due to the significant cable run lengths, 600V heat tracing would be required along the main pipeline. On the Deep Aquifer well pipes, 120V tracing would be sufficient.

The main pipeline was designed to run directly on the ground with the exceptions of the two road crossings, where it runs in a culvert under the road, and on the slope of the waste rock dump, where it runs in a half pipe. The half pipe protects the pipe insulation jacket and the pipe itself against damage from direct contact with rocks. The pipe is anchored at the top of the slope with steel cables. The cables are attached to a piping flange and anchored to the end of the culvert. It was recommended that to prevent excessive pipe movement due to thermal expansion and contraction, the pipe needs to be held down at regular intervals. Granular rock material (gravel) would be used for the purpose. Also, since the pipe runs along the road and it is subject to being buried in the snow, flags need to be driven into the ground next to the pipeline so that snow cleaning equipment operator is aware of the pipe location.

The pipeline was designed to have one high point at approximately mid-distance to the pit. An air/vacuum release valve was specified and installed at this location. A provision was made for an automatic “dump” valve to be located at a low point. However, the valve was not installed because a post-construction site survey confirmed the low point was avoided. According to site reports, the pipeline slopes towards either the pump house or the pit, so it is self-draining.

3.5.4 Power Supply and Controls

It was decided that, in the near term, electricity for the Seepage Interception and Pumping System would be supplied from a diesel generator set. An adequately sized existing generator was identified at the mine site. It was moved to a location relatively close to the pump house next to the Faro Pit access road. This location is convenient for diesel fuel deliveries. The generator voltage is 208V. A new step up 208V to 600V transformer had to be purchased and was installed in the generator shack. A single 600V power supply cable runs along the pipeline down to the pump house from where the power is converted and distributed at appropriate voltages to the heat tracing, pumps, lighting, space heater and instruments. In the future the connection to the power grid can be made by a single point connection to the pump house. No changes will be required to the system wiring.

Power cables for the well pumps and for the heat tracing along the main pipeline are strapped to the pipeline itself. Three heat trace controllers are provided along the main pipeline. The controllers are mounted on steel stands beside the pipeline and supply power to the heat tracing cables. Two heat tracing cables originate from each control box one in the direction of the pump and one towards the pit. The cables are approximately 1,000ft (300m) long each.

The two Deep Aquifer well pumps run at fixed speed and cycle on and off based on water level. Flow rates are controlled manually via a valve within the pump control room (the sea-can). The sump pump is on a VFD variable speed controlled by a Programmable Logic Controller (PLC). The pump speed changes according to the water level in the sump. It accelerates when the water level is high and slows down when it is low. This way the frequent shutdowns of the pump and draining of the pipeline can be avoided.

Control interface of the pump house is set up for future remote monitoring via radio. Presently the status of the pumps equipment can be seen on the screen inside the pump house and alarm mode can be seen from the multi-color beacon light on the roof of the sea-can. A datalogger connected to the PLC provides continuous flow, level, pump status (on or off) and alarm reports.

4 Implementation

Implementation of the S-wells SIS proceeded immediately from design to construction upon obtaining necessary approvals. Material orders, contracting and design components advanced simultaneously in order to meet the project completion deadline. Weekly conference calls were maintained, daily force accounting tallies were prepared by site staff or field engineers and, when field engineers were present, daily reports on progress and outstanding issues were prepared.

Organization and management of the SIS implementation was based on the following structure:

- SRK – Coordination and Management;
- Pelly – Overall construction;
- Hatch – Commissioning assistance on electrical and pumping;
- Precision – Sea-can pump housing, pumps and control system design and construction;
- Urecon – Input on design and field installation of heat trace components;
- D&T – Site supervision and project coordination; and
- SRK/Hatch – Site supervision when requested by D&T.

Key components of the project timeline include:

- Week of October 31, 2008 - Approval to proceed in concept;
- Early November, DIAND funding and plan approval;
- Week of December 12, 2008 – Decision reached to use prefabricated sea-can pump housing and control system approach;
- Week of December 19, 2008 – D&T reports that 1,000 m^3 of clean, coarse granular backfill has been produced and is ready for SIS trench construction. D&T also reports that a mechanism is in place to allow the project to continue into March 2009, if necessary;
- Week of January 9, 2009 – Insulated pipeline materials arrive at site;

- Week of January 12, 2009 – Pelly Construction mobilizes to site and commences site preparation and pipeline welding;
- Week of January 23, 2009 – Installation of half culvert down face of WRD to S-wells area complete. Construction of SIS trench was initiated (no field engineer supervision). Pipeline reported by contractor to be self draining in upper section, with exception of one “low point”;
- February 19, 2009 – Sea-can pump housing arrives at site and installed in place;
- February 25, 2009 – First water pumped to Faro Pit; and
- February 28, 2009 – Final system inspection with SRK, D&T, Pelly (Arctic) and DES. System deemed operational.

Daily reports for the construction/implementation phase are included as Appendix G.

5 Description of Installed System

Schematics, drawings and plans of installed components of the SIS are provided in Appendix H. Two DVDs included in the back cover of this report provide the following:

- DVD1 – Videos of interceptor trench construction.
- DVD2 – Photographs of different components and project stages.

5.1 Interceptor Trench

The SIS interceptor trench was completed between January 22 and 24, 2009. Field inspection and engineering quality control were not requested during construction. The following as-constructed details are therefore based on photographs and verbal comments from the contractors and D&T, plus measurements taken during a site visit by SRK on January 24 and 25, immediately following the construction of the trench. This visit was initiated by SRK when, during the weekly conference call, SRK learned the trench construction had already started and, in fact, was almost complete. A memorandum presenting available details of trench construction is included in Appendix H-1. A plan view of the sump at the time of the SRK site visit is included in Appendix H-1. The overall arrangement, based on this construction drawing, is shown on Figure 1.

The following summarizes SRK’s understanding of the construction details:

- Estimated dimensions of approximately 33 meters long x 10 meters wide x 5.25 meters deep, below grade. Long axis of trench cuts across shallow aquifer.
- The sump was excavated without the need or use of neither an upstream dewatering trench nor any other shoring within the trench itself.
- Stiff sandy silt was encountered on the west bank of the SIS trench, below the sump and along most of the alignment of the trench. The site contractor could not confirm if the east bank of the trench consists of this silty material as well.

- Bentomat was installed on the down stream trench face from the west end of the trench for a distance of approximately 10m. Enviro-liner was used for the remaining length of the trench, to the east end.
- The sump consists of a 7 ft (2.13 m) diameter, 18 ft (5.49 m) long corrugated metal pipe (CMP) perforated with 10 rows of approximately 2-inch holes spaced about 1-foot apart, covering the lower half of the CMP.
- A bottom layer of drain rock was placed on the bottom of the trench and the CMP was installed on top of this drain rock. At the time of installation, the sump bottom was approximately 5.25 m below grade (ground surface) and the CMP was open to approximately 5.5 m below grade (lip of the CMP). Thus, the CMP extends 0.25 m above ground surface (the "stick-up") and, at the time of construction, was open to full depth.
- The fill material was dominantly cobbles with boulders, sand and a trace of silt.

During construction, spoil materials excavated from the trench were placed down gradient of the trench, on the area of the marshy ground adjacent to the NFRC. Spoil materials froze soon after excavation.

By the week of January 30, 2009, D&T reported that the contractor had excavated the top two feet of backfill across the entire trench and installed filter fabric, then re-emplaced the granular backfill. No sketches or photographs summarizing these additional modifications were provided.

5.2 Sump Development

Following construction of the SIS trench, SRK recommended that the sump be "developed" (i.e. pumped) to remove fines prior to installation of the final pumping system. D&T's site staff used a site vacuum truck to extract water and silt from the sump.

The site reported that on the order of 50,000 US gallons (~190 m^3) were pumped from the sump between February 4 and February 10, 2009. By the end of development, total suspended solids (TSS – mg/L) were reported as 84 mg/L and total zinc as 21.57 mg/L, based on data from the site lab. Details of development are provided in Table 1.

Table 1: Sump Development Information

Date	Time	Level (inches)	Difference	TSS (Start)	TSS (End)	Zinc (mg/l)	Gallons Removed	Comments
February 04, 2009	4:45 PM	136" from top	n/a	17.3	N/A	N/A	20,000	
February 05, 2009	6:15 AM	106" from top	+30"	113	781	N/A	20,000	13.5 hrs of recharge
February 09, 2009	9:15 AM	82" from top	+87"	22.7	83.9	21.55 / 21.57	12,500	89 hrs of recharge
February 10, 2009	11:15 AM	98" from top	+28"					19 hrs of recharge

Note * 21.55/21.57 = total zinc concentrations at start and end of development, respectively, as measured at Faro site laboratory.

5.3 Pipeline

The 2-inch (51mm), insulated, heat traced pipeline was installed by Pelly Construction with oversight by D&T and, to a limited extent, SRK and Hatch.

The following points summarize installation of the pipeline:

- The pipeline is 2-inch HDPE with welded joints. The pipeline is constructed of DR11(160psi rating) grade pipe from the sea-can pump housing to south edge of the haul road and DR17 (100psi rating) grade pipe from that point to the discharge location adjacent to Faro Pit.
- General pipeline alignment is shown on Figure 1. A final alignment survey will be obtained following freshet and ground thaw (Appendix H-2). Positions of the pipeline and heat trace components are shown on Figure 2.

Pipeline grade was checked at the culvert crossing and potential low positions by SRK and Arctic Backhoe personnel using a level transit. Where necessary, the pipeline alignment was adjusted to provide correct grade.

The pipeline discharge location is along the Faro Pit access road, approximately 50m from the edge of the Faro Pit lake. At this location, all water discharging from the pipeline flows downhill to the Faro Pit lake.

Granular backfill was placed on the pipeline at three locations within the S-wells area to prevent pipeline movement. Material used to backfill the interceptor trench was the only unfrozen material available during construction. Finer grained material was used to the degree possible and carefully placed on the pipeline.

For Deep Aquifer pumping wells, 2-inch DR17 insulated pipe was connected from wellheads to the sea-can pump housing over the main interceptor trench CMP.

5.4 Generator/Electrical System

Power requirements were determined by Hatch based on pumping system and heat trace requirements. Based on these requirements, D&T determined that a suitable refurbished generator was available on site, a Standford.

Generator and electrical system construction reports are included in Appendix H-3.

The following points summarize electrical system components:

- The generator is housed in a 2x4 construction-type housing, along a mine access road on the waste rock dump above the S-wells area.
- A 1,000 US-gallon fuel tank was on site to be plumbed to the generator for fuel supply.

- Heat trace controllers and electrical feeds were installed by Pelly Construction, mostly as designed by Hatch and described in Appendix F.
- A Hatch Electrical Engineer was on-site during initial power-up and activation of the pumping and heat trace systems. Electrical system field adjustments were reviewed by the Engineer. Final comments and deficiencies noted on departure of the Engineer are included in Appendix H-3.
- The primary discharge pipeline is constructed with a 600V heat trace system.
- The Deep Aquifer pipelines are constructed with a 120V heat trace system connected directly to the load center in the sea-can pump housing.

In the future, the electrical system can easily be connected to the main power grid at the current generator housing.

5.5 Sea-can Pumping System

The SIS pumping system is comprised of three pumps with a central control system housed in the sea-can. The sea-can housing and control system were designed and built by Precision Service & Pumps, Inc. of Abbotsford, BC. The sea-can was constructed at the Precision shop and shipped to the site in a “ready-for-installation” state.

As discussed in Section 3.5.2, two of the pumping wells are installed within the Deep Aquifer, denoted as PW1 and PW2. These pumping wells are the two test pumping wells installed as part of the 2008 S-wells investigation, SRK08-SPW1 and SRK08-SPW2, respectively. The third pumping well, PW3, is within the interceptor trench CMP itself.

The sea-can is essentially an 8 ft x 10 ft shipping container that has been modified into a self-contained control system and plumbing housing unit. The sea-can housing has internal heat and oxygen sensors, the status of which can be assessed outside of the sea-can housing by noting which lights are active on the beacon mounted on the roof of the sea-can. The sea-can is positioned directly on top of the interceptor trench CMP, with a floor hatch and ladder allowing access to the CMP itself. Note that the CMP is considered a confined space and entry should only be allowed by permit with appropriate safety protocols in place.

A PW3 motor and pump are suspended by a 3-inch stainless steel riser pipe directly into the CMP through the floor of the sea-can. The PW1 and PW2 motors and pumps are suspended on 2-inch flexible, continuous HDPE piping and connected to wellhead assemblies at ground surface for each well. Pipelines connect each Deep Aquifer pumping well to the sea-can, where they discharge into the CMP.

All pump locations have 1-inch PVC guide tubes installed to depth of the pumps, accessible from the wellhead for instrumentation and water level measurements. At each of the pumping wells, one of the guide tubes has an Endress+Hauser vented water level sensor installed, which is connected to the sea-can datalogging system.

The sea-can pumping control system is comprised of pump electrical and plumbing controls, flow meters, water level recorders and system drain-down elements. The system electrical load center is also located within the sea-can. Important plumbing components, such as flow control valves, pressure gauges, flow meters and sump pump pressure regulation, are all within the sea-can. The system is controlled by a programmable logic controller (PLC), with a visual control panel and component activation switches, datalogging and storage capacity for water level, flow, pump status (on or off) and alarm indications for each of the pumps, and a VFD for the primary sump pump, PW3. The datalogging system is such that it can be easily connected to a variety of telemetry systems.

A general description and for the sea-can controls, pump setup, alarm status, etc., as well as as-builts for each of the pump installations, are included in Appendix H-4. Precision Services and Pumps has prepared a separate technical Original Equipment Manufacturer (OEM) manual under separate cover. This document includes all technical details for sea-can components and pumps.

The following specific points summarize testing and final settings for pumps:

- Pump discharge rates were adjusted to maintain anticipated sustainable water levels within the deep wells based on water levels observed at the time of installation and results from earlier aquifer testing.
- The PW3 VFD was programmed to maximize flow rates to keep the water level as deep as possible. Flow rate at the start of the 48 hour test was approximately 3.15 L/s.
- The PW3 pipeline pressure relief valve was set to approximately 190 psi.
- PW3 low water level set point = 0.1m above pump. This is the level the VFD tries to maintain.
- PW1 discharge was set to 0.43 L/s.
- PW2 discharge was set to 0.89 L/s.

5.6 Completion Test

The 48-hour operational test commenced at about 3pm on February 25, 2009. Flows were monitored over the course of the test, with minor adjustments to assess effects on drawdown. Heat trace failures caused multiple shut-downs, but allowed the automatic shut-down capabilities of the system to be tested. In total, the “48-hour” test ran for almost 72 hours before it was considered successful. Table 2 summarizes important actions and activities during the 48-hour test.

Table 2: 48-Hour Operational Test Details

Date/Time	Item	PW1	PW2	PW3
2/25/2009 15:00	Flow rates at test start (L/s)	1.3	0.56	3.95
2/25/2009 20:55	Adjust Flow rates (L/s)	0.43	0.89	3.15
2/26/2009 8:49	Measure Flow rates (L/s)	0.42	0.92	2.37
2/26/2009 8:49	Collect samples for site Lab (total zinc - mg/L)	1.33	370	312
2/26/2009 14:49	600V Heat trace fault - system shutdown and drain	RESET		
2/26/2009 21:49	600V Heat trace fault - system shutdown and drain; proper sea-can beacon light	FIXED AND RESET		
2/27/2009 8:00	System shut down due to generator issues	GENERATOR REPAIRED		
2/27/2009 15:00	Restart sump pump only (Discharge L/s)			3.28
2/27/2009 17:15	Restart Deep Aquifer pumps	1.05	0.93	
2/28/2009 11:00	System operational all night - final walk through with D&T, Pelly and DES (Discharge L/s)	TOTAL TEST TIME OF ~68 HOURS. SYSTEM DEEMED OPERATIONAL		
2/28/2009 12:44	System running on departure from site (L/s)	0.99	0.85	3.15

System shut-downs during the 48-hour test were caused by failure of the 600V heat trace and generator mechanical issues. The 600V heat trace failure was caused by a short circuit near one of the heat trace controllers. This was repaired by the Pelly electrician. The generator failed due to problems with the fuel line solenoid valve. The generator was repaired by D&T personnel.

Once the heat trace and generator issues were resolved, the test continued uninterrupted, with the sump (PW3) VFD operating as designed, adjusting flows to maximize drawdown in the sump. Deep Aquifer pumps did not experience any issues.

While the heat trace and generator failures delayed completion of the test, the failures themselves provided the opportunity to assess the system shut-down and drain mode. When the heat trace alarm was triggered, the pumps shut down, the drain solenoids opened and the pipeline drained back into the sump. These unscheduled system faults provided verification of the automatic shutdown effectiveness. Once the faults were repaired and the system reset, the pumps were restarted from the sea-can.

Figure 2 shows water level and flow data from the operational test.

5.7 Final System Deficiencies

At the end of the operational test, the full pipeline route and pumping components were walked with D&T, Pelly (Arctic Backhoe) and DES to finalize completion and identify outstanding deficiencies. Certain deficiencies were noted and scheduled to be addressed or monitored, but considered minor enough to allow positive verification of system operational status. The following lists these deficiencies with recommended actions for monitoring or correction:

5.7.1 Interceptor Trench

- East End Foundation – Uncertainty as to whether trench completely intersects shallow aquifer. **ACTION**: Assess trench effectiveness using performance data and down gradient monitoring. Keep contingency in place for trench extension, if required.
- Available CMP Depth – Internal depth within the CMP is limited due to coarse backfill placed in bottom of the CMP. Currently sufficient, but if additional drawdown is required, materials may have to be removed. **ACTION**: Assess pumping effectiveness using performance data and down gradient monitoring. Keep contingency in place for clearing material and extending pump depth, if necessary.
- Trench Monitoring Points – Specifications for monitoring points at each end of the interceptor trench were not finalized until late in the design process and were not installed during construction, limiting ability to monitor the system's performance. **ACTION**: Assess pumping effectiveness using performance data and down gradient monitoring. If necessary, install in-trench monitoring points during 2009 summer season.

5.7.2 Pipeline

- Top of pipeline half-culvert chute – Sufficient though not built as designed. **ACTION**: Monitor location to ensure that pipeline movement and rubbing on chute edge does not damage pipeline insulation and/or pipeline itself. If damage to pipeline is observed, chute must be adjusted.
- Pipeline vacuum break – Sufficient but the vacuum break may be susceptible to freezing. Additional insulation added. Heat trace not added as per design. **ACTION**: DES to monitor. Repair/replace, if necessary.
- Pipeline discharge point – Sufficient, though some glaciation. **ACTION**: DES to monitor glaciation and clear as necessary.
- Pipeline Alignment – Sufficient but should be re-aligned further off road or alongside Zone II Pit discharge line after freshet. **ACTION**: DES to re-align when appropriate.
- Pipeline Anchors – Granular backfill on pipeline in vicinity of C-can temporarily sufficient but requiring upgrade. Anchors along pipeline length required once final alignment set. **ACTION**: DES to upgrade/install once pipeline alignment finalized.
- Deep Aquifer Pipeline Stands – Current stands are a combination of saw horses, material piles and scavenged benches, which were the only materials available at the time of the winter installation. Currently sufficient, but likely requires adjustment and replacement, as necessary, to more permanent stands. **ACTION**: DES to monitor and correct as necessary after freshet.

5.8 Heat Trace

- Cabling - Power and control cable spliced close to heat trace Control Panel #3. Not optimal but sufficient. **ACTION**: Modify, if deemed necessary.

- Control panel external beacons – Not supplied/not installed. **ACTION**: Pelly electrician to work directly with DES to remedy. Lights on order.

5.9 Generator

- Generator – Sufficient but problematic. **ACTION**: Monitor generator and repair as necessary. Temporary alternate was identified that could be used if necessary.
- Generator fuel tank – Temporary fuel system sufficient; 1,000 US gallon tank was not yet plumbed in to generator. **ACTION**: DES to finalize fuel tank setup.

5.10 Sea-can Pumping System

- Roof system/alarm status beacon – Sufficient but not bright enough on sunny days. **ACTION**: If deemed necessary, upgrade beacon light. Precision has part numbers and replacement only requires releasing the existing beacon light and inserting the replacement.
- Drain solenoids – Sufficient but susceptible to jamming if sand is present in the water. **ACTION**: Monitor and correct if necessary. Alternative to current solenoids not identified.

6 Post-Installation Performance

Following installation and commissioning, the S-wells SIS has been running more or less continuously. All three pumping wells have been operating and successfully discharging to the Faro Pit via the primary discharge pipeline. Operational interruptions or shut-downs have occurred, but these have generally been remedied without major delays. These interruptions have included:

- Heat trace faults – The system was restarted after faults were corrected.
- Failure of the sea-can control system PLC – The PLC has been replaced.
- Freshet-related high flow into and water levels in the main sump – Deep Aquifer pumping wells automatically shut down to decrease inflows to sump, allowing sump pump (PW3) to work on bringing down sump water level. Freshet related inflows were unexpectedly high this year. No information on estimates of surface flows or sump performance has been provided, but modification to overall system will be assessed during the 2009 summer season.

Despite the interruptions, significant volumes of water have been removed from the Shallow and Deep Aquifers. DES has conducted semi-regular monitoring of cumulative flows, pumping rates and discharge water quality since March 2, 2009. Records indicate that as of April 28, 2009:

- Total volume pumped to the Faro Pit = 9,680m^3 in about 60 days.
- Average zinc concentration greater than 200 mg/L (as measured by site laboratory).
- Equivalent to about 2,000,000,000 mg zinc or 2 tonnes (metric tons).
- Equivalent to about 12 tonnes per year.

Routine assessment of water quality has been completed at the on-site laboratory. Samples are collected from the pump sampling ports and total zinc concentration analyzed using the on-site analytical equipment.

Table 3: Laboratory Analytical Result Comparison

April 6, 2009 Data			
Source	**PW1**	**PW2**	**PW3**
Site Lab (mg/L)	1.51	269	219
Maxxam (mg/L)	1.34	280	232

Results shown in Table 3 suggest site analytical results are reasonably comparable with off-site analytical results.

Full April 6, 2009 analytical results from Maxxam are included in Appendix I.

For comparison, the only available reports regarding the freshet flows that have recently stressed the system are approximate estimates of flow at about 20 L/min on April 29 and 30 (J. Brodie, pers. comm.). Assuming a zinc concentration of 50 mg/L and flows at this rate for 30 days, this is equivalent to approximately 0.04 tonnes. Even if the flow estimate is low by an order of magnitude (200 L/min), the freshet load (0.4 tonnes) is much less than the total load intercepted from the Shallow and Deep Aquifers (> 2 tonnes).

Monitoring data provided by DES is shown on Figure 3.

Flows and water levels from each of the pumping wells for the complete period of operation are shown on Figures 4 and 5.

Monitoring data has also been collected at monitoring wells BR1, BR4, SP5, S2a and SP4b, plus barometric data for compensation. These data will be used to assess capture performance, but have not all be downloaded since installation.

In general, the following comments can be made regarding system performance:

- The PW3 (sump) VFD has been reasonably successful at keeping the water level in the sump close to the minimum possible pumping level, therefore maximising capture potential. From about March 29 to April 24, the water level wasn’t as low as it should have been. The cause for this is currently unknown.
- PW1 and PW3 are automatically cycling on and off over periods of about 3 to 4 days. This is anticipated, but it is unclear why the shut off points vary over time. This will have to be assessed.
- The PW1 water level appears to have risen slowly over the operational period, while discharge rate has remained constant. While the trend is minor, this may suggest aquifer recharge.

- The PW2 water level shows a slight decrease over time, with the exception of the major jump upwards in late March. The slight downward trend could indicate slow dewatering of the aquifer, but the cause for the upward jump is uncertain.
- For both PW1 and PW2, there appears to be additional available drawdown, indicating that the pumping rates could be increased.

Overall, the data collection is proceeding well and data itself suggests that the system is intercepting a significant load. Capture efficiency in the Shallow Aquifer is uncertain (i.e., is the system intercepting load from the entire Shallow Aquifer or is there bypass?).

7 Recommendations

Following construction of the S-wells SIS and preliminary assessment of post-installation performance data, the following recommendations are provided:

- Known system deficiencies should be monitored and corrected as necessary.
- Once the ground has thawed fully and the system adjusted to its permanent alignment, a complete survey of the system should be completed to allow final system position maps to be made.
- The power system should be connected to the site power grid.
- A complete assessment of system performance should be completed, using existing monitoring data and data from monitoring locations that have not yet been downloaded. This should include:
  - Assessment of pumping well efficiencies incorporating all monitoring data.
  - Assessment of capture efficiency.
  - Assessment of NFRC loads.
  - Identification of options for future system upgrades.
- A long-term monitoring plan should be implemented, including:
  - Monthly sampling of pumping well water quality for submission to Maxxam. This should coincide with other routine monitoring in the area (e.g., sampling of NFRC, sampling from monitoring wells, etc.).
  - Weekly sampling of pumping well water quality for submission to the site laboratory.
  - Weekly recording of cumulative flows, pumping rates and pumping well water levels.
  - Monthly downloads of system dataloggers.
  - Regular assessment of performance data – late fall and early summer.

- SIS operational plans for seasonal operations should be developed based on performance data. The pumping system should be adjusted on an as-needed basis.
- System upgrades should be assessed based on performance data and observations of seasonal site conditions. These could include:
  - Additional Shallow Aquifer monitoring wells or drivepoints should be installed.
  - Installation of additional Deep Aquifer pumping wells.
  - Installation of a shallow interceptor trench at the toe of the WRD to intercept freshet runoff prior to infiltration into the sump. Assessment of options should be included as part of the system performance review.
  - Monitor the water quality in Faro Pit in order to evaluate the impact on the pit water quality and whether the 2-yr time line remains valid.

This report, "**Faro Mine Complex, Design and Installation of a Seepage Interception and Pumping System at the S-wells Area**," was prepared by SRK Consulting (Canada) Inc.

Prepared by

ORIGINAL SIGNED AND STAMPED

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Senior Hydrogeologist

Reviewed by

ORIGINAL SIGNED AND STAMPED

Cam Scott, P.Eng.
Principal Engineer

8 References

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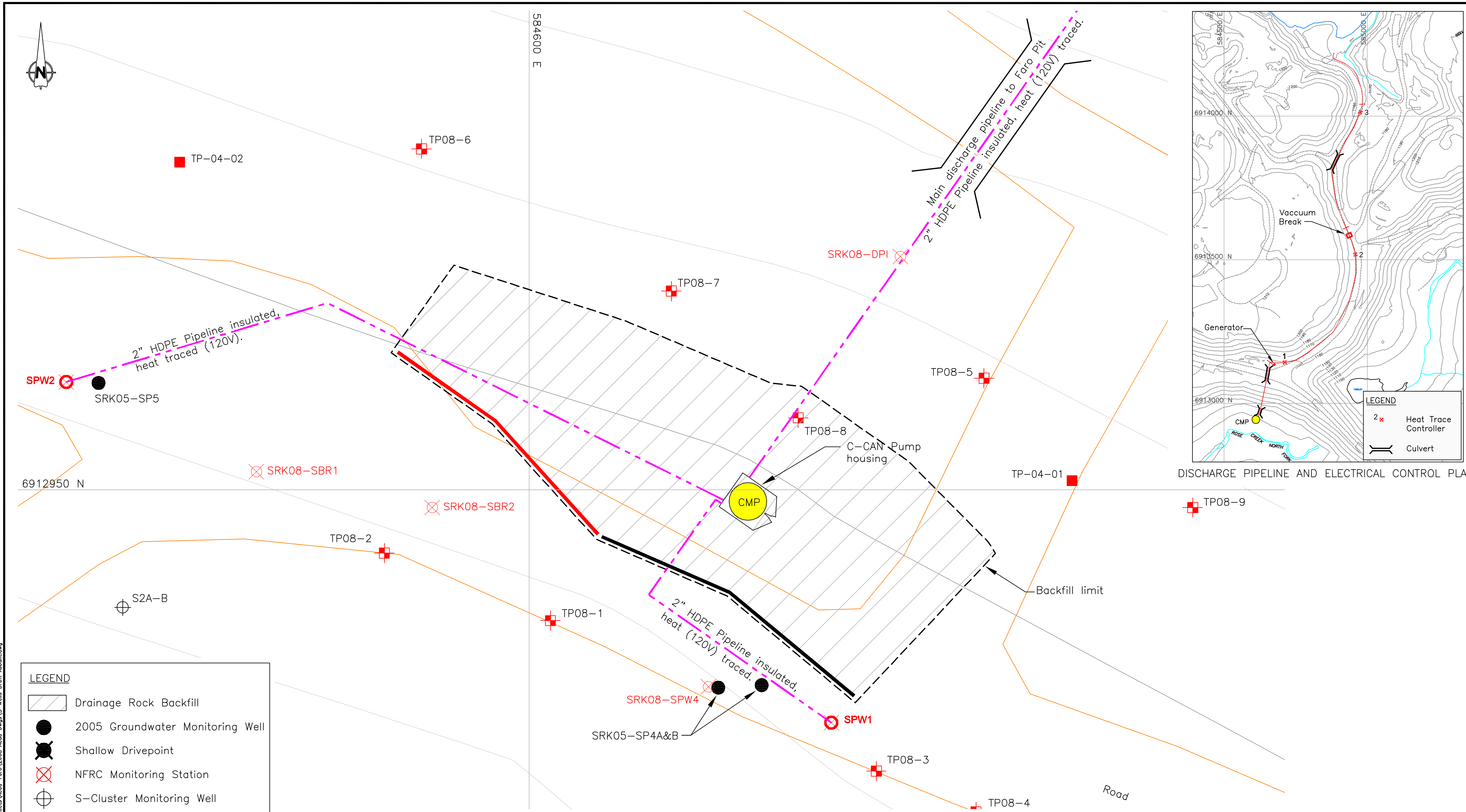
Figures



LEGEND

- Drainage Rock Backfill
- 2005 Groundwater Monitoring Well
- Shallow Drivepoint
- NFRC Monitoring Station
- S-Cluster Monitoring Well
- Test Pit (2004)
- Test Pit (2008)
- Bentonite GCL
- Enviro Liner
- Pipeline

SRK CONSULTING
Faro Mine, Yukon
Contour Interval: 2m
Date of Photography: 03/07/25
Scale of Photography: 1:20,000
Survey control derived from existing 1:20,000 photography
Survey control based on: UTM Projection, NAD27, Zone 8
Compiled by The ORTHOSHOP, Calgary, September 2003 WO 8856

Note:

1. Limits and locations are marked by hand held GPS.
2. Pipeline and C-CAN positions approximate. Not surveyed.

SRK Consulting Engineers and Scientists Vancouver B.C.

Deloitte & Touche

S-Wells Shallow Aquifer Groundwater Collection

Preliminary SIS Trench Location and Excavation Limits

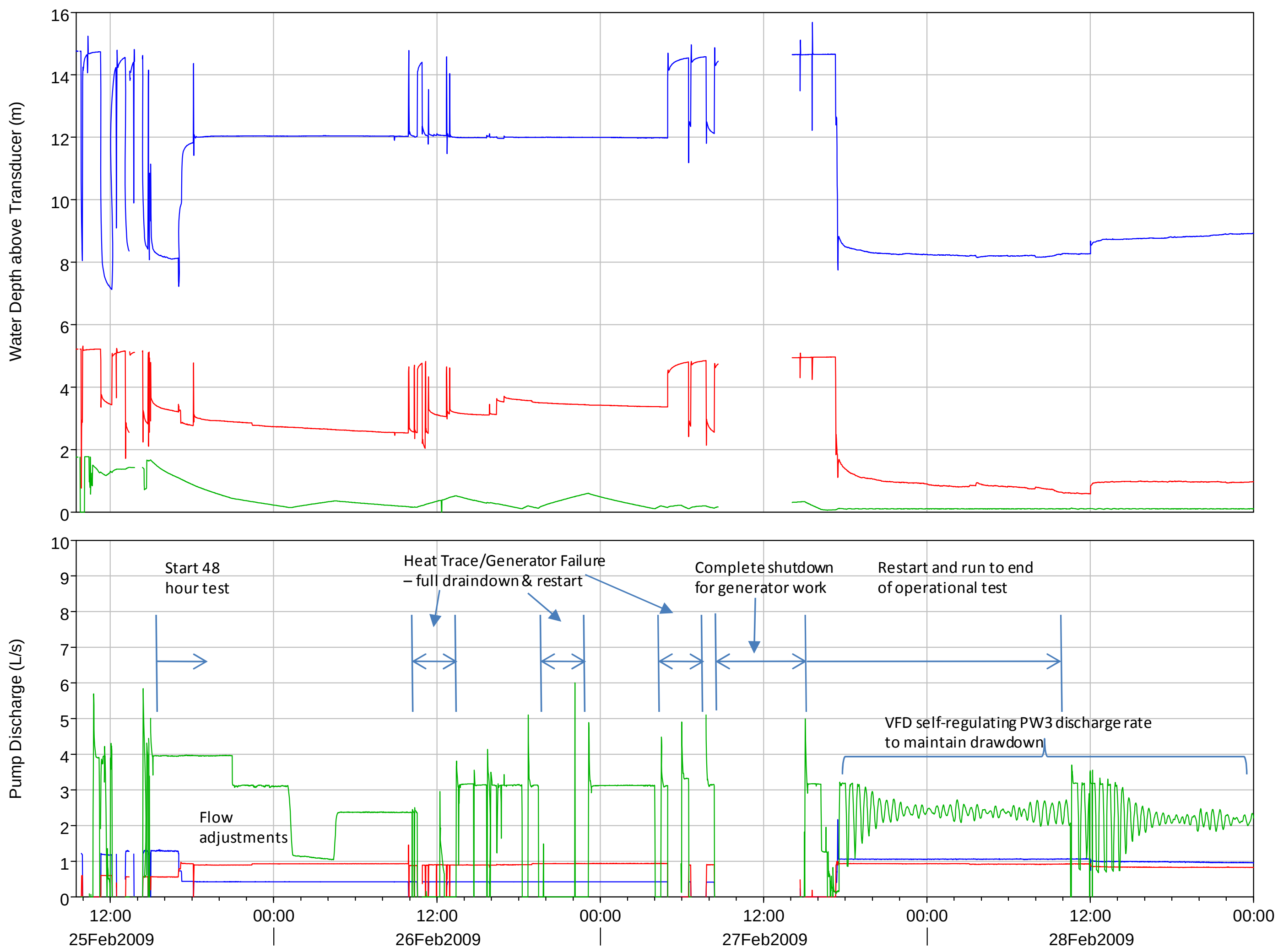
SRK JOB NO.: 1CD003.120

FILE NAME: S-Wells Draft Asbuilt.dwg

S-WELLS ACTION PLAN

DATE: Dec. 2008 | APPROVED: - | FIGURE: 1

J:\01_SITES\FARO\1000_Deloitte_from_GE_Projects\Acad-Faro\2008_Acad_Dwgs\S-Wells_Draft_Asbuilt.dwg



PW1

PW2

PW3 (sump)

SRK Consulting
Engineers and Scientists

Deloitte
& Touche

S-Wells Seepage Interception System

48-Hour Operational Test Data

PROJECT:	DATE:	APPROVED:	FIGURE::
1CD003.120	May 2009		2

Denison Environmental Services / S-Well Monitoring

SPW - 1

Date	Time	Temp °c	pH	Zinc mg/l	Intantaneous Flow (L/s)	Cummulative Flow (m^3)	Average Zn (mg/L)	Monthly Flow (m3)
2-Mar-09	1:50 PM	4.3	6.3	1.28	-	-		
3-Mar-09	8:05 AM	4.8	6.4	5.03	-	-		
4-Mar-09	8:50 AM	5.0	6.2	1.43	0.8797	301.548		
5-Mar-09	9:35 AM	3.3	6.3	5.75	0.8789	380.331		
9-Mar-09	9:20 AM	5.1	6.2	1.41	0.8875	678.799		
10-Mar-09	8:25 AM	4.1	6.4	7.06	0.885	752.094		
11-Mar-09	8:15 AM	4.6	6.3	1.42	0.8775	827.503		
12-Mar-09	8:25 AM	4.2	6.2	7.5	0.8776	903.695		
16-Mar-09	8:30 AM	3.7	6.5	4.82	0.8637	1200.9		
17-Mar-09	9:30 AM	4.6	6.4	1.57	0.8666	1278.25		
18-Mar-09	9:00 AM	3.6	6.5	12.12	0.8638	1350.66		
19-Mar-09	8:25 AM	3.0	6.6	1.48	0.8207	1412.52		
23-Mar-09	8:35 AM	2.3	6.6	1.46	0.8184	1695.14		
24-Mar-09	8:20 AM	3.3	6.5	1.5	0.8104	1763.86		
25-Mar-09	8:20 AM	3.1	6.4	1.44	-	-		
26-Mar-09	8:15 AM	3.2	6.2	1.45	0.8113	1903.3		
30-Mar-09	8:15 AM	4.7	6.3	1.49	0.8283	2128.87	2.5	2128.87
31-Mar-09	10:35AM	4.8	6.2	1.44	0.8339	2206.58		
1-Apr-09	8:00 AM	3.7	6.3	1..52	0.8349	2269.93		
2-Apr-09	10:15 AM	3.4	6.2	1.56	0.8345	2348.4		
6-Apr-09	8:20 AM	4.5	6.5	1.51	0.8266	-		
7-Apr-09	7:55 AM	4.0	6.5	-	0.8297	2685.24		
13-Apr-09	8:25 AM	4.4	6.3	1.55	0.8175	3110.03		
22-Apr-09	10:45 AM	4.5	6.6	1.48	0.8105	3746.12		
28-Apr-09	8:15 AM	4.0	6.6	1.43	0.8139	4156.11	1.5	2027.24

SPW - 2

Date	Time	Temp °c	pH	Zinc mg/l	Intantaneous Flow (L/s)	Cummulative Flow (m^3)	Average Zn (mg/L)	Monthly Flow (m3)
2-Mar-09	1:55 PM	4.3	6.3	338		-		
3-Mar-09	8:10 AM	4.2	6.3	351		-		
4-Mar-09	8:55 AM	4.5	6.3	348	0.7947	267.444		
5-Mar-09	9:40 AM	3.3	6.4	345	0.7893	337.653		
9-Mar-09	9:25 AM	4.6	6.1	330	0.7905	602.859		
10-Mar-09	8:30 AM	4.1	6.3	321	0.7912	668.237		
11-Mar-09	8:20 AM	4.3	6.2	325	0.7923	736.139		
12-Mar-09	8:30 AM	4.1	6.1	323	0.7919	804.669		
16-Mar-09	8:35 AM	3.7	6.5	311	0.7917	-		
17-Mar-09	9:35 AM	3.8	6.4	305	0.7885	1147.81		
18-Mar-09	9:05 AM	3.5	6.5	306	0.791	1213.85		
19-Mar-09	8:20 AM	3.9	6.6	303	0.9104	1278.33		
23-Mar-09	8:40 AM	2.7	6.6	296	0.8892	1590.11		
24-Mar-09	8:25 AM	3.9	6.5	290	0.8791	1664.27		
25-Mar-09	8:25 AM	3.5	6.5	287	-	-		
26-Mar-09	8:10 AM	3.8	6.3	287	0.8687	1815.23		
30-Mar-09	8:20 AM	4.2	6.2	284	0.9305	2067.42	310.1	2067.42
31-Mar-09	10:40AM	4.4	6.1	281	0.9052	2154.59		
1-Apr-09	8:05 AM	3.4	6.2	282	0.8979	2223.14		
2-Apr-09	10:15 AM	3.9	6.4	287	0.9405	2309.64		
6-Apr-09	8:25 AM	3.8	6.5	269	0.9309	-		
7-Apr-09	8:00 AM	3.3	6.6	-	0.9329	2680.48		
13-Apr-09	8:30 AM	4.0	6.2	267	0.8977	3150.08		
22-Apr-09	10:50 AM	4.0	6.3	262	0.9233	3861.22		
28-Apr-09	8:20 AM	3.8	6.3	251	0.8963	4315.34	271.0	2247.92

Sump / Combined Shallow/Deep

Sump							Combined Shallow/Deep	
Date	Time	Temp °c	pH	Zinc mg/l	Intantaneous Flow (L/s)	Cummulative Flow (m^3)	Average Zn (mg/L)	Monthly Flow (m3)
2-Mar-09	2:00 PM	4.1	6.9	257	-	-		
3-Mar-09	8:15 AM	4.6	6.5	251	-	-		
4-Mar-09	9:00 AM	4.0	6.5	242	2.0609	686.819		
5-Mar-09	9:45 AM	3.8	6.5	264	2.0927	864.834		
9-Mar-09	9:30 AM	4.2	6.3	235	1.9937	1539.25		
10-Mar-09	8:35 AM	4.2	6.5	228	1.9361	1703.15		
11-Mar-09	8:25 AM	4.3	6.3	234	2.0641	1873.35		
12-Mar-09	8:35 AM	4.5	6.3	234	2.0249	2044.04		
16-Mar-09	8:40 AM	3.8	6.7	237	1.9801	2706.27		
17-Mar-09	9:40 AM	4.5	6.7	262	3.9171	2879.09		
18-Mar-09	9:10 AM	3.8	6.7	247	1.9281	3041.48		
19-Mar-09	8:15 AM	4.7	6.8	226	2.0332	3196.57		
23-Mar-09	8:45 AM	2.8	6.7	228	1.9574	3894.33		
24-Mar-09	8:30 AM	4.7	6.7	233	1.8392	4035.55		
25-Mar-09	8:30 AM	5.1	6.6	233	-	-		
26-Mar-09	8:05 AM	4.7	6.4	221	2.003	4359.92		
30-Mar-09	8:25 AM	4.7	6.3	222	2.1601	4760.6	236.1	4760.60
31-Mar-09	10:45AM	4.5	6.3	218	1.9551	4960.97		
1-Apr-09	8:10 AM	3.7	6.3	225	1.9677	5106.31		
2-Apr-09	10:20 AM	4.3	6.6	220	1.9603	5292.02		
6-Apr-09	8:30 AM	3.7	6.6	219	1.9719	-		
7-Apr-09	8:05 AM	3.8	6.7	-	1.9545	6040.83		
13-Apr-09	8:35 AM	4.4	6.3	222	1.8064	7036.08		
22-Apr-09	10:55 AM	3.9	6.3	219	1.8681	8516.51		
28-Apr-09	8:25 AM	3.8	6.5	158	2.7322	9680.15	210.2	4919.55

Discharge to Faro Pit

Date	Time	Temp °c	pH			
2-Mar-09	-	-	-			
3-Mar-09	-	-	-			
4-Mar-09	9:10 AM	4.5	6.6			
5-Mar-09	8:40 AM	4.1	6.5			
9-Mar-09	9:10 AM	5.1	6.3			
10-Mar-09	8:00 AM	4.9	6.6			
11-Mar-09	8:00 AM	5.1	6.4			
12-Mar-09	8:05 AM	5.3	6.4			
16-Mar-09	8:10 AM	5.3	6.7			
17-Mar-09	10:00 AM	5.6	6.7			
18-Mar-09	9:30 AM	3.8	6.8			GFCI Fault on heat trace
19-Mar-09	8:00 AM	5.5	6.8			
23-Mar-09	9:00 AM	4.4	6.8			
24-Mar-09	8:00 AM	5.5	6.6			Sump on manual
25-Mar-09	8:00 AM	5.3	6.6			Sump on manual
26-Mar-09	8:30 AM	4.9	6.4			Sump on manual
30-Mar-09	8:00 AM	5.0	6.4			All pumps on manual
31-Mar-09	8:50AM	5.5	6.4			All pumps on manual
1-Apr-09	7:50 AM	4.7	6.4			
2-Apr-09	9:51 AM	5.5	6.5			
6-Apr-09	-	-	-			
7-Apr-09	8:35 AM	3.8	7.5			
13-Apr-09	8:15 AM	5.8	6.4			
22-Apr-09	8:45 AM	5.1	6.4			
28-Apr-09	8:50 AM	4.8	6.6			

SRK Consulting
Engineers and Scientists

Deloitte & Touche

S-Wells Seepage Interception System

DES Monitoring Data

PROJECT:	DATE:	APPROVED:	FIGURE::
1CD003.120	May 2009		3

PW1

PW2

PW3 (sump)

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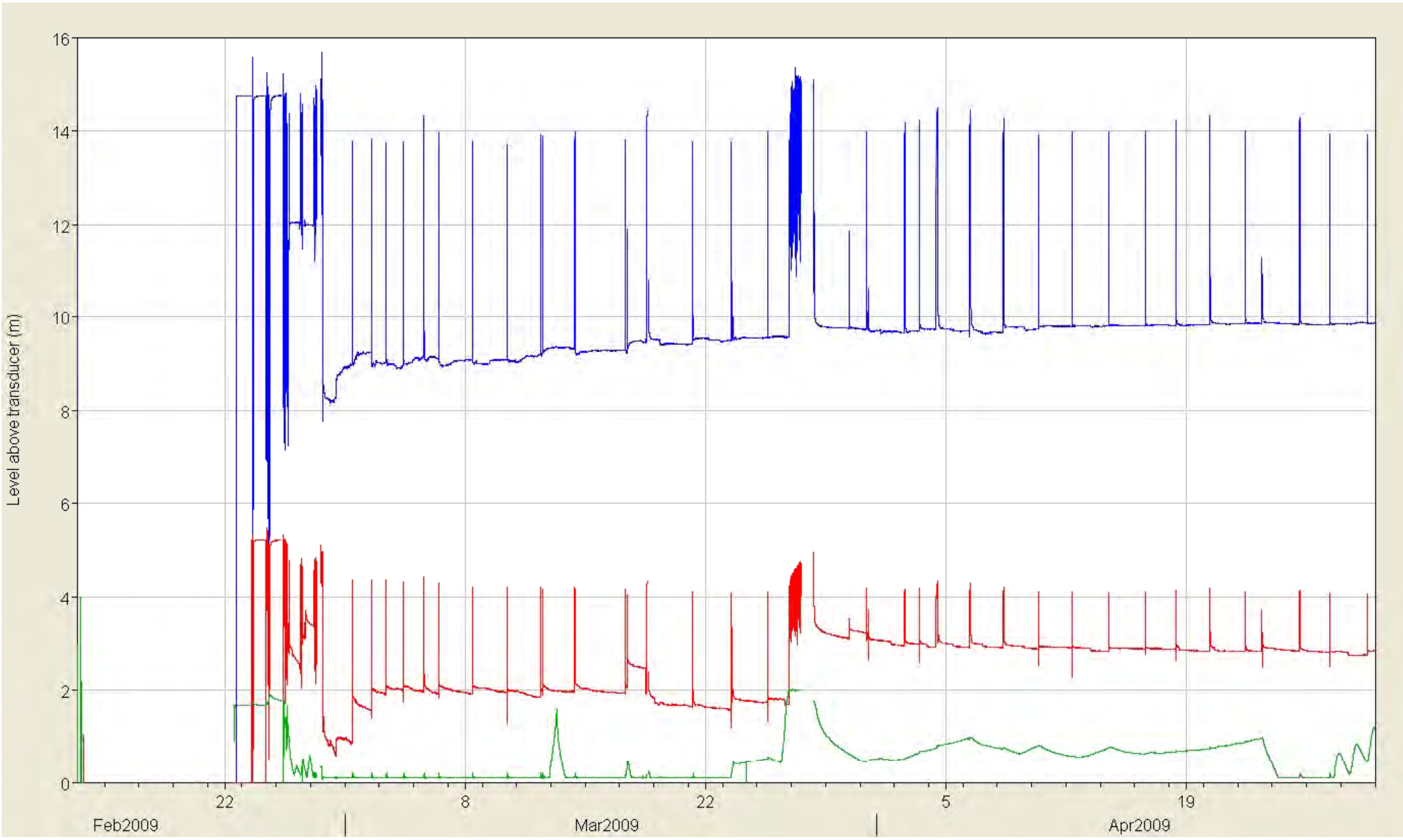
Deloitte & Touche

S-Wells Seepage Interception System

SIS Flow Monitoring Data

PROJECT:	DATE:	APPROVED:	FIGURE::
1CD003.120	May 2009		4



PW1

PW2

PW3 (sump)

SRK Consulting
Engineers and Scientists

Deloitte
& Touche

S-Wells Seepage Interception System

SIS Level Monitoring Data

PROJECT:	DATE:	APPROVED:	FIGURE::
1CD003.120	May 2009		5

Appendix A
Technical Advisory Team S-Wells Recommendation Letter

BRODIE CONSULTING

MEMORANDUM

DATE: October 3, 2008

TO: Faro Mine

FROM: Faro TAT

SUBJECT: S-Well Groundwater Assessment & Recommendation

The Faro TAT met on Sept 22, 23 to evaluate water management issues at the Faro site. This memo presents an assessment of the groundwater situation at the S-Well area and recommendation for action.

Discussion

- Water from the shallow aquifer contains up to 400 mg/L zinc and appears to discharge to surface and distribute over wet area. The surface discharge may be due to the wet conditions this year. There is a high probability that this water forms a diffuse surface discharge to Rose Creek.
- The water quality and pump test results were still being analyzed, but rough estimates were developed as follows:
    - Shallow aqufier – 15 gpm, 12 tonnes of zinc per year
    - Deep aquifer – 15-50 gpm, 20 tonnes of zinc per year.
- The rough estimates of loading from the shallow aquifer to NFRC gave reasonable agreement with the observed increases in zinc concentrations in NFRC during the past two winter low flow periods (+/- 0.1 mg/l)
- A second rough check on the total load draining via the S Well area is in reasonable agreement with the loading predicted in the site water quality model (27 tonnes/year of zinc).

The work as a whole confirms that the upper (shallow) aquifer in the S Wells area is currently contributing zinc to North Fork Rose Creek, either directly or via the surface discharge . The deep aquifer is likely to be a more significant source at some time in the future.

The TAT debated how the S-Well problem should be addressed. The following was noted:

- There is insufficient time remaining this year, and there may be permitting issues associated with most of the alternative mitigation strategies. The ground surface in the vicinity of the target capture area is too wet to construct the seepage capture trench that would be needed for the passive treatment method.
- The pump data (which was limited in scope due to discharge restrictions) leaves some question as to the sustainable discharge rate from the shallow and deep aquifers. Therefore it is not possible to design a “fully optimized” groundwater collection system. But it is possible to design a combination of sumps and use of the available wells to intercept a substantial proportion of the contamination shallow aquifer.
- If the shallow aquifer is intercepted, the next question is where to send the water. Water would need to be handled year-round. There is currently no capacity for year-round treatment. The water could be stored in either the Intermediate Pond or the Faro Pit:
    - If discharged to the Intermediate Pond, the S-Well water would make a very significant increase in the concentrations there, and add to both the volumes and loads treated each year from that source. The resulting increase in loading to the treatment plant would cause the average influent concentrations to exceed the currently assumed treatment capacity of 20 mg/L.
    - If discharged to the Faro Pit, the S-Well water would be diluted in the large volume, and average zinc concentrations in the pit would increase by about 1.5 mg/L per year. At that rate of increase, the currently assumed treatment capacity will be exceeded in 2-3 years.
- Discharge of S-Well water to the Faro Pit is the only practical option available at this time.

<u>The TAT recommends:</u>

- Collection of near surface aquifer water from S-Well area should be implemented as soon as practicable. In addition to the concerns about gradual increases in zinc loadings via groundwater and the associated AMP requirements, the work this summer has shown that that there is a high likelihood of surface discharges. The water license prohibits discharge of water exceeding 0.5 mg/L zinc to Rose Creek and specifically references “all points of entry” which would include diffuse surface discharge from the S-Wells area.
- A conceptual S-Wells capture system is expected to consist of:

- Install interim collection system this fall – sump/trench in upper aquifer, pump from 2 existing deep aquifer wells to the sump. Pump from sump to Faro Pit.
- This would constitute a first phase of groundwater collection system that would be expanded/improved as necessary in 2009.
- Opportunities for alternate treatment methods which would compliment the collection system should be investigated beginning in 2009.
- Further details on the collection system components are described below.

- The water collected from the S-Well area should be directed to the Faro pit in the short term.
- Discharge of the S-Well water to the Faro Pit for more than two years will cause the currently estimated treatment capacity of the Faro mill system to be exceeded. Several options for the longer term management of the S-Well water need to be considered:
    - The basis for the current estimates of treatment capacity need to be re-examined, and options for upgrading the Faro mill system to treat the additional load should be considered.
    - The S-Well area will be a source of relatively low flow – high strength water, similar to the ETA interim collection system and the Zone II pit pumpback. In general, it is more efficient to collect and treat high strength sources directly rather than diluting them first. As the proportion of these low flow – high strength sources increases, storing and diluting them in the Faro Pit or Intermediate Pond becomes less efficient. Options for a separate treatment system for roughly 200 gpm of high strength sources should be considered.
    - The S-Well water will require year-round collection. The ETA water is in fact also a year-round source, and the current approcah of collecting only the summer flow is a compromise. As the year-round proportion of the sources increases, the economics of instituting year-round treatment improve. Options for year-round treatment should be considered.
    - Sludge generation will increase as the high strength sources are captured and treated. The implications for sludge production, handling and long-term management need to be considered in all of the above.

S Well Contaminated Water Collection System Components:

- A 2-3 m deep sump should be constructed to intercept the shallow aquifer and covered with an insulated shack.
- Two groundwater wells have variable rate pumps already installed. These should discharge to the sump. The well-heads and the piping from the wells to the sump will need to be insulated.
- A pump should be installed in this sump and sized to be capable of pumping 50 gpm to the Faro pit.
- Temporary (08/09 winter) power from diesel generator situated on haul road above S-Wells. Fuel consumption is expected to be in the range of 2- 3 litres per hour. Capacity for up to 4 days (300 litres) would allow unattended operation over weekend periods through the winter.
- The collected water should flow via insulated but not heat traced pipeline to Faro Pit, see (attached figure). The pipeline must gravity drain in both directions if there is a system failure. Shallow sump collection of groundwater at about the rate expected here and discharge via an insulated (but not heat traced) pipeline about 300 m long was conducted without freeze up for about 10 years at Colomac. A similar system also exists in two locations at the Giant mine, although the volumes and discharge distances are much smaller.
- Consider installing a steel section in the pipeline as it passes the generator. This would allow use of exhaust heat to warm the flow.
- A control system should be designed for subsequent integration into a sitewide system, The minimum components include:
    - Low water shut off
    - System off - warning light (= high water alert)
    - Remote alarm (to guardhouse – minimum, to pager or phone alert in Faro – strongly preferred)
    - Flow meter with totalizer
- An oxygen sensor is required at the shack as this system will be situated at the toe of an ARD rock pile, or staff should use personal gas monitors.

Appendix B
Conference Call Notes Regarding “Go” Decision

SRK Consulting
Engineers and Scientists

Notes from Teleconference Meeting

SRK Project No. 1CD003.112 Notes prepared on: Oct. 9, 2008

Anvil Range Mining Complex
S-wells Area below Faro Waste Rock Dump

DISTRIBUTION: Participants + S. Mead (FPMT), D. Pitt (FPMT), M. Nahir (INAC), B. Slater (TAT), L. Gomm (TAT), D. Hockley (TAT/SRK)

DATE & TIME: October 9, 2008 at 11:00 a.m. PDT

PRESENT:

W. Treleaven	- Deloitte & Touche	J. Brodie	- TAT
D. Haggar	- Deloitte & Touche	C. Scott	- TAT/SRK
D. Sedgwick	- Deloitte & Touche	P. Healey	- TAT/SRK
G. Stevens	- Deloitte & Touche	D. Mackie	- SRK

PURPOSE: To explore options and define the path forward in relation to the water management issues at the S-wells area.

ITEM **ACTION BY:**

1. General Background

This call occurred as a consequence of a call earlier in the day which involved numerous others and focused on the following 2 issues:

- water management at the Vangorda Pit and
- the next step at the S-wells area following the note from FPMT and INAC (including a technical note from the Technical Advisory Team (TAT)) in relation to water management issues at the S-wells area.

The field program for D&T Task 24 (FPMT Project #1.12) wrapped up in mid September. A preliminary assessment by the TAT on Sept. 23rd considered the data from 2005 and 2007 and concluded:

- The water reporting to the S-wells area via the shallow aquifer warrants immediate attention.
- The best short term option would be to pump this water to the Faro Pit until a new or improved water treatment plant can be built.

A TAT concept for handling the water in the short term was summarized in an October 3rd memo by John Brodie. D&T has not seen this year's field program results as of 9 am conference call and believes there are problems with parts of the design concept.

A brief summary of the recent water quality and water flow data was sent to the participants of the 11 am call, shortly after it started. A slightly improved version of this information is attached to these notes.

2. Discussion of an Approach

Should something be done now and, if so, what?

It was agreed that steps should be taken to evaluate what, if anything, can be done this winter with respect to designing and installing a water collection and pump/pipe system that will transfer water from the shallow aquifer and convey it to the Faro Pit. The approach will be to break up the system into its basic components and to then explore the feasibility and schedule issues with respect to installing these components this winter. If the installation can't be done in a timely manner, it would make sense to defer the installation of this system until summer 2009.

Basic components of a water collection and pump/pipe system:

The main components of the system can be broken down as follows:

- Seepage interception system (SIS)
- Pumping system
- Piping system
- Heat tracing for the piping system (site experience suggests that without heat tracing, the duration of time that relatively small water volumes can be pumped over the winter period will be trivial from November onwards)

Snow making option:

The option of using a snow maker was raised, with the concept of potentially blowing the snow (made from water collected in the SIS) to a location where it handled using a different methodology. Alternatively, the snow might be blown to a stable location.

3. Short Term Action Plan

The following plan was set up:

- SRK (Dan Mackie) will develop options for the SIS system
- DES, based on previous discussions between John Brodie and DES, will explore the transfer pumping and piping system
- John Brodie will obtain the necessary data from CE Franklin, a firm experienced with heat tracing of pipelines

The intention will be to pull this information together in time for the next teleconference meeting, one week from today. Cam Scott will act as the "Project Manager" for this short term action.

No action was identified for advancing the "snow making" option.

4. Next Teleconference Meeting

The next teleconference meeting is set for 8 am PDT on Thursday October 16th. Wes Treleaven will send out the call details. **All**

Cam Scott, Project Manager

A brief summary of findings from the 2007 field program is provided below:

Water quality (all concentration values in mg/L)

Shallow Aquifer Zinc	Type	9/12/2005	6/6/2006	9/20/2006	5/28/2007	8/26/2008	8/29/2008	9/9/2008	NOTE
SP4b	2005 MW	277	362	373	366				
PW4	2008 PW							355	
DP5	2008 sump						376		
A-SC	2008 Marsh					~50			Sample from site lab;
B-SC	2008 Marsh					~50			Sample from site lab;
C-SC	2008 Marsh					~50			Sample from site lab;
D-SC	2008 Marsh					~50			Sample from site lab;

Deep Aquifer Zinc	Type	9/12/2005	6/6/2006	9/20/2006	5/28/2007	8/29/2008	8/31/2008	9/8/2008	9/18/2008
SP4a	2005 MW	1.1	1.04	0.995	2.45				
SP5	2005 MW	153	211	218	238				
SP6	2005 MW					0.0726			
SP7a	2008 MW						1.64		
SP7b	2008 MW						96.8		
SP8a	2008 MW						0.444		
SP8b	2008 MW						0.359		
PW1	2008 PW								1.35
PW2	2008 PW								330
BR1	2008 MW							1.13	
BR2	2008 MW							28.6	
BR3	2008 MW							0.0232	
BR4	2008 MW							119	

Abbreviations: MW – monitoring well; PW – pumping well

Preliminary review of water quality suggests:
-Water quality in the shallow aquifer appears to be relatively stable at about 350-375 mg/L.
-Water quality in the deep aquifer has deteriorated over the past three years. Zinc concentration from a sample taken at the end of pumping one of the deep aquifer pumping wells (PW2) is more than double the concentration observed at a nearby monitoring well (SP5) in September 2005 (153 mg/L to 330 mg/L).
-Surface water downgradient of the 2005 shallow aquifer monitoring well (SP4b) has zinc levels in the range of 50mg/L. These data are from the site lab and full analytical details have not been provided. The surface water sampling stations included seeps and standing water in the marshy area adjacent to the NFRC.
-High zinc concentrations (96.8 mg/L) have been found immediately adjacent to the NFRC (~5m from creek) in one overburden monitoring well (SP7b). The deeper monitoring well in this area (SP7a) has lower concentrations, but still elevated (1.64 mg/L).
-Zinc concentrations in materials below the NFRC at a distance of approximately 250m down gradient of the S-wells suggest impacted water (SP8a – 0.444; SP8b – 0.359; a is weathered bedrock MW).
-Deep aquifer water quality suggests that the area of highest contamination remains in the vicinity of 2005 monitoring well SP5, but is now better constrained.
-Deep aquifer water quality indicates high concentrations in shallow bedrock (BR4), but higher than background even at depths of greater than 15m into bedrock (BR1).
-The deep aquifer high concentration plume (>1 mg/L zinc) is at least 50m wide, with an ~25m wide very high concentration area (>100mg/L) and extends to the NFRC, though connection with the NFRC is currently unclear.

Water Flows:
-Dimensions of the shallow aquifer presented in the 2005 report remain appropriate, though there appears to be greater heterogeneity in hydraulic parameters than originally believed.
-Dimensions of the deep aquifer will increase significantly with findings of permeable bedrock to significant depths.

Notes from Teleconference Meeting

SRK Project No. 1CD003.112 Notes prepared on: Oct. 16, 2008

Anvil Range Mining Complex
S-wells Area below Faro Waste Rock Dump

DISTRIBUTION: Participants + S. Mead (FPMT), D. Pitt (FPMT), M. Nahir (INAC), B. Slater (TAT), L. Gomm (TAT), D. Hockley (TAT/SRK)

DATE & TIME: October 16, 2008 at 8:00 a.m. PDT

PRESENT:

W. Treleaven	- Deloitte & Touche	J. Brodie	- TAT
D. Haggar	- Deloitte & Touche	C. Scott	- TAT/SRK
D. Sedgwick	- Deloitte & Touche	P. Healey	- TAT/SRK
G. Stevens	- Deloitte & Touche	D. Mackie	- SRK
		G. Bull	- GLL (Aecom)

PURPOSE: To provide/discuss the update on the acquisition of information needed for a "go – no go" decision related to the potential installation of a capture and pump/pipe system at the S-wells area.

ITEM	ACTION BY:

1. General Update Since the Call of October 9th, 2008

We have been focussing on three design elements since the conference call of October 9th:

- The seepage interceptor system (SIS)
- The pumping/piping system and
- The heat tracing system.

On October 9th, John Brodie got some additional information from CE Franklin on heat tracing. This was forwarded to the group. On October 14th, we received information from DES on the pumping/piping system, along with some product information.

In the last 16 hours, we obtained the following additional information:

- An update from SRK (Dan Mackie) on the options for a seepage interceptor system (SIS) at the S-wells area; and
- Design information from SRK (Marija Jurcevic) related to the pump/pipe system that would be appropriate to move water from the SIS to Faro pit.

This information was forwarded to the call participants immediately prior to this morning's call.

2. Discussion of SIS System

Three broad classes of SIS have been considered:

- Large open trench;
- Wells; and
- A narrow interceptor trench.

The narrow interceptor trench is recommended. However, there are logistical issues (related mainly to running sands below the water table) that will affect our ability to excavate the trench and install the drains and/or pipes needed to capture the water in the shallow aquifer. Some suggestions for installing/designing the SIS include the use of biodegradable slurry, shoring or sheet piles, and multiple (i.e. 2) sumps without lateral pipes.

W. Treleaven points out that the potential installation of an SIS this fall/winter would require the use of a 3rd party.

D. Haggar indicates that, in order to overcome the trafficability issues associated with the soft ground conditions in the S-wells area, it would be best to do the installation in the fall when the ground surface is frozen. This would apply even if a “no go” decision is made in relation to the installation of a capture and pump/pipe system at the S-wells area this fall/winter.

The next step would be to advance the thinking on the details of the interceptor trench and to get costs based on 3rd party involvement. **SRK (D. Mackie)**

3. Discussion of the Pump/pipe System

The preliminary design of a pump/pipe system to convey the water in the sump to the Faro pit has been completed. It is based on the following:

- An HDPE pipe (either 2” or 3” but the 2” was recommended), with two design grades to account for the head differences
- A variable rate pump system.

There has been no opportunity to obtain quotes based on this information, but that’s the next step. **J. Brodie & SRK**

DES provided some data on pump control. D. Haggar notes that with respect to variable frequency drive (VFD) pump systems, it is critically important to have “clean” power, i.e. a source which provides power at a uniformly steady frequency of 60 hz. This could be problematic with a diesel powered generator (could fluctuate from 58 to 62 hz).

4. Discussion of the Heat Tracer System

No new data since the information of October 9th, though J. Brodie had hoped to have input from CE Franklin yesterday. There is some uncertainty related to some details, such as the availability of the mold for the insulation. Further contact required. **J. Brodie**

5. Discussion on the Power Requirements

For this year, if we reach a “go” decision, we would plan to use a diesel powered generator situated about 125 m from the pumps. However, the power requirements are still a work in progress. The following details form our current understanding:

- On site presently are a 600 V generator (it’s spoken for) and a 480 V generator (its available if needed)
- After the meeting it was confirmed that there is a Standford generator which has been converted from 208 V up to 600 V which could be potentially utilized. However, it hasn’t been run for 3years and would likely require a major service/overhaul.
- DES specified a 20 V power supply for their recommended pump system.
- The heat trace system can be 220 or 600 V.

Further input required. **J. Brodie & SRK**

6. Next Teleconference Meeting

The next teleconference meeting is set for 1 pm PDT on Monday October 20th. The call-in details are as follows: **All**

Toll-free Dial-in number: **1-866-862-7608**
Conference ID: **3172616**#

Cam Scott, Project Manager

SRK Consulting
Engineers and Scientists

Notes from Teleconference Meeting

SRK Project No. 1CD003.112 Notes prepared on: Oct. 20, 2008

Anvil Range Mining Complex
S-wells Area below Faro Waste Rock Dump

DISTRIBUTION: Participants + S. Mead (FPMT), D. Pitt (FPMT), M. Nahir (INAC), B. Slater (TAT), L. Gomm (TAT), D. Hockley (TAT/SRK)

DATE & TIME: October 20, 2008 at 1:00 p.m. PDT

PRESENT:

W. Treleaven	- Deloitte & Touche	J. Brodie	- TAT
D. Haggar	- Deloitte & Touche	C. Scott	- TAT/SRK
D. Sedgwick	- Deloitte & Touche	D. Mackie	- SRK
G. Stevens	- Deloitte & Touche	G. Bull	- GLL (Aecom)

PURPOSE: To discuss the update on the acquisition of information needed for a "go – no go" decision related to the potential installation of a capture and pump/pipe system at the S-wells area.

ITEM **ACTION BY:**

1. General Update Since the Call of October 16th, 2008

A table, attached, formed the basis of the update associated with the potential installation of the seepage interception and pump/pipe systems. The table provides preliminary information on the schedule and costs associated with the system. For the most part, it has been assumed that 3rd party contractors would be used. **Unfortunately, contractor/supplier input regarding the schedule and costs of essentially all key items is still required.**

2. SIS

The current thinking for the seepage interception system (SIS), based on the recommendation from the last call, is to excavate a narrow interceptor trench and backfill it with a concrete-ringed sump and clean gravel. However, the presence of saturated sands raises concerns over the methodology required to excavate to the target depth (about 3.5 m), because the sands will likely "run" into the excavation as quickly as it can be dug.

One option to deal with this problem would be to use steel sheet piles, provided the shallow aquifer is not too dense or gravelly. A brief introduction to steel sheet piles follows the summary table referenced above.

At least one Whitehorse contractor with experience in steel sheet piles has been contacted, and is developing an approximate cost to complete the steel sheet pile installation. A second contractor will also be contacted to obtain comparative information. **C. Scott/ D. Mackie**

If the pump/pipeline system is not installed this winter, it may nevertheless be cost effective to attempt to install an SIS trench/sump this winter when the ground surface is frozen and the site equipment (the 345 excavator) has completed the two essential tasks remaining on this year's agenda. If nothing else, this approach might clarify the difficulties that will be faced in the event the SIS installation is delayed until next summer.

D. Haggar to contact the excavator operator (Ray) who dug the test pits in the S-wells area in August 2008 to get his input on: **D. Haggar**

- how this work might be safely executed, and
- the probability of success based on his observations during last summer's test pit program.

The 6-page attachment that follows the sheet pile summary provides information on the exact location of the proposed trench.

3. Pump/pipe System

There is still considerable uncertainty with respect to the schedule to supply a heat traced, insulated 2 inch HDPE pipeline. The current cost estimate ($250k) is thought to be reasonable but remains to be confirmed. There is some concern that the supplier (CE Franklin) is taking much longer than had been previously indicated.

Further pressure will be applied to CE Franklin, but a second contractor will be contacted to obtain parallel information. **J. Brodie**

4. Power Supply

D. Haggar confirmed that there is a generator on site that could be likely be used, assuming it gets an appropriate service/overhaul (likely to take 1 to 2 weeks). This generator may have more capacity than is needed, but it may still be the most expedient option. Preliminary information from the internet suggests a new, "more appropriately sized" generator might cost in the order of $35k. Shipping and installation (including a control unit) are excluded from this amount. This is the one task where it may be feasible to use site staff for part of the installation.

The power supply options warrant a closer look once the input from the pump/pipeline suppliers has been obtained. **J. Brodie**

5. Engineering Design/Supervision

Much of this project has either been defined (pump and pipeline requirements) or will be defined by the suppliers. Many other elements will be field fit. It is likely, therefore, that the engineering design requirements for this project will be relatively light. There will definitely by a need for engineering supervision; details to be defined later.

6. Next Steps Towards a "Go – No Go" Decision

Current expectations, allowing for a 25% contingency, put the capital costs for this project in the order of $500k to $600k. There is still considerable uncertainty regarding the schedule, particularly in relation to the pipeline supply. Based on verbal input from suppliers, the start date for installation could conceivably be December or January (more likely the latter). However, the contractor/supplier input that will define the schedule and costs at a level suitable for a "go – no go" decision is still outstanding.

W. Treleaven points out that if D&T is to facilitate the funding of this project, the contracted work must be completed by February 28th 2009.

7. Next Teleconference Meeting

The next teleconference meeting is set for 9 am PDT on Friday October 24th. The call-in details are as follows: **All**

Toll-free Dial-in number: **1-866-862-7608**
Conference ID: **3172616**#

Cam Scott, Project Manager

Preliminary Estimate of Capital Costs for Emergency Action at S-wells Area, Faro Mine Complex (October 20, 2008)

Main Construction Element	Provider/Installer	Expected Duration	As early as for start*	Approximate Cost**
Sump installation (using sheet piles)	Whitehorse earthworks contractor, i.e. Golden Hills or Pelly or ?	1 to 2 weeks, plus shipping of sheet piles	November 10	$50k to 100k (awaiting more detailed information)
Pump/pipeline installation, including	Likely the same contractor as for the sump installation	4 to 6 weeks, including shipping	uncertainty on delivery time???	$250k (awaiting more detailed information)
Power supply (generator, fuel, etc.)	D&T possibly, assuming that we can use the generator on site (if not, it is likely that it could be the same as for the sump installation)	3 weeks	November 10???	$50k (could be $75k all in, if we have to purchase a new generator); (awaiting more detailed information)
Engineering design/supervision	DES/ ?			$75K
Subtotal				**$425k to $475k**
Contingency @ 25%				$105k to $120k
Total				**$530k to $595k**

* based on technical reasons and negotiated contracts, exclusive of timing factors related to, for example, competitive bids or Federal approvals regarding budgets/funding.
** still awaiting quotations from contractors and suppliers.

Steel Sheetpiles – A Brief Introduction

Steel sheet piles are interlocking steel panels driven into the ground to form a wall. The installation of sheet piles can be carried out with impact or vibratory hammers. Sheet piling has been used in the construction industry for years.

Steel sheet piles are used in temporary works such as forming a temporary wall to support excavation in soft or water logged soil for the construction of cofferdams or basement. Steel sheet piles can also be used to form permanent retaining walls especially those used for river bank strengthening and in the construction of jetties. They can also be used to form part of the permanent wall of building basement where they are casted together with the basement concrete wall.

Steel sheetpiles are popular due to:

- strength
- ease of handling
- ease of construction
- potential for reuse

Lengths may be mixed within a wall, but sheetpiles should be ordered from a single source because interlocks vary by manufacturer. Steel sheetpiles are generally shipped and driven in pairs.

Temporary applications of steel sheet piles:

- basement to a building
- retaining walls to exclude earth and/or water
- construction of the pile cap for a pier in the river
- prevent slides and cave-ins in trenches
- pump house below grade

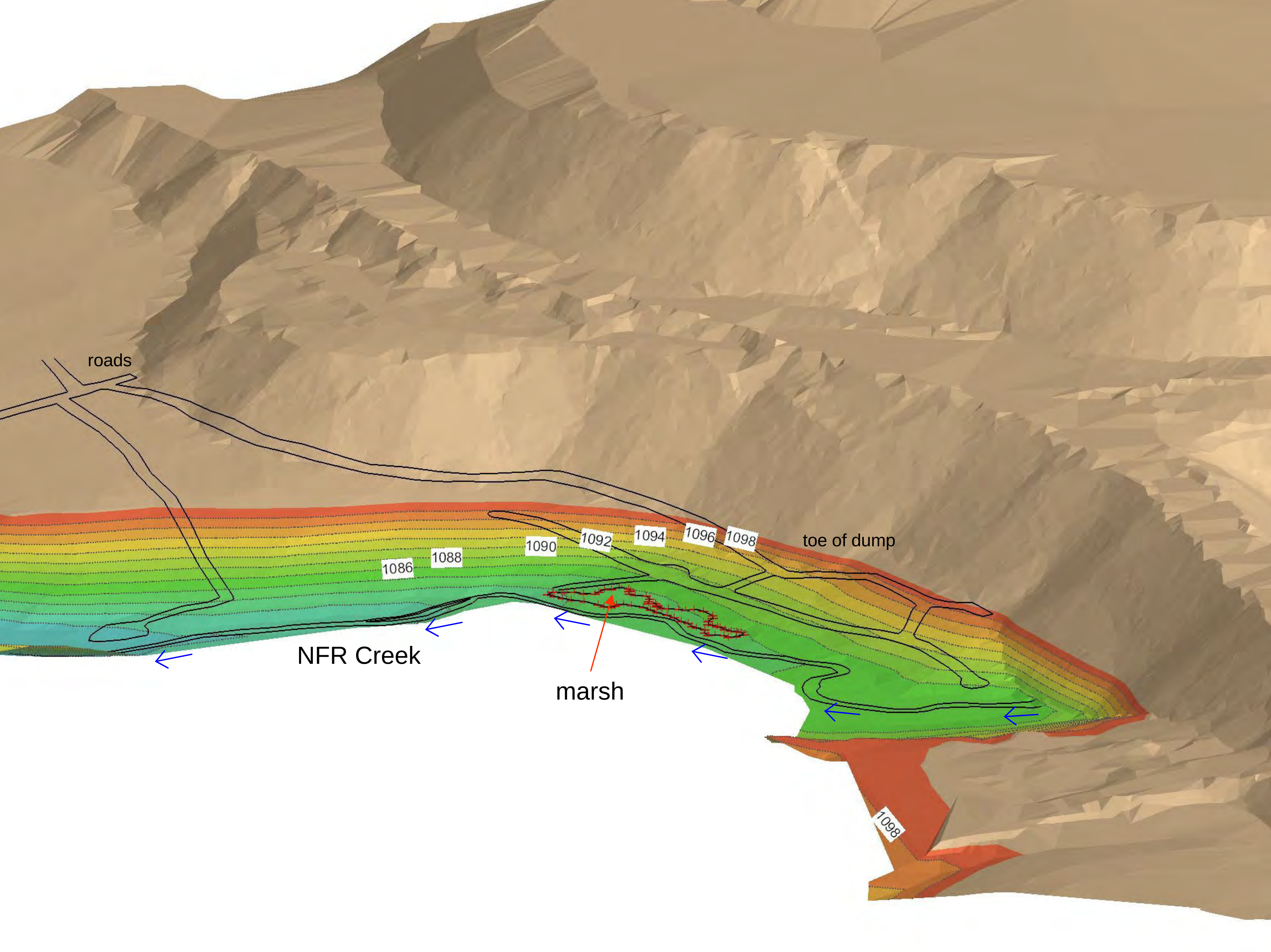
Permanent applications of steel sheet piles:

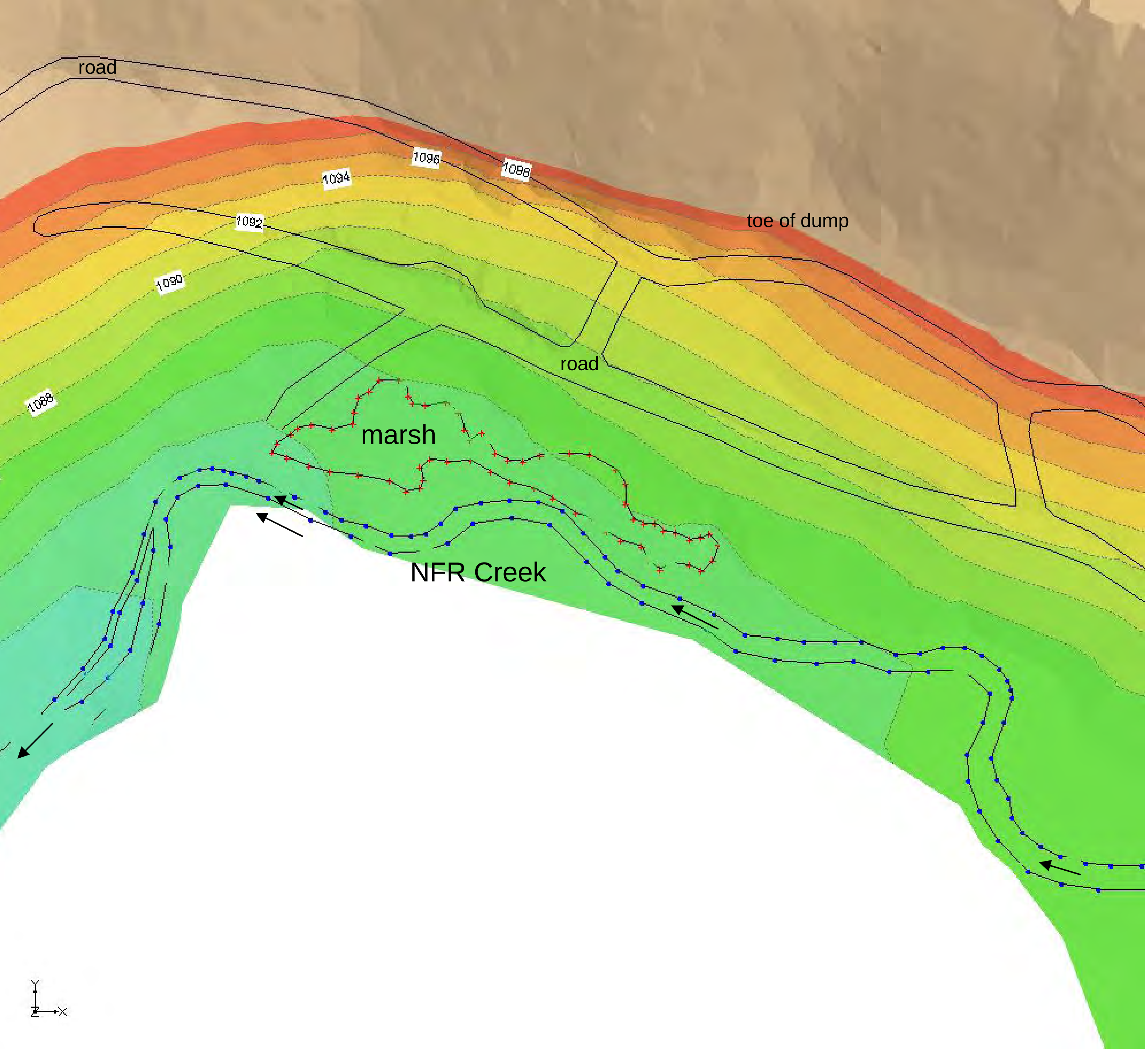
- basements
- underground car parks
- waterfront structures
- landfill and waste disposal
- foundations
- beach erosion protection
- cofferdams
- stabilizing ground slopes

Advantages of steel sheet pile walls:

- positive trench wall support
- controls groundwater effectively
- can be extracted and used many times
- minimum right of way required
- allows maximum access
- fast in loose soils
- satisfies "extraction of temporary works" requirement
- excavation / backfill quantities minimized

They have an important advantage in that they can be driven to depths below the excavation bottom and so provide a control to heaving in soft clays or piping in saturated sands. However sheet piles are less adaptable to hard driving conditions, particularly where boulders or irregular rock surfaces occur.


roads
1086
1088
1090
1092
1094
1096
1098
toe of dump
NFR Creek
marsh
1098


road
1096
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toe of dump
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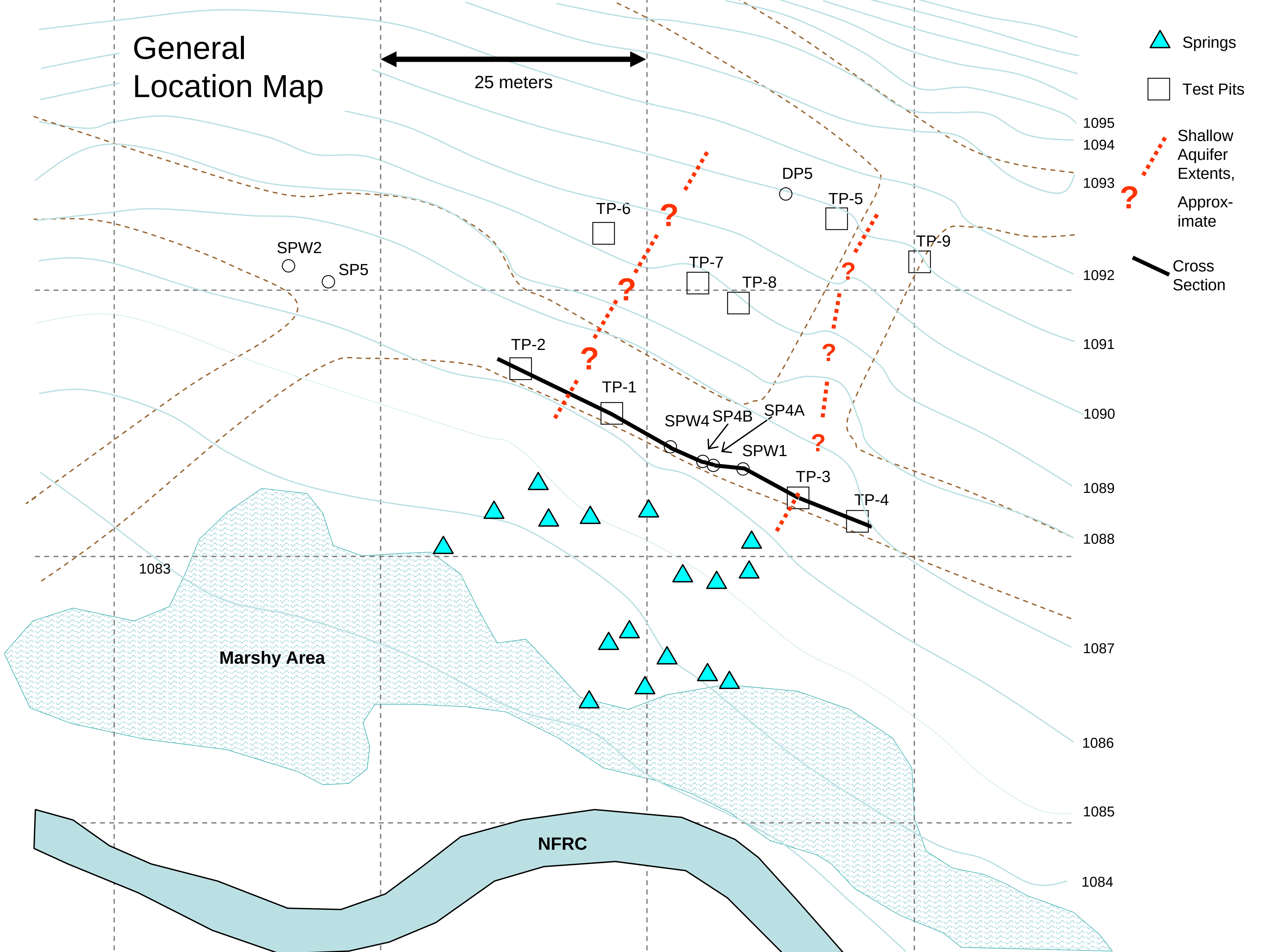
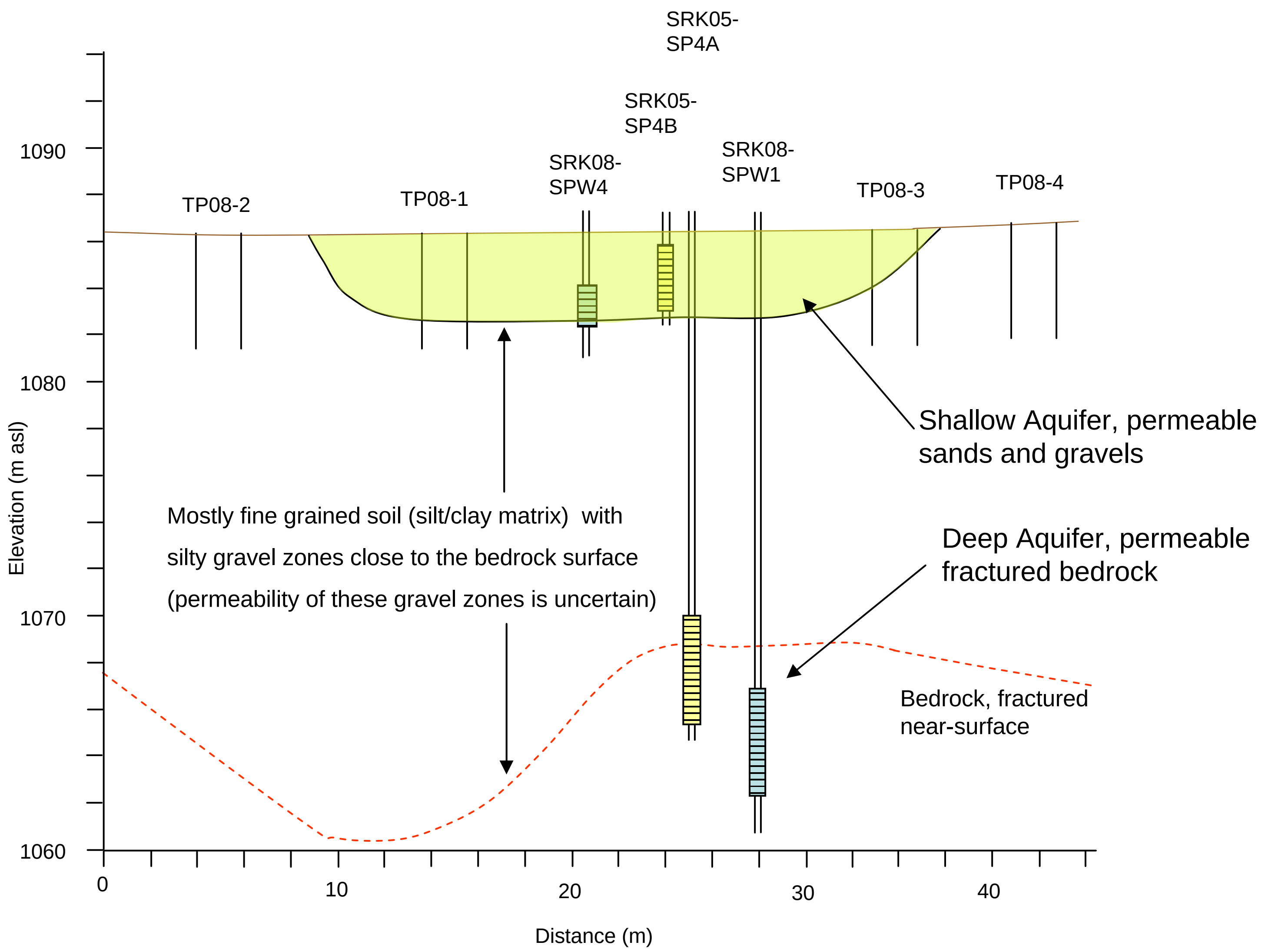
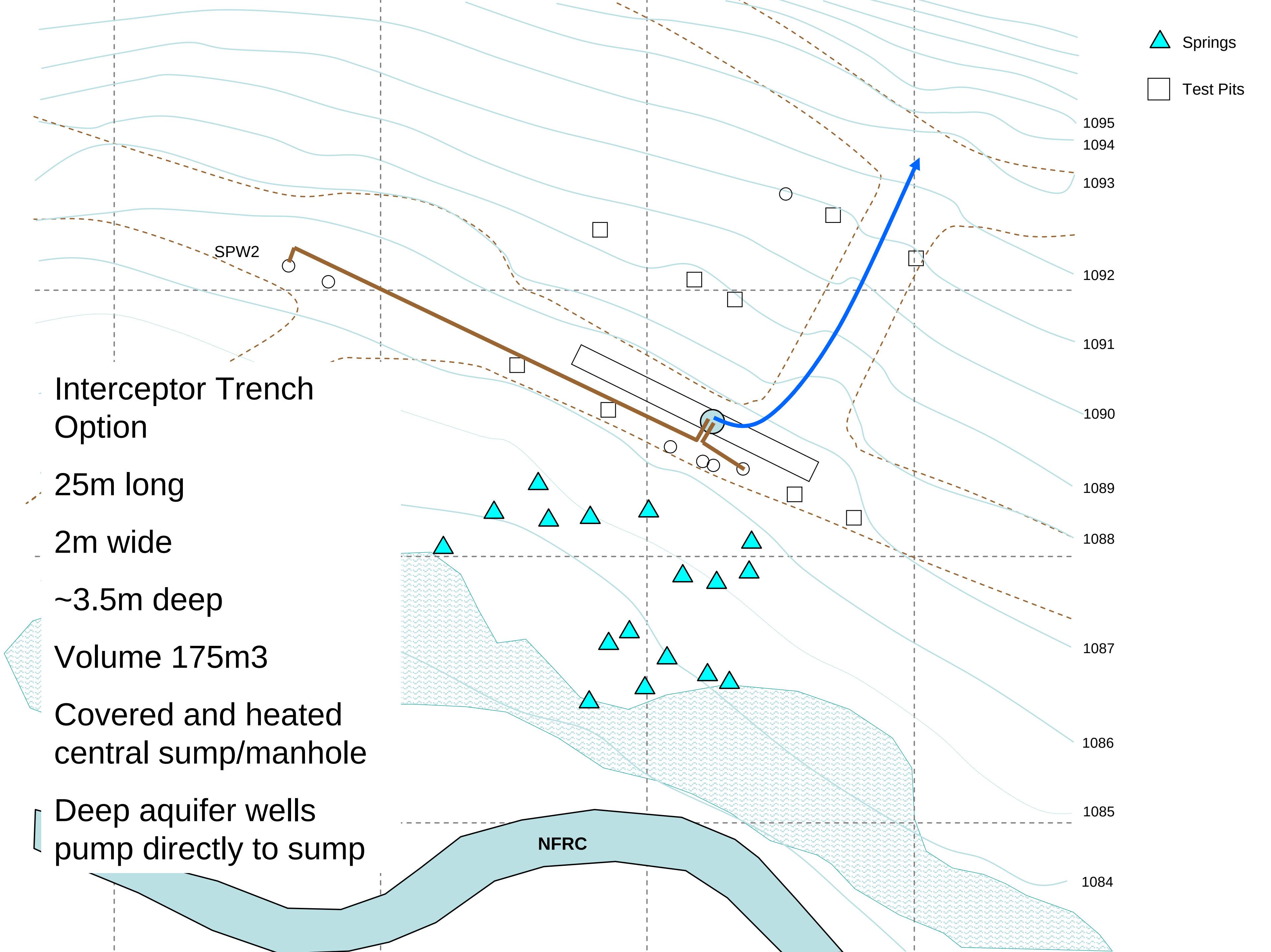
road
1088
marsh
NFR Creek



General Location Map
25 meters
Springs
Test Pits
Shallow Aquifer Extents, Approx-imate
Cross Section
1095
1094
1093
1092
1091
1090
1089
1088
1087
1086
1085
1084
1083
DP5
TP-5
TP-6
TP-9
SPW2
SP5
TP-7
TP-8
TP-2
TP-1
SPW4
SP4B
SP4A
SPW1
TP-3
TP-4
Marshy Area
NFRC


SRK05-
SP4A
SRK05-
SP4B
SRK08-
SPW4
SRK08-
SPW1
TP08-2
TP08-1
TP08-3
TP08-4
1090
1080
1070
1060
Elevation (m asl)
Shallow Aquifer, permeable sands and gravels
Mostly fine grained soil (silt/clay matrix) with
silty gravel zones close to the bedrock surface
(permeability of these gravel zones is uncertain)
Deep Aquifer, permeable fractured bedrock
Bedrock, fractured near-surface
0
10
20
30
40
Distance (m)



Interceptor Trench Option

25m long

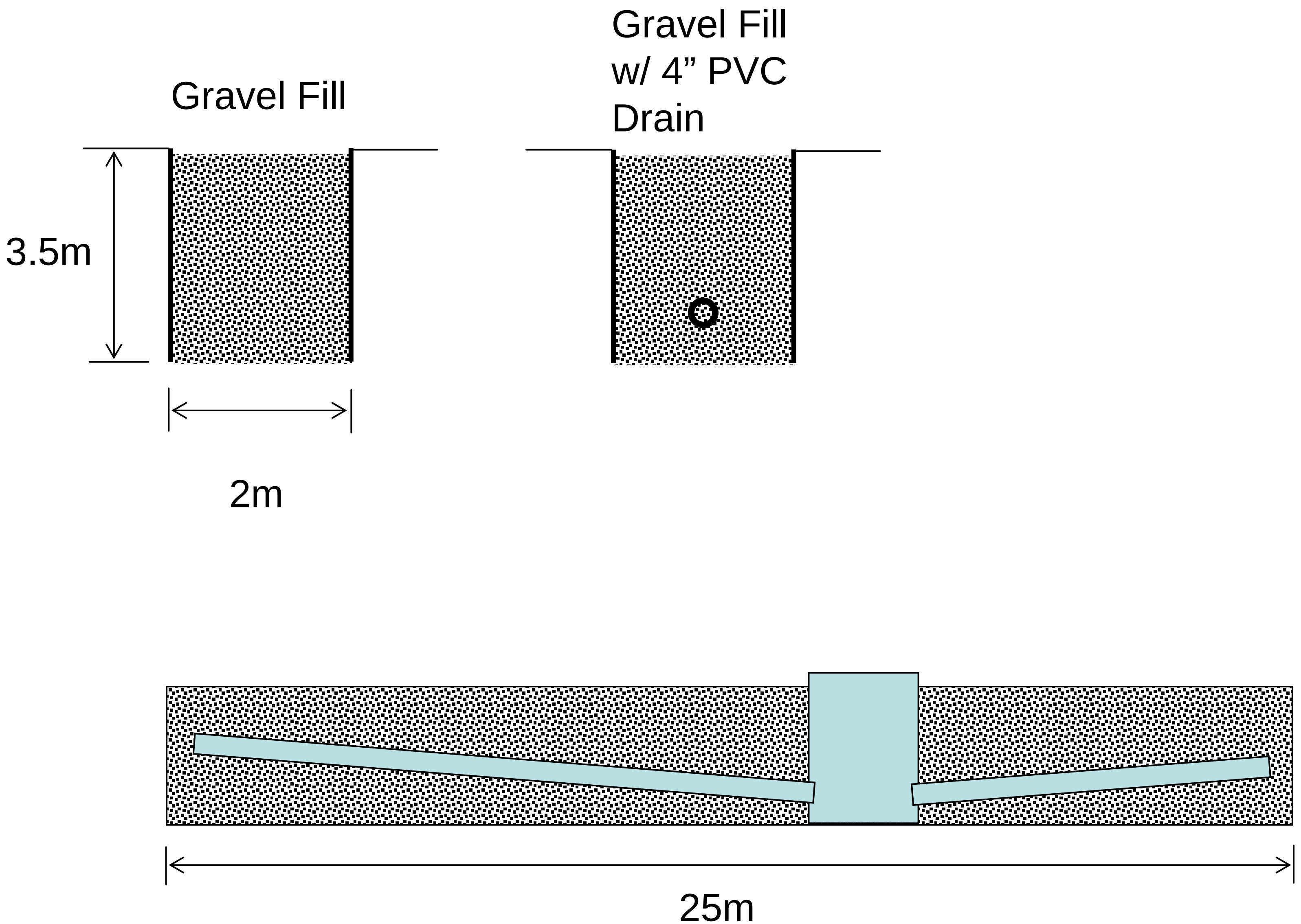
2m wide

~3.5m deep

Volume 175m3

Covered and heated central sump/manhole

Deep aquifer wells pump directly to sump


Gravel Fill
Gravel Fill
w/ 4" PVC
Drain
3.5m
2m
25m

Notes from Teleconference Meeting

SRK Project No. 1CD003.112 Notes prepared on: Oct. 26, 2008

Anvil Range Mining Complex
S-wells Area below Faro Waste Rock Dump

DISTRIBUTION: Participants + S. Mead (FPMT), D. Pitt (FPMT), M. Nahir (INAC), B. Slater (TAT), L. Gomm (TAT), D. Hockley (TAT/SRK), D. Mackie (SRK)

DATE & TIME: October 24, 2008 at 1:00 p.m. PDT

PRESENT:

W. Treleaven	- Deloitte & Touche	J. Brodie	- TAT
D. Haggar	- Deloitte & Touche	C. Scott	- TAT/SRK
D. Sedgwick	- Deloitte & Touche	G. Bull	- GLL (Aecom)
G. Stevens	- Deloitte & Touche		

PURPOSE: To discuss the update on the acquisition of information needed for a "go – no go" decision related to the potential installation of a capture and pump/pipe system at the S-wells area.

ITEM **ACTION BY:**

1. General Update Since the Call of October 20th, 2008

The table from the previous meeting was updated on the basis of new information provided over the past 4 days, and is attached to these notes. The most significant new information is as follows:

- Based on preliminary information from two contractors (one assuming sheet pile construction and one without), the cost of the SIS could be in the range of $100k to $150k, which meets or exceeds the upper bound estimate ($100k) that was previously assigned to the SIS.
- The duration of time to fabricate the insulated, heat-traced HDPE pipe appears to be 9 weeks (FOB Edmonton), based on input from a single supplier, which would likely push the start of installation to January (see item 3 for another option).

Given the new information, the contingency has been reduced (from 25%) to 20%, but the estimate to complete is still in the $500k to $600k range. (Note: calculations after the meeting indicated the range is in the order of $510k to $670K).

2. SIS

Input from site personnel indicates that there should be little concern for widening the access in the vicinity of the proposed SIS utilizing the 345 excavator. The plan would be to remove trees, stumps and large material with the excavator and finish off with the D5 Cat.

According to Golden Hills, the cost of the SIS option based on the use of sheet piles is $95k. Pelly felt that, subject to seeing a test excavation, it might be possible to avoid sheet piles. This would require the installation of the pump/pipeline system so that water which reports to the trench can be pumped to Faro Pit, thereby facilitating the dewatering of the ground around the trench. However, the Pelly estimate without sheet piles is about $150k. Clarification as to why the option without a sheet pile wall is more expensive, is needed. **C. Scott**

3. Pump/pipe System

The information from CE Franklin, with an adjustment for taxes and shipping, was circulated by J. Brodie prior to this call (total of $177k and 9 weeks delivery time, FOB Edm). Preliminary but parallel information from Urecon was obtained after the call (total of $147k and 2 to 3 weeks to deliver). Verification of the cost and schedule in relation to the Urecon information is needed. **C. Scott**

4. Power Supply

Additional data collected over the past few days provides the information necessary to re-evaluate the power supply costs and schedule but, so far, this hasn't been done. **J. Brodie**

5. Next Steps Towards a "Go – No Go" Decision

W. Treleaven will be contacting Ottawa to give them a "heads up" on current status and to obtain clarity as to whether a decision from Ottawa would have to wait until after the water management strategy meetings (with YG, INAC, IPRP, TAT, etc.) scheduled for Nov 19/20 in Vancouver. **W. Treleaven**

In order to facilitate funding, W. Treleaven (D&T) requires a document from SRK that provides the rationale and estimated costs/schedule for installation of the proposed capture and pump/pipe system at the S-wells area. SRK to target completion of a letter by Oct. 31. **SRK & J. Brodie**

D&T would like to get the sump for the SIS completed asap. The first step in this regard is to undertake the "test excavation" using site labour and equipment, but with the external contractor that is likely to complete the work present as an observer. SRK to try to get the "test excavation completed by Oct 30th. **C. Scott**

Additional design work related to the SIS is required as well, but it should follow the "test excavation". **SRK/D. Mackie**

6. Next Teleconference Meeting

The next teleconference meeting is set for 1 pm PDT on Friday October 31st. The call-in details are as follows: **All**

Toll-free Dial-in number: **1-866-862-7608**
Conference ID: **3172616**#

Cam Scott, Project Manager

Preliminary Estimate of Capital Costs for Emergency Action at S-wells Area, Faro Mine Complex (October 24, 2008)

Main Construction Element	Provider/Installer	Expected Duration	As early as for start*	Approximate Cost
Sump installation (without sheet piles, after the pump pipeline system are in place)	Based on verbal estimate from Pelly	2 weeks (contingent on the results of a “trial excavation” in the presence of the contractor’s rep	Following the installation of the pump & pipeline (January)	$150k
Sump installation (using sheet piles)	Based on written estimate from Golden Hills	1 week (8 days), plus shipping of sheet piles	Concurrent or prior to installation of the pump & pipeline	$95k
Pump purchase and shipping	Precision Pumps	??	??	$25k**
Pipeline purchase and shipping	CE Franklin	9 weeks, FOB Edm		$177k
Pipeline purchase and shipping	Urecon	2 to 3 weeks (needs verification)	Needs verification	$147k
Pump/pipeline installation	Likely the same contractor as for the sump installation	2 weeks	January	$30k (Pelly) to $60k (Golden Hills)
Power supply (generator, fuel, etc.)	D&T possibly, assuming that we can use the generator on site (if not, it is likely that it could be the same as for the sump installation)	3 weeks	November 10???	$50k (could be $75k all in, if we have to purchase a new generator); this item needs updating
Engineering design/supervision	DES/ ?	??	??	$75K
Subtotal				**$425k to $560k**
Contingency @ 20%				$85k to $110k
Total				**$510k to $670k**

* based on technical reasons and negotiated contracts, exclusive of timing factors related to, for example, competitive bids or Federal approvals regarding budgets/funding.

** have had some input from contractors, but awaiting some additional information in writing; ditto for suppliers.

SRK Consulting
Engineers and Scientists

Notes from Teleconference Meeting

SRK Project No. 1CD003.112 Notes prepared on: Oct. 31, 2008

Anvil Range Mining Complex
S-wells Area below Faro Waste Rock Dump

DISTRIBUTION: Participants + S. Mead (FPMT), D. Pitt (FPMT), M. Nahir (INAC), B. Slater (TAT), L. Gomm (TAT), D. Hockley (TAT/SRK), D. Mackie (SRK)

DATE & TIME: October 31, 2008 at 1:00 p.m. PDT

PRESENT:

W. Treleaven	- Deloitte & Touche	J. Brodie	- TAT
D. Haggar	- Deloitte & Touche	C. Scott	- TAT/SRK
D. Sedgwick	- Deloitte & Touche	G. Bull	- GLL (Aecom)
G. Stevens	- Deloitte & Touche	D. Mackie	- SRK
		P. Mikes	- SRK

PURPOSE: To discuss the update on the acquisition of information needed for a “go – no go” decision related to the potential installation of a capture and pump/pipe system at the S-wells area.

ITEM **ACTION BY:**

1. General Update Since the Call of October 24th, 2008

A “test excavation” was completed on site on October 29th. A representative from SRK (Peter Mikes) and Pelly Construction (Wayne Dear) were in attendance, but Golden Hill Ventures (GHV) was unable to send a suitable representative due to previous commitments. Peter Mikes met with a representative of GHV (Jon Rudolph) in Vancouver on October 30th. Notes and photos from the test excavation were e-mailed out to the individuals on the distribution list at the top of this page prior to this call.

2. “Go – No Go” Decision

Based on the information that has been compiled since October 9, 2008, it appears feasible to install a capture and pump/pipe system at the S-wells area prior to February 28, 2009 at a cost that is commensurate with the cost summary that accompanied the notes from the meeting of October 24th. D&T and the other participants in the call concluded, therefore, that a “go” decision is appropriate.

W. Treleaven (D&T) still requires a document from SRK that provides the rationale and estimated costs/schedule for installation of the proposed capture and pump/pipe system at the S-wells area. The previous target completion date for this letter was today, Oct. 31, but the week of November 3 is more realistic.

3. Next Steps

SRK had understood that DES would be involved in the final procurement and supervision of the pump and pipeline installation. However, based on information provided today by J. Brodie, DES is unlikely to have any involvement in the management or implementation of this project. (Note: the final procurement and supervision of an integrated pump and pipeline installation, including heat tracing and power supply, are not part of the routine services offered by SRK, and as a result, a third party contractor will have to be arranged to undertake these tasks).

D&T foresees the following framework going forward:

- SRK will provide final design details
- SRK will contact Pelly Construction and GHV with a view to obtaining time and materials data, as well as availability and schedule information.
- D&T will undertake procurement.
- SRK will undertake field supervision.

John Brodie will provide support to SRK in relation to these tasks. Greg Bull indicated Aecom could potentially assist as well, if needed. **J. Brodie**

Further discussion of some specific action items:

- There are currently two quotes related to the supply of an insulated heat-traced pipeline: one involves a delivery time of 9 weeks and the other involves a delivery time of 2-3 week, with qualifications. SRK to clarify uncertainties related to the latter quote. **SRK**
- Additional granular material is going to be needed in conjunction with backfilling of the trench. Approximately 200 m^3 of suitable materials are currently available in the pit across from the S-wells area. Current estimates suggest that approximately 400 to 500 m^3 of additional material may be needed, and if this requires screening by site personnel, it would take approximately 3 weeks to complete.
- D&T indicates that if site involvement is needed, Dana Haggar should be contacted directly with specifics. **D&T**
- To the extent possible, D&T will rely on Yukon suppliers.

4. Next Teleconference Meeting

The next teleconference meeting is set for 1 pm PST on Monday November 10th. The call-in details are as follows: **All**

Toll-free Dial-in number: **1-866-862-7608**
Conference ID: **3172616**#

Cam Scott, Project Manager

Appendix C

SRK Site Visit Memorandum Summarising Constructability and Borrow Sources

SRK Consulting
Engineers and Scientists

SRK Consulting (Canada) Inc.
Suite 2200 – 1066 West Hastings Street
Vancouver, B.C. V6E 3X2
Canada

vancouver@srk.com
www.srk.com

Tel: 604.681.4196
Fax: 604.687.5532

Memo

To:	Cam Scott	**Date:**	Oct. 30, 08
cc:		**From:**	Peter Mikes
Subject:	Faro SIS Site Visit – October 29, 2008	**Project #:**	1CY001.021.003

This memo summarizes the site visit completed on October 29, 2008 to investigate the constructability of the SIS located in the "S-Cluster" area near the North Fork Rock Drain at the Faro Mine site. Present at the site visit was Wayne from Arctic Backhoe Services, Peter Mikes and Dan from Deliotte & Touche who provided assistance with discussing sources of clean backfill material and access options around the site.

The objective of the visit was to excavate a test pit in the location of the proposed sump and observe the amount of slumping into the pit to help the contractor determine the best method of construction (i.e. with or without sheet piles), as well as to help determine the location of the backfill that will be used in the SIS and the access route between the two areas.

1 Sump Test Pit

The test pit was excavated in the proposed sump location and was estimated to a total depth of approximately 5.5 m (limit of excavator). Accurate depth measurements were difficult to obtain due to safety concerns of the sloughing of the pit walls. The general stratigraphy of the excavation is summarized in Table 1 below:

Table 1: Test Pit Stratigraphy

Depth (m)	Description
0 to 1.5 m	Silty SAND with gravel, moist, inter-bedded layers of organics.
1.5 to 3.5 m	Sandy GRAVEL with some silt, wet. Gravel is rounded, well graded.
3.5 to 5.5 m	Silty SAND with gravel, moist.

Upon reaching the gravel water began pouring into the hole and sloughing began to occur, primarily on the upgradient (north) side of the excavation (see attached photos). The pit wall in the lower silty sand layer was fairly competent.

2 Trench Backfill and Access

Ray the excavator operator mentioned that there may be some suitable borrow material along the access road into the site. While the excavator was walking into the site, some exploratory shallow holes were dug to expose the material. In all instances, the material consisted of silty sands and was unsuitable for access material.

Access to the SIS site from the main access road into the Faro mine site follows a single lane access road for a distance of 1 km and is generally access able for tandems or rock trucks. Several pull-outs are available or could easily be constructed along the route.

The notable exception for access is the last 50 m where the road turns south down a slope away from the toe of the waste rock dump. It is expected that a tandem would not be able to travel up this slope loaded. Road improvements would also have to be made in this area to allow a rock truck to travel up this slope.

The closest borrow source to the site is the Haul Road Borrow Pit located just across the North Fork Rose Creek. Access options to the site were discussed with Deloitte and Touche staff on site. Specifically the option of establishing a road from the main road to site to the borrow pit. It was noted by D&T that a road used to exist there but was decommissioned. The route also passes through a trapping cabin, and it was determined that for the amount of material needed for the project, it was not worth the permitting that would need to be required to re-establish the road.

The material in the Haul Road Borrow Pit was investigated. It was noted by D&T that there was a stockpile of screened oversized material in one location of the pit. The volume is estimated at 100 to 150 m^3 of gravelly material that would be ideal as backfill material. This material is shown in photos 19 to 21. The pit run material was also looked at with the exposed areas of the pit appearing to contain a significant amount of gravels (Photos 22 and 23).

Photo 1: View of seepage infiltration trench area taken from the proposed sump location looking west.

Photo 2: View of access road down to the trench area taken from the sump location looking north.

Photo 3: Start of excavation of the test pit taken from the access road looking south.

Photo 4: Excavation of the test pit. Water began to pour into the excavation at a depth of 1.5m.

Photo 5: Excavation of test pit.

Photo 7: Significant sloughing of the pit began to occur primarily on the upgradient side of the test pit upon reaching the coarser sandy gravel layer.

Photo 8: Excavation of the test pit with sloughing.

Photo 10: View of water seeping into the test pit.

Photo 11: Excavation of test pit

Photo 12: Excavation of test pit. The material below the gravel layer was relatively dry.

Photo 14: Excavation of test pit (end of hole)

Photo 15: View of test pit after approximately 2 minutes after completion of hole.

Photo 16: View of test pit after approximately 2 minutes after completion of hole.

Photo 18: View of test pit after approximately 2 minutes after completion of hole.

Photo 19: View of screened oversized reject stockpile in Haul Road Borrow Pit.

Photo 20: View of screened oversized reject stockpile in Haul Road Borrow Pit.

Photo 21: View of screened oversized reject stockpile in Haul Road Borrow Pit.

Photo 22: View of exposed pit run in the Haul Road Borrow Pit.

Photo 23: View of exposed pit run in the Haul Road Borrow Pit.

Appendix D
D&T Letter to Yukon Water Board

Deloitte

Deloitte & Touche Inc.
Brookfield Place
181 Bay Street
Suite 1400
Toronto, Ontario M5J 2V1
Canada

Tel: 416-601-4494
Fax: 416-601-6690
www.deloitte.ca

Via courier

December 19, 2008

Yukon Water Board
Suite 106, 419 Range Road
Whitehorse YT Y1A 3V1
Attention: Judi White, Secretary

Dear Sirs:

RE: ANVIL RANGE MINING CORPORATION ("Anvil Range")

We are writing to you in connection with the AMP Event No. 5 – Degraded Water Quality in the North Fork of Rose Creek. We have written to you previously advising that this AMP event was triggered in 2004 and as a result, further investigations and monitoring were going to be carried out. We refer to this area as the S-wells which will be referred to in this letter and attachments.

As a result of the investigations and monitoring program, a decision was taken to complete a comprehensive drilling program this year. Work was carried out at the mine site mid-August through to September 17th.

The results of the program revealed that elevated zinc concentrated water was identified in the vicinity of the North Fork of Rose Creek. The Technical Advisory Team ("TAT") working with the Faro Project Management Team ("FPMT") recommended that a seepage intervention system ("SIS") be installed as soon as practicably possible.

Since October 1st, engineers have been designing a SIS which includes a collection ditch and sump to be installed at the base of the Waste Rock Dump in the S-wells area. The contaminated water will be pumped through a heat traced two-inch pipeline to the Faro Pit. The distance of the pipeline is approximately 1.5 kilometres. Materials are presently being purchased and installation will commence in January 2009.

Attached for your information are a number of memos and a PowerPoint presentation prepared by the TAT and SRK, the lead engineer.

We will continue to provide to the Water Board further details regarding this installation in our annual Water Board Report which will be filed February 28, 2009. Also, we will provide further updates in our regular monthly reports which will be submitted for the months of January and February 2009.

As a final step, we have also advised the Yukon Water Inspector of this planned installation.

Yours very truly,
DELOITTE & TOUCHE INC.
in its capacity as Interim Receiver of
ANVIL RANGE MINING CORPORATION

Per: [signature]

Robert W. Paul, CA • CIRP
Senior Vice-President

Enclosures

c: Stephen Mead, FPMT
John Brodie, TAT
Mike Nahir, DIAND
Dana Haggar, Anvil Range
Greg Stevens, Deloitte
Doug Sedgwick, Deloitte

Appendix E
Conference Call Notes Related to Design Decisions

Scott, Cam

From: Adanjo, Rui [RAdanjo@hatch.ca]
Sent: Monday, February 16, 2009 10:18 AM
To: Scott, Cam
Cc: Mackie, Daniel; Pytlewski, Marius; Darrell Moore; Ron Nelson; Mike Lamont
Subject: Factory Acceptance Test

Cam,
On Friday, the 13th of February 2009, I attended the Factory Acceptance Test (FAT) of the pump house sea-can at the premises of Precision in Abbotsford. Overall the layout and design was well thought off and met all the electrical conditions and requirements, with a few requested modifications, as listed below:

- Two extra interposing relays was required for the interfacing of the heat trace control panels to the sea-can control panel. This was required because the heat trace control panels in the field are supplying it's own independent control voltage for the alarm status of the individual heat trace system.
- An extra junction box on the outside and an extra conduit on the inside the sea-can had to be installed, for the purpose of the 120Vac heat trace controller temperature sensors (3 x RTD's).
- An USB extension to the front of the panel had to be installed. In order to collect the archived data logged, the panel had to be opened. The circuit breaker has a mechanical interlock to the panel's front door, which prevents the door from opening while the system is energized. To open the panel door the circuit breaker has to be switched off shutting down the system, or overcome the breakers mechanical interlock which would result in an non-electrical type person exposed to 600V.
- The beacons on the outside of the sea-can, were not luminous enough to be easily detectable, on a sunny day, in the event of an alarm or hazard. This is/was modified to install a reflective barrier at the back of the beacon. The beacons were also set up, by means of the software, to pulse instead of being continuously on, making it more easily detectable.
- The system was modified to control the VFD speed by means of the level of the sump instead of a flow setpoint.
- The software for the SCADAPack PLC (Programmable Logic Controller) and the Beijer Exter T70 HMI (Human Machine Interface) is proprietary and does not seem to be included in the sea-can purchase package (Precision to confirm). I was concerned that during commissioning on site, if modifications had to be done in the field, there would be no one qualified to do those changes. It is my understanding that Ron Nelson from Precision is to be trained on the system, so commissioning modifications are done if it deems necessary.
- Precision is to provide an Operational Manual on the system, identifying functionality, procedures and event alarm troubleshooting. Included in the documentation, commissioning datasheet of the final parameter settings and backups of the electronic configuration files.

I was not present to see the completion of the modifications required to be done on the sea-can but it is my understanding that it would be completed before it was shipped to site.

Regards,
Rui Adanjo P. Eng
Electrical Engineer
Hatch
T. 604 629 9536

Notes from S-wells conference call of Dec 5, 2008
Time: 10:00 to 11:35 am PST

Attendees:
- D&T: W. Treleaven, D. Sedgwick, G. Stevens, D. Haggar, M. Bryson
- Pelly Construction (PC): J. Jewell, D. Russell, K. Byram, W. Dear, J. DeHart
- Hatch: M. Pytlewski, R. Adanjo
- SRK: D. Mackie, C. Scott
- Brodie Consulting: J. Brodie

Contract with PC
- PC has been provided with a list of people and respective skill sets.
- D. Sedgwick and C. Scott have provided J. DeHart additional details and the draft contract is largely in order. However, there will be a few minor revisions required due to today's call. Target completion date to be February 25th, 2009.

Review of Tasks in the Gantt Chart (see attached Gantt chart)
1) Pipeline
- Pipe supplier has apparently sent the pipe in 50-ft lengths to Urecon. (***Note:*** *Following the call it was confirmed that the pipe has not yet arrived at Urecon's facilities*).
- There was a discussion of the power options related to heat tracing. The series option is believed to be the more expensive of the two. The second option requires multiple lines but may offer enhanced redundancy. The consensus of the group was to go with the latter option. **Action:** SRK/Hatch to finalize heat tracing details and related power requirements with Urecon ASAP, so that the Urecon can commence their work. Mike Bryson to be kept in the loop as he will be doing all the ordering (applies to many of the purchases.
- **Action:** SRK/Hatch to obtain feedback from Urecon in relation to controls for the heat trace lines.
- It was agreed that 12" "black" plastic pipe currently on site will be cut to form a half-culvert, and it will be used instead of whole pipe to provide separation between the 2" pipe and the steep haul road sideslope. **Action:** D&T to check into what pipe is available for this purpose and to evaluate how it might be cut and who might cut it.
- Hatch suggests installing vacuum break at high point in pipeline to allow better drainage. **Action (from previous call):** SRK/Hatch to finalize extra fittings, i.e. for vacuum break and shut-down drainage.
- **Action (from previous call):** Hatch to provide recommendation on thrust blocks next week, i.e. by next call.

2) Pump
- A decision is needed as to what type of control system is required. A simple relay logic system which will not easily adapt to future automation expansion, or a more complex system with the ease of future automation and telemetering options. The control panel and its components is a long lead item either way. **Action:** SRK/Hatch/D&T and DES to address as soon as practically possible.
- SRK/Hatch have looked at the related power requirements and these have been factored into the generator requirements. The only time sensitive component at this point appears to be the metering. **Action:** SRK/Hatch to finalize pump details, including information on flange sizing to connect HDPE pipe from pumps to steel, ASAP and to involve both D&T and PC in further discussions with Precision (the pump supplier).
- **Action (from previous call):** Hatch to build in the option of monitoring oxygen in the shack.

3) Groundwater Wells
- SRK/Hatch have looked at the related power requirements.

4) Site Access

- Site access improvements will be the responsibility of PC and will start during the week of January 5th. PC indicates the mobilization of equipment will commence before Jan. 5th.

5) SIS Trench

- SRK reviews the trench and the potential loss of one of the two targeted groundwater wells (PW1), depending on the size/location of the excavation (see attached sketch). **Action:** SRK to finalize the location based on two options: (1) base centered on the road and (2) base centered on the upslope edge of the road, i.e. south of what's shown in the attached sketch).
- It was agreed that a sump should be excavated upslope of the SIS trench, and water should be pumped from this sump for some period of time before excavation of the SIS trench commences.
- It was agreed that it would be prudent to have sheet pile and appropriate driving hardware lined up as a contingency prior to the start of the field program. **Action:** PC to pursue the details and costs associated with this contingency.
- There is some uncertainty regarding the gradation of the 2,000 (?) m^3 of waste rock that have been set aside as rip rap adjacent to the haul road. **Action:** D&T will spend 1½ days early next week processing this material with a view to evaluating its gradation. If needed, there's a stockpile of material on the Vangorda/Grum side of the property that could be screened. **Action:** SRK to provide sections through the SIS trench (with material details) prior to the next regular call.
- CMP has been located on site, i.e. 58 ft of 7-ft diameter pipe. The cutting of this pipe for length and drainage holes will be done on site.
- Foundation to be granular rock as it appears unlikely there will be time (or suitable conditions) for a concrete pad.
- Rather than placing the spoil material on the ground to the south of the SIS trench, it will likely be wasted to the east of the SIS trench. **Action:** SRK (DM) to show a location (s) on a drawing prior to next regular call.

6) Generator

- Significant progress has been made in relation to the definition of the power supply. Efforts to price/source a transformer are underway.
- **Action (from previous call):** Hatch to decide where it must be sited, i.e. on haul road or next to SIS.
- **Action (from previous call):** Hatch to include option of monitoring oxygen in the shack.

Questions from PC

- PC had some questions, some of which were answered in the meeting, per the notes, below. Others need more attention. **Action:** PC to provide an e-mail with the list of questions/issues for which they would like input.
  - There is some uncertainty regarding the ability of the site's welding machine to handle 2" HDPE pipe welds. Action: D&T to check into this question.
  - Stakes marking the pipeline can be rebar.
  - Availability of geosynthetics on site. **Action:** D&T (MB) to look into the availability of geofabric and GCL on site at this time.
  - There are a number of other scope items for which PC is looking for input or specs at this time.
  - D. Haggar will be back on site on about January 12th.
  - Health & safety plans. Both the site and PC have H&S plans, and they will both be used as a reference in relation to the execution of the work.
  - Environmental management plan: A complex one, similar to that which was developed for the breach of the Freshwater Supply Dam would be inappropriate. SRK believes that a shortlist of general guidelines that address the water-related issues that could be faced during this work would be logical to have in hand prior to the commencement of the field work.
  - Oxygen monitoring: likely to be single fixed internal with no power backup, complemented by portable oxygen monitors.

- Signage for shacks. **Action:** D&T (DH) to order.
- Communications. **Action:** SRK (CS) to add Jess Jewell & Dan Russell to list.

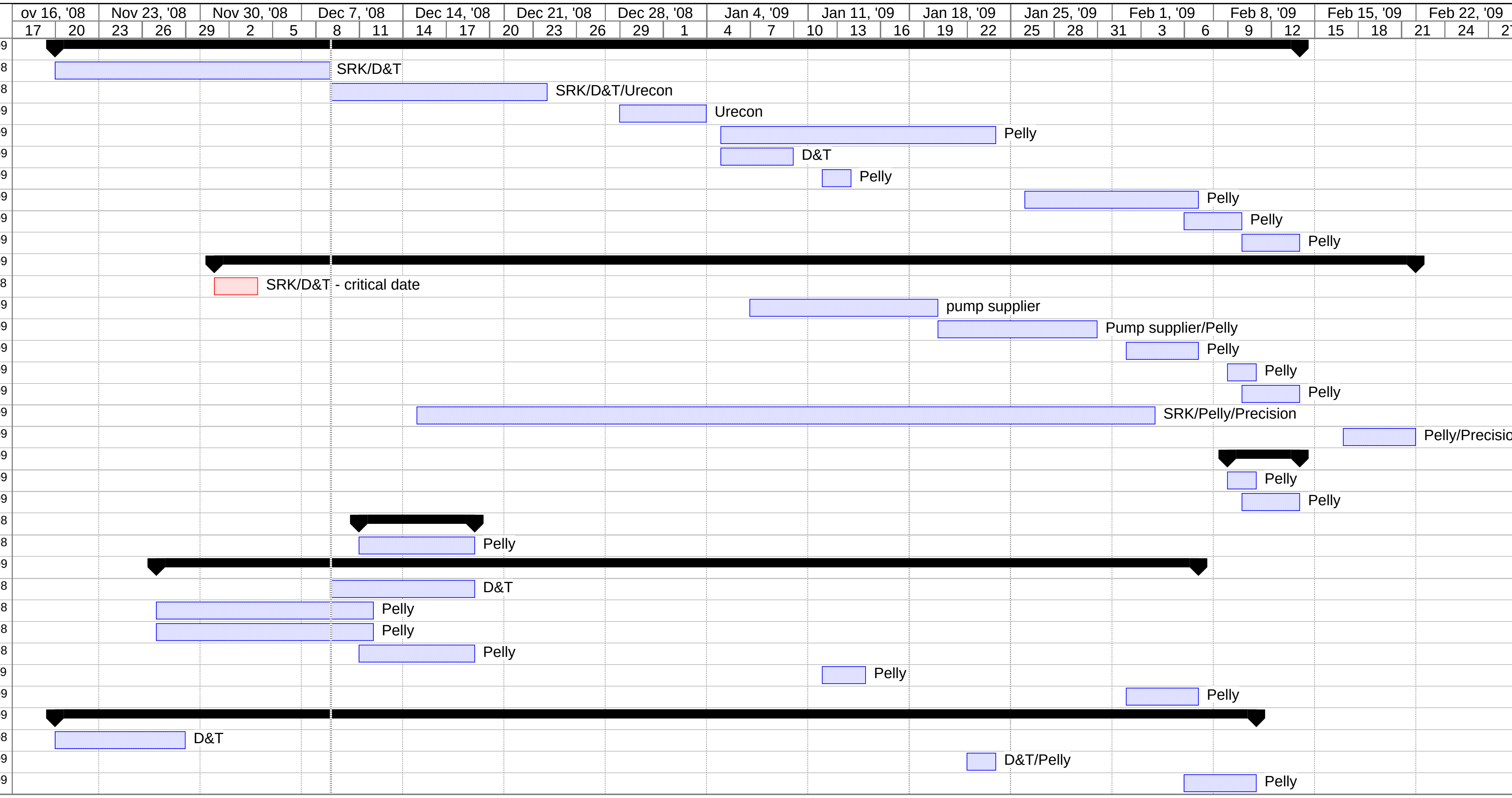
Next Call

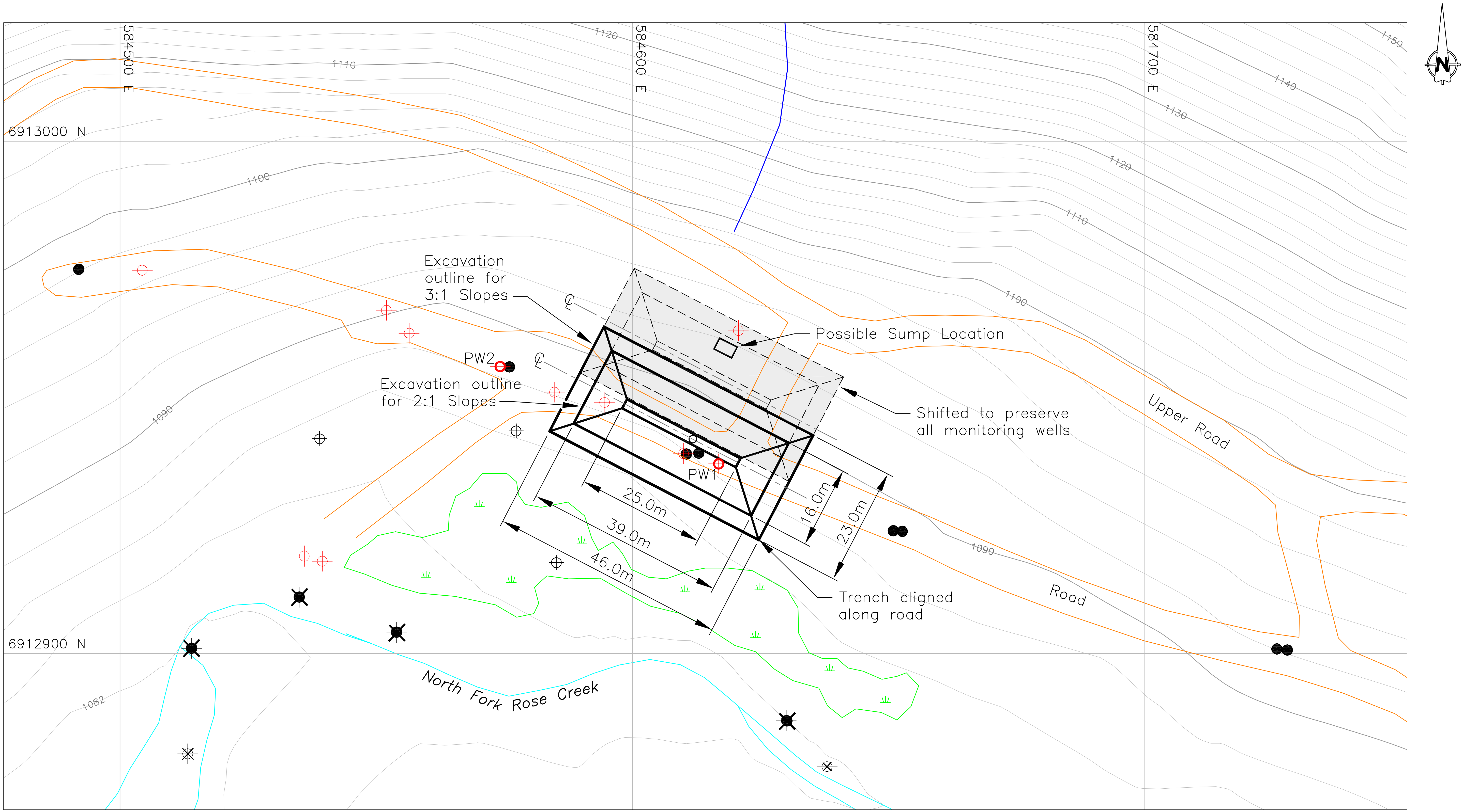
- Next weekly call is set for Friday, December 12th at 10 am PST (1 pm in Toronto)
- A short call will be held Wednesday, December 10th at 10 am PST (1 pm in Toronto).
- Call in details for both calls are as before: 1-866-862-7608, and participant, 3172616#

If there are any errors or missing actions, please raise these at the next conference call.

S-Well Construction Schedule - Draft

Task Name	Duration	Start	Finish
Pipeline	62 days	Thu 11/20/08	Fri 2/13/09
order/produce HDPE pipe	13 days	Thu 11/20/08	Mon 12/8/08
specify, insulate and heat trace pipe	11 days	Tue 12/9/08	Tue 12/23/08
ship to site from Edmonton	5 days	Mon 12/29/08	Sat 1/3/09
lay and weld pipeline	15 days	Mon 1/5/09	Fri 1/23/09
prepare half-culvert using plastic pipe	5 days	Mon 1/5/09	Fri 1/9/09
install pipe over steep section below haul rd	2 days	Mon 1/12/09	Tue 1/13/09
installation of electrical and controls	10 days	Mon 1/26/09	Fri 2/6/09
final testing of the system	2 days	Fri 2/6/09	Mon 2/9/09
place fill over the pipeline at select locations	4 days	Tue 2/10/09	Fri 2/13/09
Pump	61 days	Mon 12/1/08	Sat 2/21/09
order pump	3 days	Mon 12/1/08	Wed 12/3/08
ship to site	9 days	Wed 1/7/09	Mon 1/19/09
initial pump installation	9 days	Tue 1/20/09	Fri 1/30/09
use pump to move water from SIS to pit	5 days	Mon 2/2/09	Fri 2/6/09
final installation of pump inside sump	2 days	Mon 2/9/09	Tue 2/10/09
install wooden shack over main sump	4 days	Tue 2/10/09	Fri 2/13/09
design-build control panel	37 days	Mon 12/15/08	Tue 2/3/09
install control panel & auxiliary electrical devices	5 days	Tue 2/17/09	Sat 2/21/09
Groundwater pumps	5 days	Mon 2/9/09	Fri 2/13/09
install & hookup the groundwater pumps	2 days	Mon 2/9/09	Tue 2/10/09
install wooden shack over each of 2 wells	4 days	Tue 2/10/09	Fri 2/13/09
Site access	6 days	Thu 12/11/08	Thu 12/18/08
improve site access	6 days	Thu 12/11/08	Thu 12/18/08
SIS Trench	52 days	Thu 11/27/08	Fri 2/6/09
produce granular backfill (or W/R) stockpile	8 days	Tue 12/9/08	Thu 12/18/08
obtain PVC liner	11 days	Thu 11/27/08	Thu 12/11/08
purchase CMP with drilled holes	11 days	Thu 11/27/08	Thu 12/11/08
ship CMP to site	6 days	Thu 12/11/08	Thu 12/18/08
move backfill stockpile to SIS area	3 days	Mon 1/12/09	Wed 1/14/09
excavate and backfill trench	5 days	Mon 2/2/09	Fri 2/6/09
Generator	59 days	Thu 11/20/08	Tue 2/10/09
check-out generator & do maintenance	7 days	Thu 11/20/08	Fri 11/28/08
install generator	2 days	Thu 1/22/09	Fri 1/23/09
install wooden shack over generator	3 days	Fri 2/6/09	Tue 2/10/09





LEGEND

- ● 2005 Groundwater Monitoring Well
- ○ Other Groundwater Monitoring Well
- Shallow Drivepoint
- × NFRC Monitoring Station (NFRC_SC-4 = FLOW/SAMPLING) (SCS_1 = SURFACE SEEP)
- ⌖ S-Cluster Monitoring Well

1:750 — 0 10 20 30 40 50 Metres

SRK Consulting
Engineers and Scientists

Deloitte & Touche

Faro Mine Site
S-Cluster Area Action Plan

SIS Trench Location Options
And Excavation Limits

PROJECT NO.	DATE	APPROVED	FIGURE
1CD003.112	Dec. 2008	DM	1

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Notes from S-wells conference call of Dec 10, 2008
Time: 10:00 to 10:50 am PST

Attendees:
- D&T: W. Treleaven, D. Sedgwick, G. Stevens, D. Haggar, M. Bryson
- Pelly Construction (PC): W. Dear, J. DeHart
- Hatch: M. Pytlewski, R. Adanjo
- SRK: D. Mackie, C. Scott
- DES: R. Fennema, K. Autio

Contract with PC
- J. DeHart requested an updated scope of work from SRK. **Action:** PC to provide SRK with an e-mail listing the questions/issues for which they would like additional input.

Review of Select Time-sensitive Tasks
1) Pipeline
- The pipe, which was delayed due to shipping issues related to the manufacturer, arrived at Urecon's facilities on Monday Dec 8. M. Bryson confirms that a PO was sent to Urecon on Tuesday Dec 9 for the installation of the 2-inch insulation.
- Following the email from Urecon on Tuesday afternoon related to electrical options and potential delays with some options, R. Adanjo of Hatch has spoken to Urecon and confirms that:
  - We are still on track with the 575 controllers.
  - We will still be going with series-parallel option, i.e. the "extension cord" option.
  - Schedule remains largely unchanged, but SRK/Hatch need to resolve a few more details with Urecon over the next few days before the heat trace portion of the Urecon order can be finalized.
- Based on a suggestion by M. Bryson, a Urecon representative will be on site for the heat trace line installation. **Action:** D&T will account for this in the next Urecon PO.

2) Pump
- The original quote from Precision Service and Pumps Inc. was about $35k and included the cost and shipping of the pump and a flow meter, i.e. very basic.
- Updated quotes have recently been obtained from Precision (attached as 2 separate pdf's), and they consist of the following:
  - Est 1868, **simple system** – The simple system quote includes the following grouped items: a. all wellhead, piping and fittings, b. primary pumping equipment, c. simple control panel, d. general site labour to oversee and manage hookups and commission + training for operators. The simple system is not capable of full automated control, nor telemetry ready. All shipped lose, so someone has to put it together at site and program/test. Cost: $102k including GST/PST.
  - Dec82008_PrecisionQuote4 **- containerized setup**. The containerized system includes the above PLUS: a. install-ready container housing as pump shack, b. PLC logic controls and datalogger, c. electrical load center (including for heat trace cable hookups). Precision is amenable to a full "Factory Acceptance Test" for the containerized system if we want to go that way (i.e. have someone at their shop to be present during testing of control system). Cost: $127k including GST/PST.
- There was general consensus that the containerized setup was preferred due to its expediency. **Action:** The decision will be finalized next call (Friday) after D&T has had a chance to go through the cost details.
- **Note:** Precision requires 50% payment at the time the order is placed. It was agreed that M. Bryson would look after this on behalf of D&T.

3) SIS Trench

- Screening of the coarse waste rock commenced earlier this week, creating 3 piles: coarse oversize, fines and a graded mid-size granular material, i.e. mostly minus 9-inch rock. Photos of these materials are provided separately. **Action:** By next call, D&T will provide more information on quantities and rate of production.

4) Generator

- Hatch has concluded that the generator can be sited on the haul road, which is preferable in terms of access for inspections, fueling and maintenance.

Other

- The issue of water management options during SIS trench construction was raised. This question is thought by SRK to be the core issue relative to a simple environmental management plan. **Action:** This topic should involve J. Brodie and will therefore be discussed further during the next call, i.e. Dec 12th.
- **Action:** SRK/Hatch to have a series of additional figures/sketches circulated prior to the next conference call.
- **Action:** SRK to compile a revised budget prior to the next call, and this budget will have an estimate of the fees by SRK/Hatch.

Next Call

- Next weekly call is set for Friday, December 12th at 10 am PST (1 pm in Toronto)
- Call in details are: 1-866-862-7608, and participant, 3172616#

If there are any errors or missing actions, please raise these at the next conference call.

Notes from S-wells conference call of Dec 12, 2008
Time: 10:00 to 11:00 am PST

Attendees:
- D&T: W. Treleaven, D. Sedgwick, G. Stevens, M. Bryson
- Pelly Construction (PC): W. Dear, J. DeHart
- Hatch: M. Pytlewski
- SRK: C. Scott
- DES: R. Fennema, K. Autio
- Brodie Consulting: J. Brodie

Review of Select Tasks
1) Pipeline
- On Dec. 10th, a conference call involving representatives from Urecon, Hatch, D&T and SRK was held to (1) advise Urecon of the decision regarding the heat trace system (i.e. we wish to proceed with the 575V system, constant wattage heat trace cable, the series-parallel option, a.k.a extension cord option, and the 575V controllers) and (2) to firm up various design details related to this decision. Urecon will quantify all components necessary for this application. There is at least one detailed question that remains to be resolved and Urecon is to get back to us with a response. **Action: Hatch (R. Adanjo)** to follow up with Urecon on Dec 15th.
- M. Pytlewski walked the group through four sketches related to some of the pipeline details. There were changes to some of his concepts, i.e. cement-filled tires will be used as anchors instead of rail ties. **Action: M. Pytlewski** to revise/advance these sketches based on the outcomes of today's call.
- **Action: M. Bryson** to forward a copy of the details of the fittings (stubs, flanges, etc.) to M. Pytlewski at Hatch.

2) Pump
- Participants have had time to review the two quotes from Precision that were circulated earlier in the week. Per the conference call of Dec. 10th, it was agreed that the containerized setup was the best option, although it might take as long as 6 weeks to obtain some parts. **Action: D&T (G. Stevens & M. Bryson)** to advise Precision of this decision and to start getting the paperwork/payment organized to complete the order with Precision (Precision to start ordering the most time sensitive components ASAP).

3) SIS Trench
- SRK has prepared/circulated several detailed sketches but a profile through the SIS trench has not yet been circulated. An unissued version of this profile indicates the low point of the permeable gravels is near the middle of the western half of the trench. **Action: SRK** to complete/circulate the figures showing the details, including sump location, of the SIS trench by next call.
- Further discussion occurred in regards to the contingency plan, i.e. sheet pile walls. **Action: Pelly** to provide more details on the logistics, schedule and costs associated with the implementation of the contingency plan. **Note:** Current expectations are that it won't be needed, but it is agreed it would be prudent to have the plan in place.)
- D&T reports that the screening operations are proceeding faster than hoped. It should be possible, therefore, to produce the required volume of material.

4) Generator and Transformer
- M. Bryson will be ordering a new stack for the generator, but otherwise it is ready. The transformer has been ordered and is expected to take 4 weeks to arrive.

5) Survey

- Ground level survey work is needed for two reasons:
    - the profile along the pipeline between the haul road and the high point before the line falls to Faro Pit needs to be checked to determine if there are any low points that would pool water following a power shutdown, and
    - the SIS trench alignment, and the location of the temporary and permanent sumps should be staked in preparation of the field work by Pelly.
- **Action: D&T (M. Bryson)** to contact YES with a view to getting them on site next week.
- **Action: SRK** to provide D&T with the key survey points associated with the SIS trench and sumps.

6) EMP

- There was a discussion of the first draft of an EMP issued by J. Brodie on Dec. 11th. It was agreed that attempting to pump water to the tailings impoundment instead of Faro Pit is impractical. The plan should define a program of water sampling at X2 and subsequent lab testing (both on and off site). **Action: J. Brodie** to confer with Leslie Gomm about recommendations for a water sampling program that would be carried out during the field work, and to then revise the EMP accordingly.

Contract with PC

- Some information related to questions from PC was sent from SRK to J. DeHart prior to this call. **Action:** PC to review this information and get to SRK with any remaining questions.

Next Call

- Next weekly call is set for Friday, December 19th at 10 am PST (1 pm in Toronto)
- Call in details are: 1-866-862-7608, and participant, 3172616#

If there are any errors or missing actions, please raise these at the next conference call.

Notes from S-wells conference call of Dec 19, 2008
Time: 10:00 to 11:00 am PST

Attendees:
- D&T: W. Treleaven, D. Sedgwick, G. Stevens, D. Haggar, M. Bryson
- Pelly Construction (PC): W. Dear, D. Russell, J. Jewell, J. DeHart
- Hatch: R. Adanjo
- SRK: C. Scott, D. Mackie
- DES: R. Morrell, K. Autio
- Brodie Consulting: J. Brodie

Update on Key Developments since the Last Conference Call
1) Site: The site is now closed for the Christmas break
2) Water Board
- D&T confirms that there has been a variety of communications, both written and verbal, with the Water Board apprising them of the fact that actions are being implemented to deal with the S-wells area.

3) Pipeline
- Urecon has completed the installation of the insulation on the pipe. The pipe is scheduled to arrive on site on January 5th.
- There are presently still a few purchases that remain to be completed in relation to the vacuum break and drainage systems. However, based on the information provided yesterday by Hatch, it appears that D&T will now be able to order most of these items. In the event that there are any gaps or unresolved details, they will have to wait until Marius Pytlewski is back in the offices of Hatch on January 5th.
- There are still a few details outstanding in relation to the heat trace system. **Action: Hatch (R. Adanjo)** to send some clarifications through to M. Bryson in relation to some final details related to the heat trace line. **Action: SRK/Hatch (C. Scott/R. Adanjo)** to send along the distances between control boxes to Mike Bryson asap.
- Current plan if for Urecon's representative to be on site once the sea-can and pump arrive in mid-February (see details related to Precision's expected pump delivery, below).
- The 20-inch half culvert has been cut by D&T staff and it is ready for installation by Pelly Construction.
- There are culverts available on the Faro side of the property that can be used to convey the pipeline across the road, i.e. at the proposed road crossings.
- The tires to be used as anchors (with or without concrete) have to be moved to the haul road. **Action: SRK** to add this item to the Gantt chart.

2) Pump
- Precision has indicated that the pump and sea-can (with all the control panels) will not arrive on site until mid-February (Precision didn't specify a date but we'll push for 02/14).
- SRK/Hatch is trying to set up a meeting with Precision next week, i.e. Dec 23rd. **Action: SRK/Hatch (D. Mackie/R. Adanjo)** to meet with Precision with a view to:
  - (i) finalizing design details in relation to the order,
  - (ii) putting a little pressure on Precision,
  - (iii) insisting that they keep Mike Bryson and SRK apprised on progress so Mike can have a truck waiting to pick up the sea-can/pump and related hardware as soon as its ready.
- **SRK/Hatch (D. Mackie/R. Adanjo)** to forward to the group a set of summary notes following the meeting with Precision.

3) SIS Trench
- D&T reports that 1,000 m^3 of the drain rock have been produced and are now ready for use in the construction of the SIS trench (and temporary sump).
- There are still some uncertainties around water management during the construction of the SIS trench. **Action: PC** to be prepared for various options related to handling the

water as the temporary sump and permanent sump are being installed, i.e. another pump to push water from the S-wells are to the Faro Pit using the new pipeline. Details will depend on factors such as the climate, rate of progress, conditions encountered during the installation of the temporary and permanent sumps.
- The need for a contingency plan, i.e. sheet pile walls, still exists. **Action: Pelly** to provide more details on the logistics, schedule and costs associated with the implementation of the contingency plan, preferably by Jan 9th.

4) Survey
- YES was on site on Dec. 16th and completed the following:
  - the profile along the pipeline between the haul road and the high point before the line falls to Faro Pit.
  - the layout of a series of key points for the SIS trench alignment and the sumps, as well as the pickup of the roads in the immediate area of the SIS trench.
- The results have not yet been received from YES. **Action: SRK (C. Scott)** to contact YES with a view to getting this information. **(Note: The data has since been rec'd)**.

Contract with PC
- The last details seem to have been resolved, and PC will be issuing the contract to D&T later today.
- Wes Treleaven indicated that, due to some recent developments, there is a mechanism to carry this contract into March, if necessary.
- Pelly has shifted their mobilization date to Jan 5th or 6th.

Next Call
- Next weekly call is set for Friday, January 9th at 10 am PST (1 pm in Toronto)
- Call in details are: 1-866-862-7608, and participant, 3172616#

If there are any errors or missing actions, please raise these at the next conference call.

Notes from S-wells conference call of Feb 6, 2009
Time: 10:00 to 10:45 am PST

Attendees:
- D&T: W. Treleaven, D. Sedgwick, G. Stevens, M. Bryson, D.Haggar
- Pelly Construction (PC): absent
- Hatch: M. Pytlewski, R. Adanjo
- SRK: D. Mackie
- Precision: R. Nelson, M. Lamont, D. Moore
- Urecon: Ron Gravel

Update on Key Developments since the Last Conference Call

1) Pipeline
- Thermal cable installed along long run.
- Road crossings are completed.
- Pipeline laid in half-culvert down face of WRD to S-cluster area.
- Cable ends taped awaiting electricians.
- R. Gravel notes that 3 x 600V controllers are scheduled to ship to site Feb 10.
- Power cable spools are at the top of the WRD awaiting to be laid out.
- Short runs between deep groundwater wells and sump are laid out.
- Vacuum break not yet at site. As previously discussed, will arrive after pipeline completed.
- Location of temporary T for vacuum break location clarified with Hatch. Location at high point on pipeline, near road at top of WRD. **ACTION:** Mike Bryson to follow up and ensure T is correctly positioned. This is a small job, not as time-sensitive as other pump issues.

2) Pump
- Precision provided an update:
  - Most components are accounted for.
  - C-Can “plumbing” underway.
  - The electrical panel arrived last week.
  - Touch pad programming is behind schedule. Hopefully to be available at Precision shop by Tuesday the 10th.
- Factory Acceptance Testing hopefully to commence mid to end of week of February 9, after touch pad received.
- Hatch and possibly SRK to be present for factory acceptance test.
- **ACTION:** *Precision to follow up with touch pad supplier/programmer and attempt to speed things up. Precision will provide update to group on February 11 re: status of touch pad.*
- Remainder of Sea-Can construction is progressing well and relatively on-schedule.
- Marius Pytlewski (Hatch) to go to Precision shop today, Friday Feb 6, to check on Sea-Can progress and setup.
- Rui Adanjo offered programming assistance to Precision. **ACTION:** Rui will follow up with Advanced Drives to see if assistance necessary.
- Upon notice that panel is ready and Sea-Can ready to ship, Dan Mackie will notify group.
- **ACTION:** Precision to follow up with Fortress Forwarders to determine if weekend pickup possible.

3) Sump
- D.Haggar reports that vacuum truck was successfully used to pull water from sump and drawdown water level.

- On the order of 20,000 gallons by 8 truck fills were removed on February 4 and 5. Water level was drawn down on the order of 10 feet or so. Water level recovered approximately 30-inches over a 13.5 hour period following development.
- TSS of developed water was 17 mg/L.
- Site will prepare daily reports with water levels, will monitor suspended solids during development and will take samples for site lab water quality analyses at beginning and end of each development day.

4) Electrical Design

- No further updates. Communications between Precision, Hatch and Mike Bryson continuing normally.

5) Generator

- M.Bryson reports that generator shelter is ¾ complete.
- Pelly electrician will be available to start electrical work Sunday.
- Small sheds for deep groundwater well covers will be built as necessary when installing pumps.

6) Pelly Construction

- No representative present.
- **ACTION:** Dan Mackie to follow up with Dan Russell regarding status of daily reports. SRK is not receiving these in a timely manner.

8) Scheduling

- Tentative Schedule as of Feb 6:
    - Touch pad to Precision on Feb 10.
    - Factory testing 11 to 15.
    - Sea-Can ship one day between Feb 13 to 16.
    - Sea-Can arrives site by about Feb 20.
    - Testing week of Feb 23.
- SRK to have presence at 48-hour system testing

Next Call

- Next weekly call is set for Friday, February 13 at 10 am PST (1 pm in Toronto)
- Call in details are: 1-866-862-7608, and participant, 3172616#

If there are any errors or missing actions, please raise these at the next conference call.

Notes from S-wells conference call of Feb 13, 2009
Time: 10:00 to 10:20 am PST

Attendees:

- D&T: W. Treleaven (1st part of call only), D. Sedgwick, M. Bryson, D.Haggar (last part of call only)
- Pelly Construction (PC): D. Russell, J. Jewell, B. Dear
- Hatch: R. Adanjo
- SRK: D. Mackie, C. Scott
- Precision: R. Nelson, D. Moore

Update on Key Developments since the Last Conference Call

1) Pipeline and related elements

- Brian Dear reports from site that Pelly is continuing to get things prepped in anticipation of the arrival of the materials from Precision later next week. For example, this weekend they are building a small shack to house the generator and control system. By Sunday, nothing further can be done until the sea-can arrives.
- There are still a couple of pipe tie-ins to be resolved – timing not an issue.
- Still no sign of the control panels from Urecon. **Action: Mike Bryson** to follow up with Ron Gravel at Urecon (perhaps Ron can bring these with him when he travels to site).

2) Pump System and related elements

- There have been numerous emails this past week regarding progress on the pump system and the sea-can. *Not discussed during the call, but Marius Pytlewski (Hatch) visited Precision's shop on Friday Feb 6 to check on Sea-Can progress and setup. His followup email and photos from the visit are attached.*
- Rui Adanjo and Dan Mackie are at Precision's facilities this morning in preparation for the Factory Acceptance Testing which will start later today (*an email from Rui Adanjo summarizing his comments on the Factory Acceptance Testing is attached*).
- Ron Nelson provides an update:
  - There was a minor hiccup with the panel but the programmer is coming later today with a new panel.
  - Still on track for shipping by noon tomorrow (Sat., Feb 14)

4) Communications

- Dan Russell indicates that, following some delays, the outstanding force account sheets are being sent to SRK today.

5) Scheduling

- Tentative schedule as of Feb 13:
  - factory testing of sea-can and related electrical components on Feb 13 and 14.
  - sea-can to be picked up by truck at Precision shop at noon on Feb 14.
  - sea-can expected to arrive in Whitehorse on Wed Feb 19.
  - sea-can expected to arrive at site on Thurs Feb 20.
  - Pelly expects to take up to 2 days to install the sea-can and hook up all the plumbing and electrical (about Feb 20 and 21).
  - Provided the control panels arrive by Fri Feb 20th, the field testing of the system should start by about Sat Feb 21.
  - Assuming the field testing takes 2 to 3 days (Sat Feb 21 to Sun Feb 22 or Mon Feb 23, barring any major glitches), the system may be declared operational early in the week of Feb 23rd.
- Rui Adanjo of Hatch is planning to be on site during the electrical hookup. Dan Mackie of SRK is planning to be on site in time for the start up of the pumps.

- Dana cautions that flights may by difficult to arrange due to the Yukon Quest dogsled race. *Race starts in Whitehorse this year on Feb 14th and takes about 10 days to complete*. **Action: SRK/Hatch** to look into travel arrangements later today.

Next Call

- Next weekly call is set for Friday, February 20 at 10 am PST (1 pm in Toronto)
- Call in details are: 1-866-862-7608, and participant, 3172616#

If there are any errors or missing actions, please raise these at the next conference call.

From: Pytlewski, Marius [mailto:MPytlewski@hatch.ca]
Sent: Friday, February 06, 2009 10:20 PM
To: Scott, Cam
Cc: Mackie, Daniel; Adanjo, Rui
Subject: S-Wells Pumphouse Status - Shop Visit to Precision

Hello Cam,

On Friday, February 8, 2009 I visited Precision Pumps shop in Abbortsford. The purpose of the visit was to get a good understanding of the S-wells pumphouse status prior to shipping to site planned for some time next week. The visit was also an opportunity to review the quality of Precision work. Ron Nelson of Precision accompanied me during the visit. The status in short is as follows:

1. In general bulk of installation work is completed with remaining work focused on wiring. An electrician is in process of wiring up the panels, recaptacles and instruments. One oxygen detector is installed the second (at the floor level) - to be mounted . Space heater is hung of the ceiling for testing, it will be taken down for transport.
2. Installation of piping including valves and fittings is very advanced. The sump discharge line is set up for pressure testing to 500psi. A few details to be completed include:
  - sample port and second pressure indicator on the sump discharge line
  - support bracket on the sump discharge pipe protruding through the wall (on outside)
  - sections of pipe between the sump pump and the pump support need to be cut into sections and threaded
  - return leg of the sump discharge line is missing
  - sump vent pipe is completely missing. The preferred location was discussed with Ron and agreed on.
3. Well water supply piping is glued PVC. Sump pump discharge piping is Type 304 stainless steel with a mixture of screwed and victaulic fittings. This selection of materials is consistent with the operating pressures in these two systems.
4. Floor hatch is of good quality with a power assist (gas cylinder) opener. It is easy to open and holds "open" position. Precision intends to provide a custom ladder to be used to ascend into the sump through the floor hatch. The ladder is in fabrication and I have not seen it.
5. 1/2 ton pump chain fall hoist is installed and appears adequate for the job of lowering and raising of the sump pump.
6. Some signage including "Confined Area" warning is still missing

To conclude bulk of the work is completed and the installation of piping and wiring appears on track to be finished mid next week when the control panel is supposed to arrive and be installed. Once that happens the PLC programing and final shop testing will take place which may take 2-3 days.

I attached a few photos to illustrate the status as of today.

Regards,

Marius Pytlewski, P.Eng.
Discipline Lead - Mechanical

HATCH™

Tel: +1 604 638 7696
Fax: +1 604 689 3918
400 - 1066 W. Hastings, Vancouver, B.C. V6E 3X2

Photos taken February 2, 2008 by M. Pytlewski of Hatch
Project: S-wells Action Plan
SRK Project Number: 1CD003.120

Photo 1:Can Entrance

Photo 2: Floor Hatch

Photos taken February 2, 2008 by M. Pytlewski of Hatch
Project: S-wells Action Plan
SRK Project Number: 1CD003.120

Photo 3: Pipes

Photo 4: Can Pipe Connections

Photos taken February 2, 2008 by M. Pytlewski of Hatch
Project: S-wells Action Plan
SRK Project Number: 1CD003.120

Photo 5: Heater and Oxygen Detector

Photo 6: Sump Piping and Hoist

Photos taken February 2, 2008 by M. Pytlewski of Hatch
Project: S-wells Action Plan
SRK Project Number: 1CD003.120

Photo 7: Control Panel Enclosure

Photo 8: Pipe Connections Close Up

Photos taken February 2, 2008 by M. Pytlewski of Hatch
Project: S-wells Action Plan
SRK Project Number: 1CD003.120

Photo 9: Sump Pump Discharge Piping

Scott, Cam

From: Adanjo, Rui [RAdanjo@hatch.ca]
Sent: Monday, February 16, 2009 10:18 AM
To: Scott, Cam
Cc: Mackie, Daniel; Pytlewski, Marius; Darrell Moore; Ron Nelson; Mike Lamont
Subject: Factory Acceptance Test

Cam,
On Friday, the 13th of February 2009, I attended the Factory Acceptance Test (FAT) of the pump house sea-can at the premises of Precision in Abbotsford. Overall the layout and design was well thought off and met all the electrical conditions and requirements, with a few requested modifications, as listed below:

- Two extra interposing relays was required for the interfacing of the heat trace control panels to the sea-can control panel. This was required because the heat trace control panels in the field are supplying it's own independent control voltage for the alarm status of the individual heat trace system.
- An extra junction box on the outside and an extra conduit on the inside the sea-can had to be installed, for the purpose of the 120Vac heat trace controller temperature sensors (3 x RTD's).
- An USB extension to the front of the panel had to be installed. In order to collect the archived data logged, the panel had to be opened. The circuit breaker has a mechanical interlock to the panel's front door, which prevents the door from opening while the system is energized. To open the panel door the circuit breaker has to be switched off shutting down the system, or overcome the breakers mechanical interlock which would result in an non-electrical type person exposed to 600V.
- The beacons on the outside of the sea-can, were not luminous enough to be easily detectable, on a sunny day, in the event of an alarm or hazard. This is/was modified to install a reflective barrier at the back of the beacon. The beacons were also set up, by means of the software, to pulse instead of being continuously on, making it more easily detectable.
- The system was modified to control the VFD speed by means of the level of the sump instead of a flow setpoint.
- The software for the SCADAPack PLC (Programmable Logic Controller) and the Beijer Exter T70 HMI (Human Machine Interface) is proprietary and does not seem to be included in the sea-can purchase package (Precision to confirm). I was concerned that during commissioning on site, if modifications had to be done in the field, there would be no one qualified to do those changes. It is my understanding that Ron Nelson from Precision is to be trained on the system, so commissioning modifications are done if it deems necessary.
- Precision is to provide an Operational Manual on the system, identifying functionality, procedures and event alarm troubleshooting. Included in the documentation, commissioning datasheet of the final parameter settings and backups of the electronic configuration files.

I was not present to see the completion of the modifications required to be done on the sea-can but it is my understanding that it would be completed before it was shipped to site.

Regards,
Rui Adanjo P. Eng
Electrical Engineer
Hatch
T. 604 629 9536

Notes from S-wells conference call of Jan 9, 2009
Time: 10:00 to 11:00 am PST

Attendees:
- D&T: W. Treleaven, D. Sedgwick, G. Stevens, D. Haggar, M. Bryson
- Pelly Construction (PC): W. Dear, D. Russell, J. Jewell, J. DeHart
- Hatch: M. Pytlewski, R. Adanjo
- SRK: C. Scott, D. Mackie
- Brodie Consulting: J. Brodie
- Precision: R. Nelson

Update on Key Developments since the Last Conference Call

1) Pipeline
- The insulated pipe from Urecon arrived on site earlier this week.
- Still awaiting the arrival of a selection of 45 and 90 degree elbows (the insulation for these elbows is being prepared by Urecon at this time).
- The heat trace components have not yet arrived.

2) Pump
- Ron Nelson from Precision reports that, at present, the expected “ready to ship” date is still January 31, though it is contingent upon receiving the electrical control panel by January 27th (i.e. upon receipt of the electrical control panel, it should take 3 to 5 days before the sea-can, pump, and related piping/electrical components are ready to ship).
- In response to conceptual drawings for the control panel that were issued by Precision on January 5, there have been a series of emails between Hatch (Rui Adanjo and Marius Pytlewski) and Ron Nelson. A number of changes to the concepts have since been implemented, i.e. the pipe that will be used in the sea-can will be metal rather then PVC.
- Precision expects to issue the next generation of drawings in Autocad format by about Monday January 12. **Action: Ron** to send the Autocad drawings to SRK/Hatch with a cc to Dana Haggar and Mike Bryson of D&T, and DES.
- Ron asked if the controller boxes could be sent to Precision for connection with the control panels. Only the 120v controller will go inside the sea-can, as the three 600v the controllers will be along the pipeline route. **Action: Rui Adanjo** to send Mike Bryson a note on parts re the 120 v controller; **Mike Bryson** will then overlap with the supplier to get the 120v controller sent to Precision.

3) Mobilization by Pelly Construction
- Extremely cold weather in the Yukon has delayed the mobilization date from January 5th to Monday, January 12th. **Action**: **Pelly** to issue a memo on January 12 as to the mobilization progress.
- PC asked if they need to provide an electrician, given that Urecon will provide an electrician in relation to the heat trace. **Action: Pelly** should plan on providing an electrician.
- Pelly asked if they should provide a first aid person. **Action: D&T** to provide a first aid person (7 days a week), so Pelly will not need to do so.

4) Generator
- The generator is in the shop. D&T is waiting for a replacement muffler. Dana Haggar is reviewing the fuel system with a view to determining if it is adequately sized, i.e. hardware to provide additional capacity may need to be purchased.

Miscellaneous Logistical Issues

1) Travel to site

The Hatch inspector, Andreas Delbruck, will travel to Whitehorse on Monday night. He'll then overnight in Whitehorse and drive to Faro on Tuesday. **Action: Andreas Delbruck** to call site on the following schedule: (i) when he leaves Whitehorse and (ii) when he fills up with gas in Carmacks.

2) Accommodation on site

Pelly has organized accommodation for their employees at the various B&B's. Andreas will join Dana Haggar and Mike Bryson at the Guesthouse. Dana and Mike will be on site from January 12 to 18.

3) D&T lead

For the first week, i.e. Jan 12 to 18, Dana will be the D&T lead. After he leaves site, Ken Alderson will take on this role.

4) Work week

Pelly is planning to work 7 days a week, from 8am to 6pm.

5) First aid

Pelly not need bring someone in relation to first aid, per the notes above. D&T has someone through the week, and will expand this to include the weekend. In addition the site ambulance is available for use in conjunction with this contract.

6) Daily safety meeting

Project personnel should plan on a daily safety meeting first thing every morning.

7) Other details

Project personnel will be able to use the site facilities, such as the "dry" and the lunch room, etc. Many other details that don't fit well with this call will be worked out during the first week on site, i.e. between January 12 and 18, inclusive. This will include, amongst other things, the daily signing of the PC time and material sheets (for now, it should be assumed that when there is an SRK or Hatch representative on site, they would take responsibility for signing these daily sheets, but D&T will assume this role if there is no SRK or Hatch rep on site).

Contract with PC

- Contract between PC and D&T has been signed.

Water Board Notification

- Per previous notes, the Water Board has been advised of the S-wells action plan.

Next Call

- Next weekly call is set for Friday, January 16th at 10 am PST (1 pm in Toronto)
- Call in details are: 1-866-862-7608, and participant, 3172616#

If there are any errors or missing actions, please raise these at the next conference call.

Notes from S-wells conference call of Jan 16, 2009
Time: 10:00 to 11:00 am PST

Attendees:
- D&T: W. Treleaven, D. Sedgwick, G. Stevens, D. Haggar, M. Bryson
- Pelly Construction (PC): W. Dear, D. Russell, J. Jewell, J. DeHart
- Hatch: M. Pytlewski, R. Adanjo
- SRK: C. Scott, D. Mackie
- Brodie Consulting: J. Brodie
- Precision: R. Nelson
- DES: K. Autio

Update on Key Developments since the Last Conference Call

1) Pipeline
- The heat trace components are apparently being shipped to site today; travel time is about 4 days, so they should be on site by next call (Fri, Jan 23rd).
- There was no update on the elbows. (**NOTE**: f*ollowing this call, Mike Bryson was informed that the order of 2" insulated elbows will be in Whitehorse on Jan 16th in the evening*.)

2) Pump
- Ron Nelson from Precision provides an update:
  - The initial panels are being constructed.
  - Will start the "plumbing" components on Monday January 19th.
  - Still hoping to test the system on January 29/30, which would mean the expected "ready to ship" date is still January 31.
- The dialogue between Precision and Hatch regarding the details of the panels has continued through this past week.
- The 120v controller has not yet arrived at Precision's shop. **Action: Mike Bryson** to obtain input from Urecon as to when the 120v controller will be sent to Precision. (**NOTE**: *following this call, Mike Bryson was informed by Urecon that the controllers that were to be shipped today are delayed by 3 weeks. Based on this delivery timetable and Precision's panel construction schedule, the controllers will have to be shipped directly to site, with installation of the 120v controller in the sea-can being done on site in Feburary*.)

3) Report from Pelly Construction
- Mobilization occurred on Monday, January 12th.
- Pipe "welding" commenced on January 13th and it is likely that most of the top section will be fused in the next few days.
- The installation of the half culvert over the side of the haul road will occur next week.
- Wayne Dear had several meetings with the Hatch rep, Andreas Delbruck, over the 2-day period that Andreas was on site this week (Wed & Thurs).
- Andreas Delbruck is presently en route back to Vancouver. The next visit by Hatch is likely required sometime next week, depending on contractor progress.

4) Electrical Design
- Dana Haggar noted that electrical drawings are needed (**Note:** *Revision A of the electrical drawings prepared by Hatch are attached to these meeting notes.*)
- Given that Urecon will have someone on site during the hookup of the heat trace and Precision will have someone on site during the hookup of the pump, and Pelly has been requested to have an electrician on site, there were questions about the responsibilities of each of these groups. **Action: Rui Adanjo** to overlap with Urecon and Precision with a view to confirming what they will do on site and, therefore, what will be the responsibilities of the Pelly electrician.

5) Generator

- Dana Haggar and Mike Bryson have reviewed the fuel system for the generator and concluded that it is too small to provide 3 to 4 days of operation without re-fueling. Another tank has been ordered by D&T and it is expected it will take 2 weeks to arrive on site.

6) Update on Sheet pile contingency for the SIS trench

- Pelly confirmed that sheet piles are available in Whitehorse, although there was no indication of quantity. Pelly expressed concerns regarding the ability to drive sheet pile given the presence of some boulders in the ground. **Action: SRK (Cam Scott/Dan Mackie)** to forward to Pelly the estimated quantity of sheet piles that would be needed for this contingency.

7) Field issues

- Daily reports have been prepared by Hatch for the period of Jan 13th to 15th and these have been circulated. The circulation list for daily reports has been expanded and now includes the following:
    - D&T: Wes Treleaven, Doug Sedgwick, Dana Haggar, Greg Stevens, Mike Bryson
    - Hatch: Marius Pytlewski and Rui Adanjo
    - SRK: Cam Scott and Dan Mackie
    - Pelly: Jess Jewell, Dan Russell and Jennifer DeHart
- Dan Russell notes that the daily report for Jan 15 indicates he was on site that day. In fact he wasn't. **Action: SRK** will issue a revised report for January 15th.
- Power lines over the access to the S-wells area have been noted as a safety hazard. In fact, these are telephone lines and D&T has previously asked Northwest Tel to remove them. Wes Treleaven indicates that these can be "snipped."
- Dana Haggar and Mike Bryson will leave the site on January 18. Following their departure, the D&T rep on site will be Dan Duivenvoorden.
- It was agreed that weekly reports are not needed.

8) Contact list

- The first draft of this list was distributed by SRK on January 14. A number of individuals have gotten back to SRK with corrections and information to fill gaps in the table. **Action:** Anyone who hasn't checked this list should do so and then respond to SRK with any corrections. SRK will issue an updated contact list shortly.

Next Call

- Next weekly call is set for Friday, January 23rd at 10 am PST (1 pm in Toronto)
- Call in details are: 1-866-862-7608, and participant, 3172616#

If there are any errors or missing actions, please raise these at the next conference call.

Notes from S-wells conference call of Jan 30, 2009
Time: 10:00 to 10:40 am PST

Attendees:

- D&T: W. Treleaven, D. Sedgwick, G. Stevens, M. Bryson
- Pelly Construction (PC): D. Russell, J. Jewell,
- Hatch: A. Delbruck
- SRK: A. Tong, D. Mackie
- Precision: R. Nelson, M. Lamont, D. Moore

Update on Key Developments since the Last Conference Call

1) Pipeline

- Thermal cable being installed on pipeline.
- Electrician from Highland Electrical (Pelly's sub-contractor on this) has been at site, reviewing program requirements, assessing heat trace controllers, heaters and other miscellaneous electrical items.

2) Pump

- Precision provided an update:
    - Most components are accounted for.
    - C-Can "plumbing" underway.
    - The electrical panels are estimated to arrive Precision shop by February 5. Immediate installation could allow for factory acceptance test sometime between February 7 to 9. C-Can shipment possible week of 9th, with arrival at site week of 16th.
- Hatch and possibly SRK to be present for factory acceptance test.
- Mike Bryson had questions regarding details on enclosures and/or heating for the deep aquifer pumping wellheads. Precision and SRK do not think space heaters required, but pipelines will need to be heat traced and insulated. **ACTION:** *Precision to provide wellhead CAD drawings to Mike Bryson for sizing enclosures.* Enclosures should be insulated and have top access.
- **ACTION:** *Precision to update group on February 6 re: status of electrical panels.*

3) Sump

- D&T reports that contractor excavated top two feet of sump backfill, installed filter fabric and replaced backfill. (**REQUESTED ACTION:** *Details on this work, such as photographs, dimensions etc. should be forwarded to SRK for inclusion in as-built*)
- D&T reports that water level in sump is rising on the order of 6 feet every 5 days and there is concern regarding overflow and subsequent effects.
- Water levels will be watched and if it seems likely that the sump will overflow, the vacuum truck will be used to drain down the sump. This may be required multiple times prior to installation of the pumps. Collected water would be disposed of in the Rose Creek Valley tailings facility.
- SRK requested that daily water levels be recorded. Time of record should be noted and depth to water in sump measured with tape. Past records should be provided as well. **ACTION:** *D&T to instruct site personnel to provide said information.*
- D&T raises issue of sump development. SRK agrees that the CMP/sump should be developed to remove fines and sand, which could damage submersible pump. Vacuum truck or pump available at site could be used. **ACTION:** *D&T will discuss with Dana Haggar for appropriate action.* (**NOTE:** *SRK requests to be present as part of this discussion*.)

4) Electrical Design

- No further updates. Communications between Precision, Hatch and Mike Bryson continuing normally.

5) Generator
- Mike Bryson organizing construction of housing.

6) Pelly Construction
- No significant issues
- Wayne Dear to be on vacation for two weeks starting on February 2. Richard Cull will take over interim site supervisor role.
- Jennifer will be gone from February 2 until March. In the interim, all invoicing questions should be directed to Dan Russell.

8) Material excavated from sump
- D&T requested input on whether the “muck” excavated from the site should be removed from it’s current site storage area, which is relatively close to the North Fork Rose Creek. D&T does not think that the small amount of pore water would present a serious issue to NFRC water quality, but would like input. If the material is to be moved, now is the time to do it, when it is frozen. Material would be moved to the Rose Creek tailings facility. **ACTION:** *Dan Mackie to follow up with John Brodie on this issue.*

Next Call
- Next weekly call is set for Friday, February 6 at 10 am PST (1 pm in Toronto)
- Call in details are: 1-866-862-7608, and participant, 3172616#

If there are any errors or missing actions, please raise these at the next conference call.

Notes from S-wells conference call of Nov 28, 2008
Prepared by CCS
Time: 10:00 to 11:35 am PST

Attendees:

- D&T: W. Treleaven, D. Sedgwick, G. Stevens, D. Haggar, M. Bryson
- Pelly Construction (PC): Keith B., W. Dear, J. DeHart
- Hatch: M. Pytlewski, R. Adanjo
- SRK: D. Mackie, C. Scott

Contract with PC

- Draft contract is a work in progress.
- **Action:** J. DeHart to contact D. Sedgwick and C. Scott for input on a few details.
- To the extent practical, PC should try to use local personnel
- **Action:** Dana to provide PC with a list of people and respective skill sets, i.e. for carpentry and pipeline work.

Review of Tasks in the Gantt Chart (attached)

1) Pipeline

- Pipe supplier to send pipe in 50-ft lengths to Urecon on Dec.2. In order to limit the amount of work in the field, Urecon will install the heat trace at their plant
- **Action:** SRK/Hatch to finalize heat tracing and related power requirements with Urecon ASAP, i.e. early in week of Dec.1.
- **Action:** SRK/Hatch to finalize extra fittings, i.e. for vacuum break and shut-down drainage, to be finalized early in week of Dec.1.
- **Action:** Hatch to provide recommendations on how to secure the 12" steel pipeline to the slope
- **Action:** Hatch to provide recommendation on thrust blocks

2) Pump

- **Action:** SRK/Hatch to finalize pump details ASAP, i.e. early in week of Dec.1.
- **Action:** Hatch to evaluate the related power requirements early in week of Dec.1.
- **Action:** Hatch to build in the option of monitoring oxygen in the shack.

3) Groundwater Wells

- **Action:** Hatch to evaluate the related power requirements early in week of Dec.1.

4) Site Access

- Site access improvements will be the responsibility of PC.

5) SIS Trench

- D&T cannot process projected the requirements for granular material (450 m^3) per SRK email issued earlier this week. A second option would be to use waste rock with suitable geochemical properties. D&T is aware of at least one such waste rock option, and could start "preparing" this material starting the second week of December.
- **Action:** SRK to work with D&T to identify suitable sources of waste rock (or other granular materials).
- The group's preference is to use corrugated metal pipe (CMP) for the sump (they come in 20-ft lengths). Drainage holes would be cut on site.
- Foundation will likely have to granular rock as it appears unlikely there will be time (or suitable conditions) for a concrete pad.
- Spoil material will likely be wasted on the ground immediately to the south of the SIS trench.

6) Generator

- Generator was rebuilt about 4 yrs ago. It was recently tested and it is working fine.
- **Action:** Hatch to decide where it must be sited, i.e. on haul road or next to SIS.
- **Action:** Hatch to build in the option of monitoring oxygen in the shack.

Communications

- Group agreed to maintain conference call frequency at once a week.
- As regards emails and the outcomes of other calls, it will be at the discretion of the participants as to who should be cc'd/apprised, with the qualification that D&T should be copied in relation to any correspondence that involves significant expenditures.

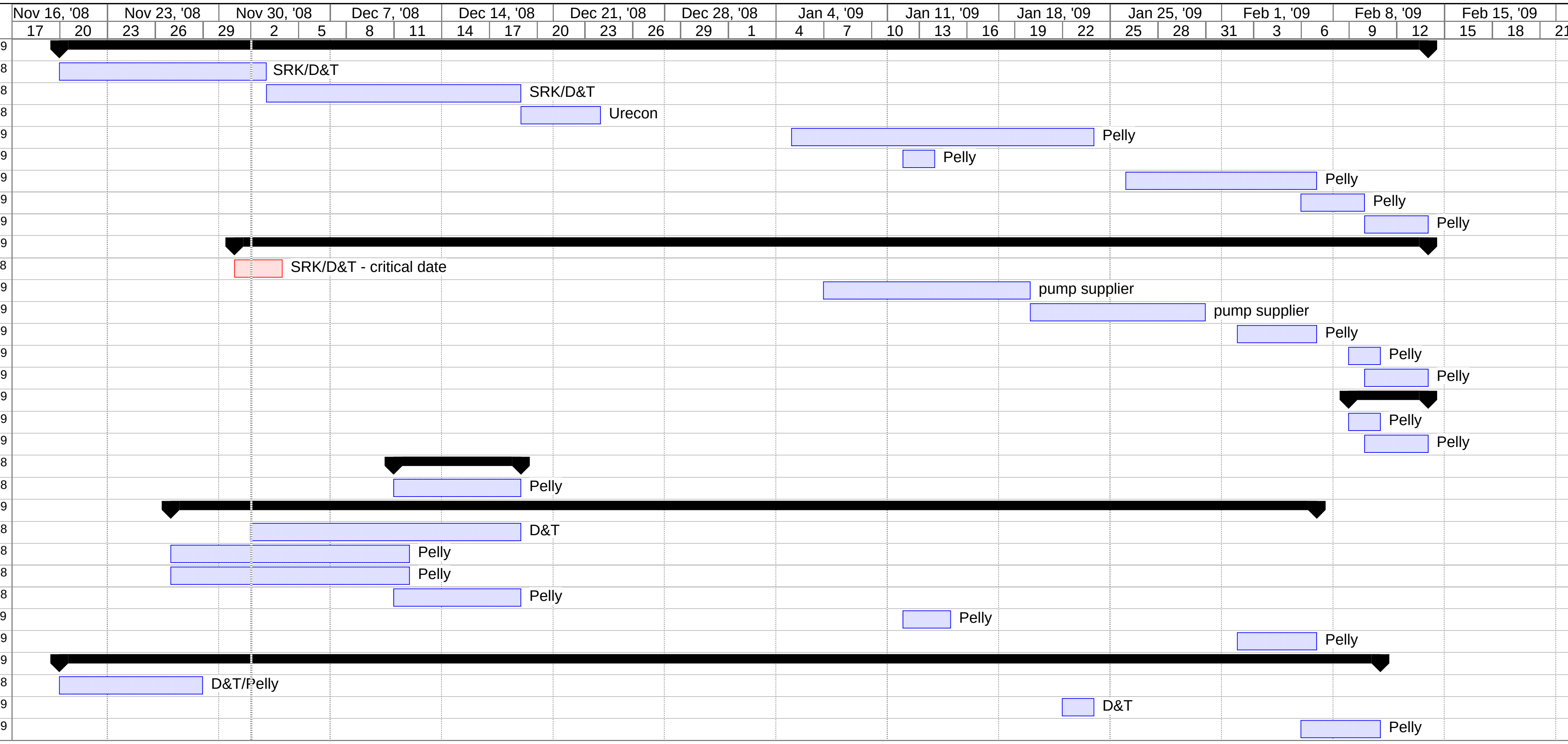
Next Call

- Set for Friday, December 5th at 10 am PST (1 pm in Toronto)
- Call in details are same as before: 1-866-862-7608, and participant, 3172616#

If there are any errors or missing actions, pls raise these at the next conf call.

S-Well Construction Schedule - Draft

Task Name	Duration	Start	Finish
Pipeline	62 days	Thu 11/20/08	Fri 2/13/09
order/produce HDPE pipe	9 days	Thu 11/20/08	Tue 12/2/08
specify, insulate and heat trace pipe	12 days	Wed 12/3/08	Thu 12/18/08
ship to site from Edmonton	3 days	Fri 12/19/08	Tue 12/23/08
lay and weld pipeline	15 days	Mon 1/5/09	Fri 1/23/09
install pipe over steep section below haul rd	2 days	Mon 1/12/09	Tue 1/13/09
installation of electrical and controls	10 days	Mon 1/26/09	Fri 2/6/09
final testing of the system	2 days	Fri 2/6/09	Mon 2/9/09
place fill over the pipeline at select locations	4 days	Tue 2/10/09	Fri 2/13/09
Pump	55 days	Mon 12/1/08	Fri 2/13/09
order pump	3 days	Mon 12/1/08	Wed 12/3/08
ship to site	9 days	Wed 1/7/09	Mon 1/19/09
initial pump installation	9 days	Tue 1/20/09	Fri 1/30/09
use pump to move water from SIS to pit	5 days	Mon 2/2/09	Fri 2/6/09
final installation of pump inside sump	2 days	Mon 2/9/09	Tue 2/10/09
install wooden shack over main sump	4 days	Tue 2/10/09	Fri 2/13/09
Groundwater pumps	5 days	Mon 2/9/09	Fri 2/13/09
install & hookup the groundwater pumps	2 days	Mon 2/9/09	Tue 2/10/09
install wooden shack over each of 2 wells	4 days	Tue 2/10/09	Fri 2/13/09
Site access	6 days	Thu 12/11/08	Thu 12/18/08
improve site access	6 days	Thu 12/11/08	Thu 12/18/08
SIS Trench	52 days	Thu 11/27/08	Fri 2/6/09
produce granular backfill (or W/R) stockpile	13 days	Tue 12/2/08	Thu 12/18/08
obtain PVC liner	11 days	Thu 11/27/08	Thu 12/11/08
purchase CMP with drilled holes	11 days	Thu 11/27/08	Thu 12/11/08
ship CMP to site	6 days	Thu 12/11/08	Thu 12/18/08
move backfill stockpile to SIS area	3 days	Mon 1/12/09	Wed 1/14/09
excavate and backfill trench	5 days	Mon 2/2/09	Fri 2/6/09
Generator	59 days	Thu 11/20/08	Tue 2/10/09
check-out generator & do maintenance	7 days	Thu 11/20/08	Fri 11/28/08
install generator	2 days	Thu 1/22/09	Fri 1/23/09
install wooden shack over generator	3 days	Fri 2/6/09	Tue 2/10/09



Notes from S-wells muck and water management discussion of Feb 3, 2009
Time: 2:00 to 2:30 pm PST

Attendees:

- D&T: D. Sedgwick, D.Haggar
- SRK: A. Tong, D. Mackie
- Faro TAT: John Brodie

Two issues discussed: 1. Should materials excavated from sump be moved from current location, and 2. Options for managing sump water, both for sump development and if sump water level reaches overflow.

1) Muck Handling

- D.Haggar updates that Dan from site has investigated option of moving material and suggests D9 would be required to rip frozen ground. D. Haggar also notes that Pelly's larger equipment has de-mobed from site, such that only smaller equipment would be available to move materials if excavated. Move would require on the order of 100 truck loads.
- J. Brodie , A.Tong and C.Scott earlier expressed opinion that risk of significant damage to wetland vegetation matt is likely if frozen ground removed.
- J. Brodie points out that it is only pore water that is the issue, not the physical soil materials. Volume of pore water might be on the order of one day of groundwater flow through the sump. Not moving the materials is equivalent to starting interception one day later. Hence, the anticipated impact is **NOT** considered to be a significant issue.
- D.Haggar indicates that there is a swale that could be modified slightly during early spring to allow ponding of free water from muck. This free, assumed pore quality, water could be pumped back to the sump.
- All agree that this is more reasonable than moving entire muck pile and recommend this approach.

2) Sump Development

- Site staff have started preparations for pumping the sump using the vacuum truck (e.g., thawing ice etc.)
- Gauge has been installed in sump to measure water levels. Daily water level reports will be presented. Timing uncertain.
- Questions arise as to whether the vacuum truck has sufficient capacity to drawdown sump to any significant level.
- Question posed as to whether pipeline could be used with different generator-powered pump for development. Pipeline is not completed and will not be for a while longer, so may not be practical.
- J.Brodie brings up idea of spraying water on dumps, if snow blower available. D.Haggar says no snow blower at site.
- General agreement reached that the vacuum truck should be used initially to see what kind of water recovery the sump is capable of. If the sump cannot be drawdown sufficiently, alternates will be developed.
- Site staff will monitor sediment load in pumped water for assessing development progress/effectiveness.

Steel Sheetpiles – A Brief Introduction

Steel sheet piles are interlocking steel panels driven into the ground to form a wall. The installation of sheet piles can be carried out with impact or vibratory hammers. Sheet piling has been used in the construction industry for years.

Steel sheet piles are used in temporary works such as forming a temporary wall to support excavation in soft or water logged soil for the construction of cofferdams or basement. Steel sheet piles can also be used to form permanent retaining walls especially those used for river bank strengthening and in the construction of jetties. They can also be used to form part of the permanent wall of building basement where they are casted together with the basement concrete wall.

Steel sheetpiles are popular due to:

- strength
- ease of handling
- ease of construction
- potential for reuse

Lengths may be mixed within a wall, but sheetpiles should be ordered from a single source because interlocks vary by manufacturer. Steel sheetpiles are generally shipped and driven in pairs.

Temporary applications of steel sheet piles:

- basement to a building
- retaining walls to exclude earth and/or water
- construction of the pile cap for a pier in the river
- prevent slides and cave-ins in trenches
- pump house below grade

Permanent applications of steel sheet piles:

- basements
- underground car parks
- waterfront structures
- landfill and waste disposal
- foundations
- beach erosion protection
- cofferdams
- stabilizing ground slopes

Advantages of steel sheet pile walls:

- positive trench wall support
- controls groundwater effectively
- can be extracted and used many times
- minimum right of way required
- allows maximum access
- fast in loose soils
- satisfies "extraction of temporary works" requirement
- excavation / backfill quantities minimized

They have an important advantage in that they can be driven to depths below the excavation bottom and so provide a control to heaving in soft clays or piping in saturated sands. However sheet piles are less adaptable to hard driving conditions, particularly where boulders or irregular rock surfaces occur.

From: Pytlewski, Marius [mailto:MPytlewski@hatch.ca]
Sent: Friday, February 06, 2009 10:20 PM
To: Scott, Cam
Cc: Mackie, Daniel; Adanjo, Rui
Subject: S-Wells Pumphouse Status - Shop Visit to Precision

Hello Cam,

On Friday, February 8, 2009 I visited Precision Pumps shop in Abbortsford. The purpose of the visit was to get a good understanding of the S-wells pumphouse status prior to shipping to site planned for some time next week. The visit was also an opportunity to review the quality of Precision work. Ron Nelson of Precision accompanied me during the visit. The status in short is as follows:

1. In general bulk of installation work is completed with remaining work focused on wiring. An electrician is in process of wiring up the panels, recaptacles and instruments. One oxygen detector is installed the second (at the floor level) - to be mounted . Space heater is hung of the ceiling for testing, it will be taken down for transport.
2. Installation of piping including valves and fittings is very advanced. The sump discharge line is set up for pressure testing to 500psi. A few details to be completed include:
   - sample port and second pressure indicator on the sump discharge line
   - support bracket on the sump discharge pipe protruding through the wall (on outside)
   - sections of pipe between the sump pump and the pump support need to be cut into sections and threaded
   - return leg of the sump discharge line is missing
   - sump vent pipe is completely missing. The preferred location was discussed with Ron and agreed on.
3. Well water supply piping is glued PVC. Sump pump discharge piping is Type 304 stainless steel with a mixture of screwed and victaulic fittings. This selection of materials is consistent with the operating pressures in these two systems.
4. Floor hatch is of good quality with a power assist (gas cylinder) opener. It is easy to open and holds "open" position. Precision intends to provide a custom ladder to be used to ascend into the sump through the floor hatch. The ladder is in fabrication and I have not seen it.
5. 1/2 ton pump chain fall hoist is installed and appears adequate for the job of lowering and raising of the sump pump.
6. Some signage including "Confined Area" warning is still missing

To conclude bulk of the work is completed and the installation of piping and wiring appears on track to be finished mid next week when the control panel is supposed to arrive and be installed. Once that happens the PLC programing and final shop testing will take place which may take 2-3 days.

I attached a few photos to illustrate the status as of today.

Regards,

Marius Pytlewski, P.Eng.
Discipline Lead - Mechanical

HATCH™

Tel: +1 604 638 7696
Fax: +1 604 689 3918
400 - 1066 W. Hastings, Vancouver, B.C. V6E 3X2

Photos taken February 2, 2008 by M. Pytlewski of Hatch
Project: S-wells Action Plan
SRK Project Number: 1CD003.120

Photo 1:Can Entrance

Photo 2: Floor Hatch

Photos taken February 2, 2008 by M. Pytlewski of Hatch
Project: S-wells Action Plan
SRK Project Number: 1CD003.120


Photo 3: Pipes

Photo 4: Can Pipe Connections

Photos taken February 2, 2008 by M. Pytlewski of Hatch
Project: S-wells Action Plan
SRK Project Number: 1CD003.120

Photo 5: Heater and Oxygen Detector

Photo 6: Sump Piping and Hoist

Photos taken February 2, 2008 by M. Pytlewski of Hatch
Project: S-wells Action Plan
SRK Project Number: 1CD003.120

Photo 7: Control Panel Enclosure

Photo 8: Pipe Connections Close Up

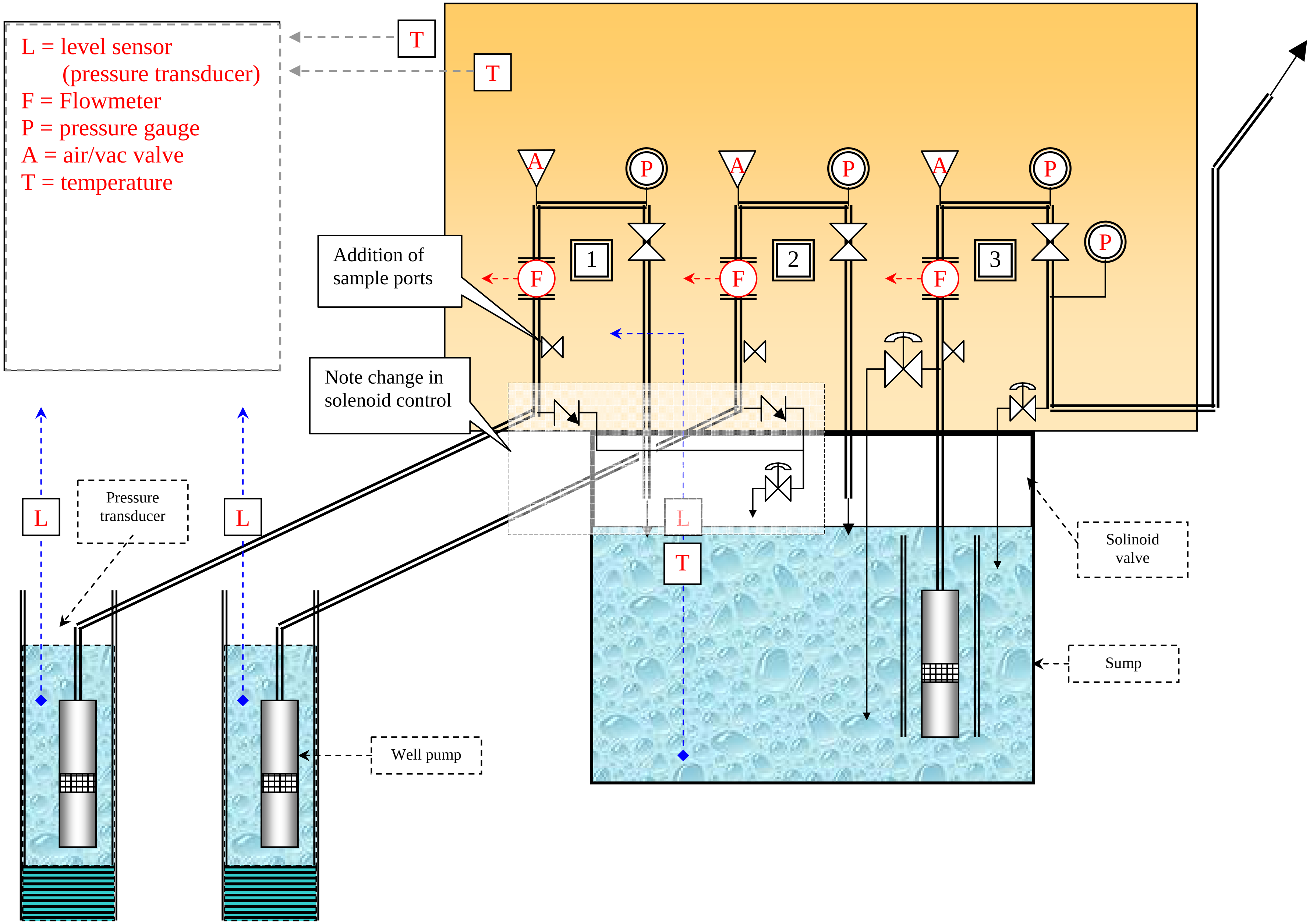
Photos taken February 2, 2008 by M. Pytlewski of Hatch
Project: S-wells Action Plan
SRK Project Number: 1CD003.120

Photo 9: Sump Pump Discharge Piping

Appendix F
Final Design Drawings and Sketches

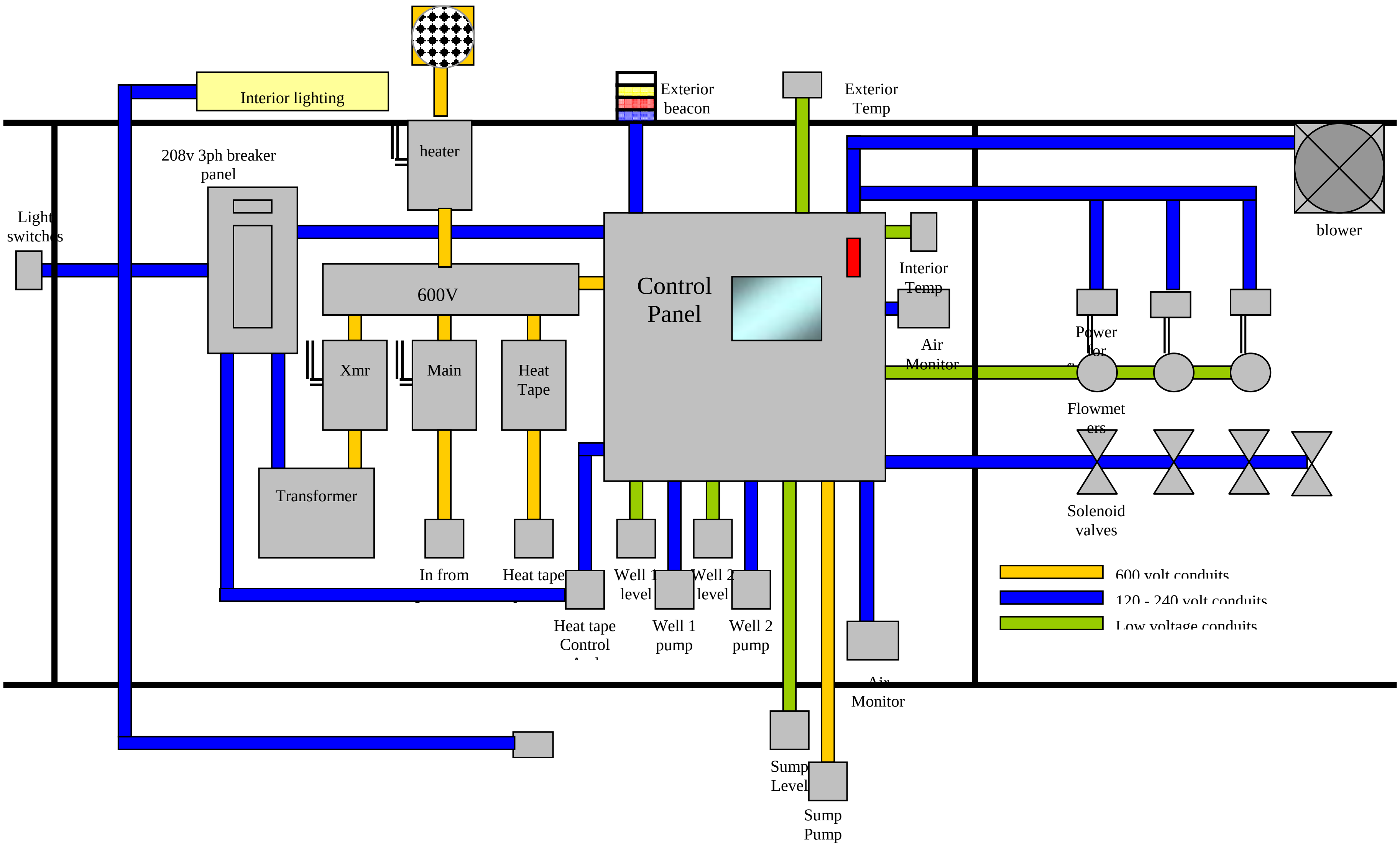
Appendix F.1
Sea-can and Wellheads

Anvil Range Pump System



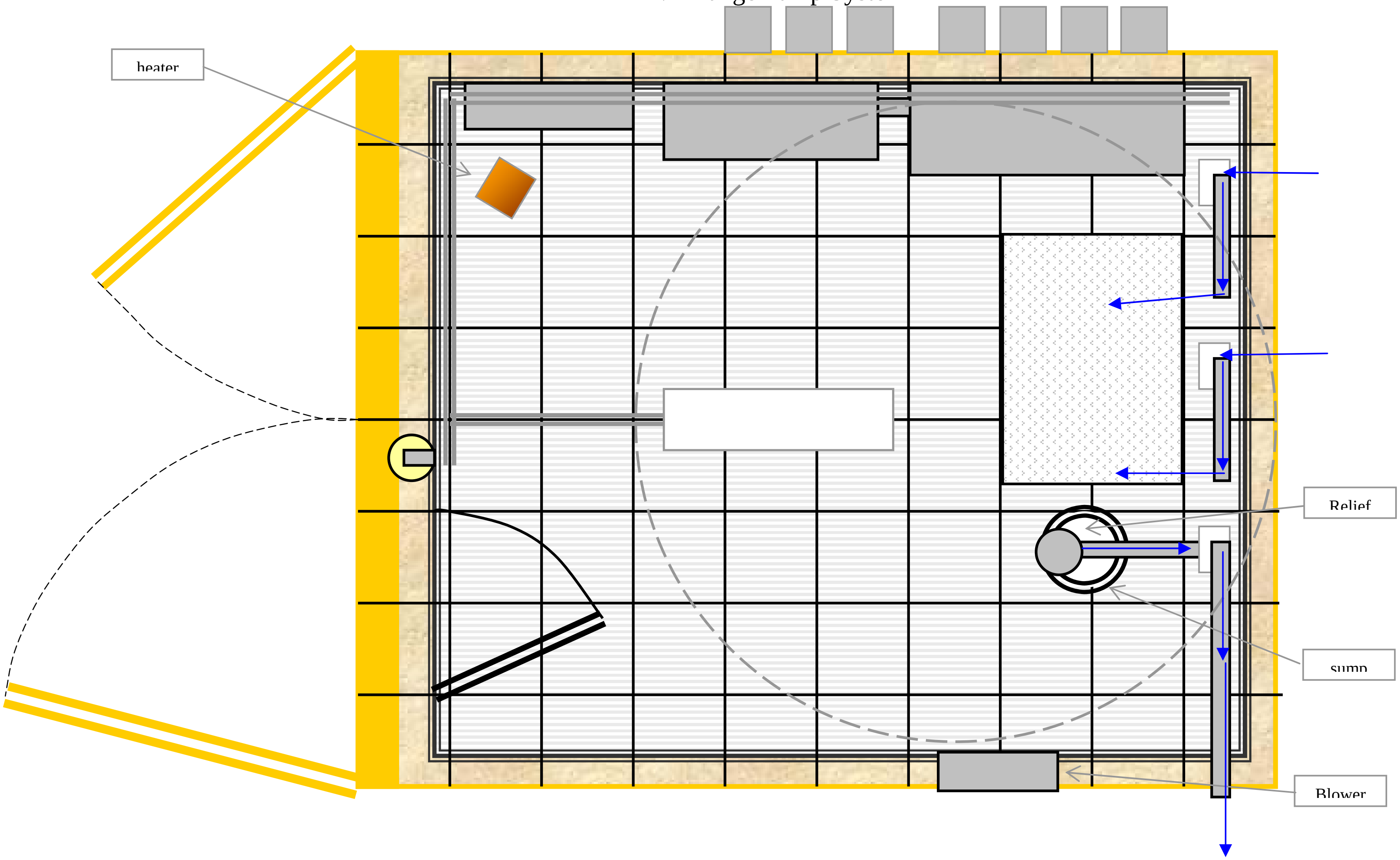
Drawn by R. Nelson – Precision Service & Pumps Inc.
5/12/2009 – Page 1 of 5

Anvil Range Pump System

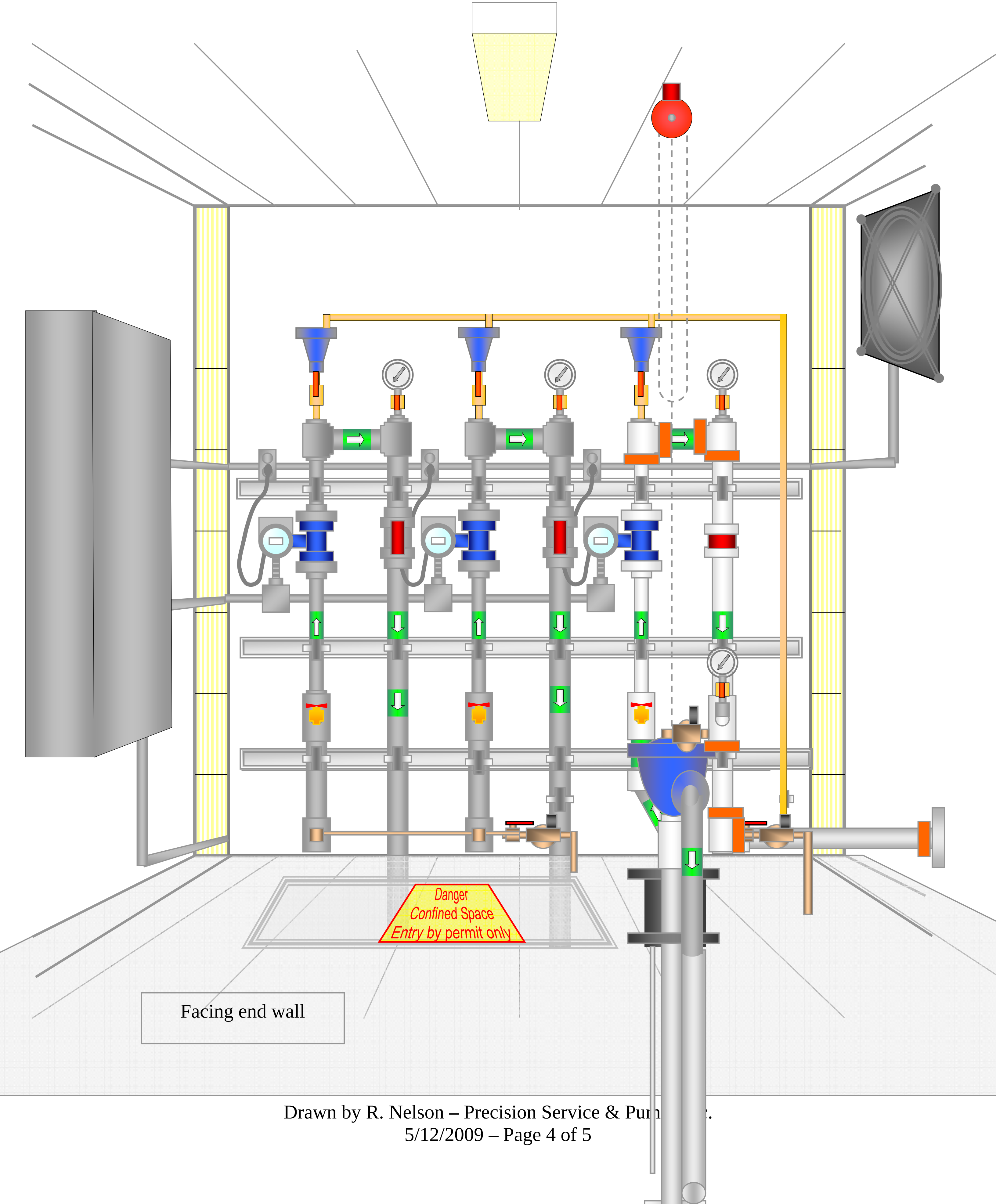


Drawn by R. Nelson – Precision Service & Pumps Inc.
5/12/2009 – Page 2 of 5

Anvil Range Pump System

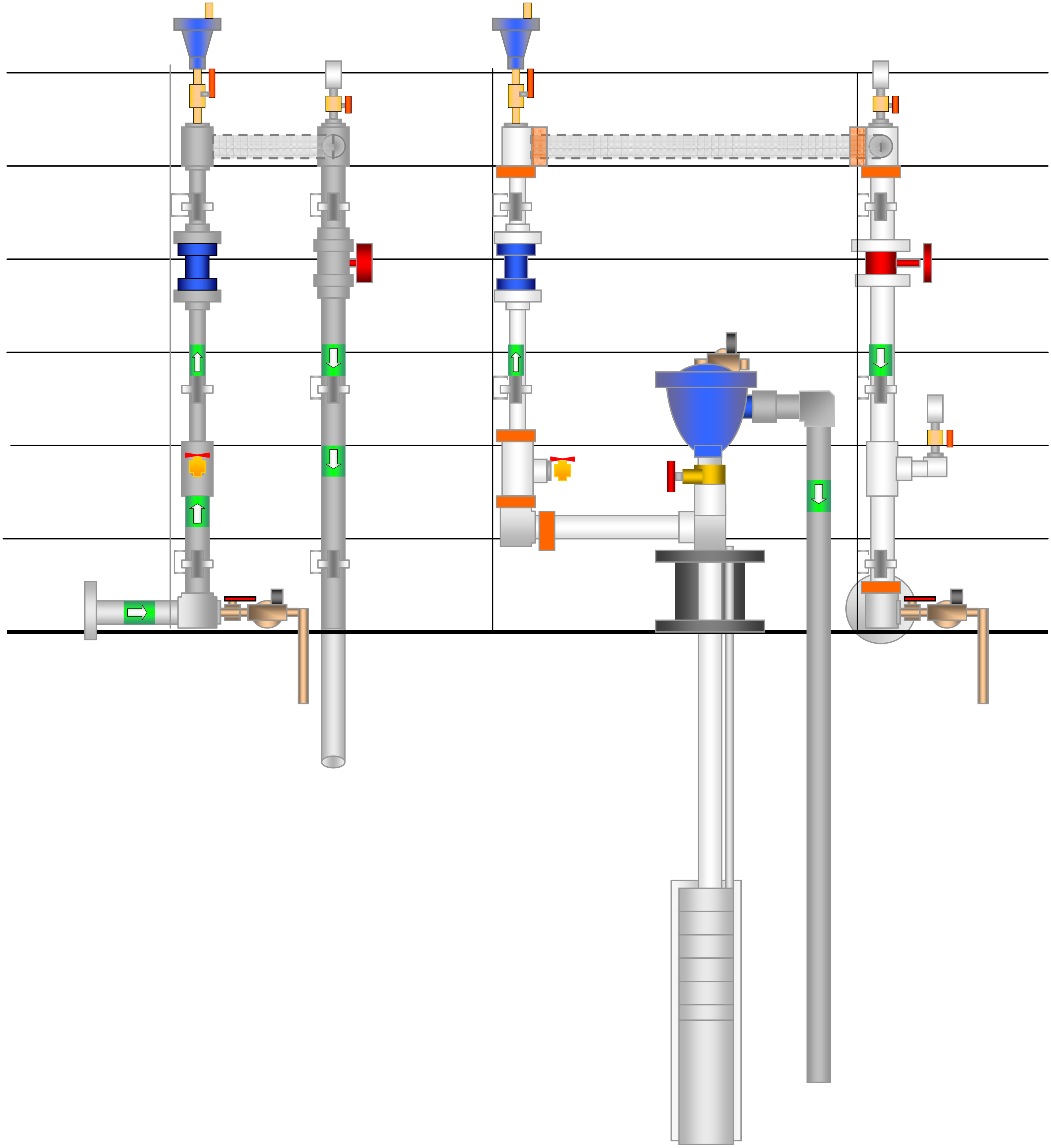


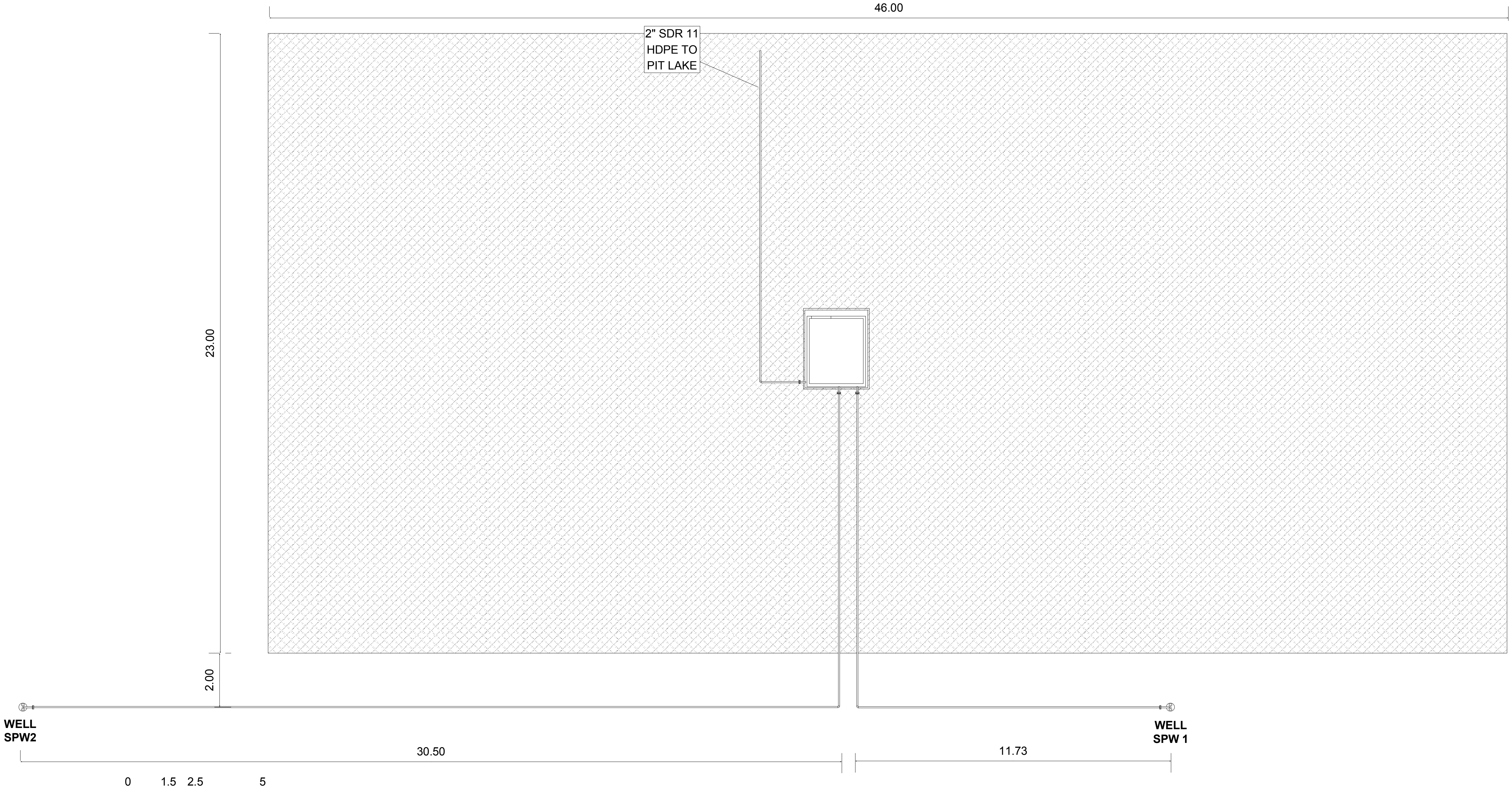
Anvil Range Pump System



Drawn by R. Nelson – Precision Service & Pu[illegible].
5/12/2009 – Page 4 of 5

Anvil Range Pump System





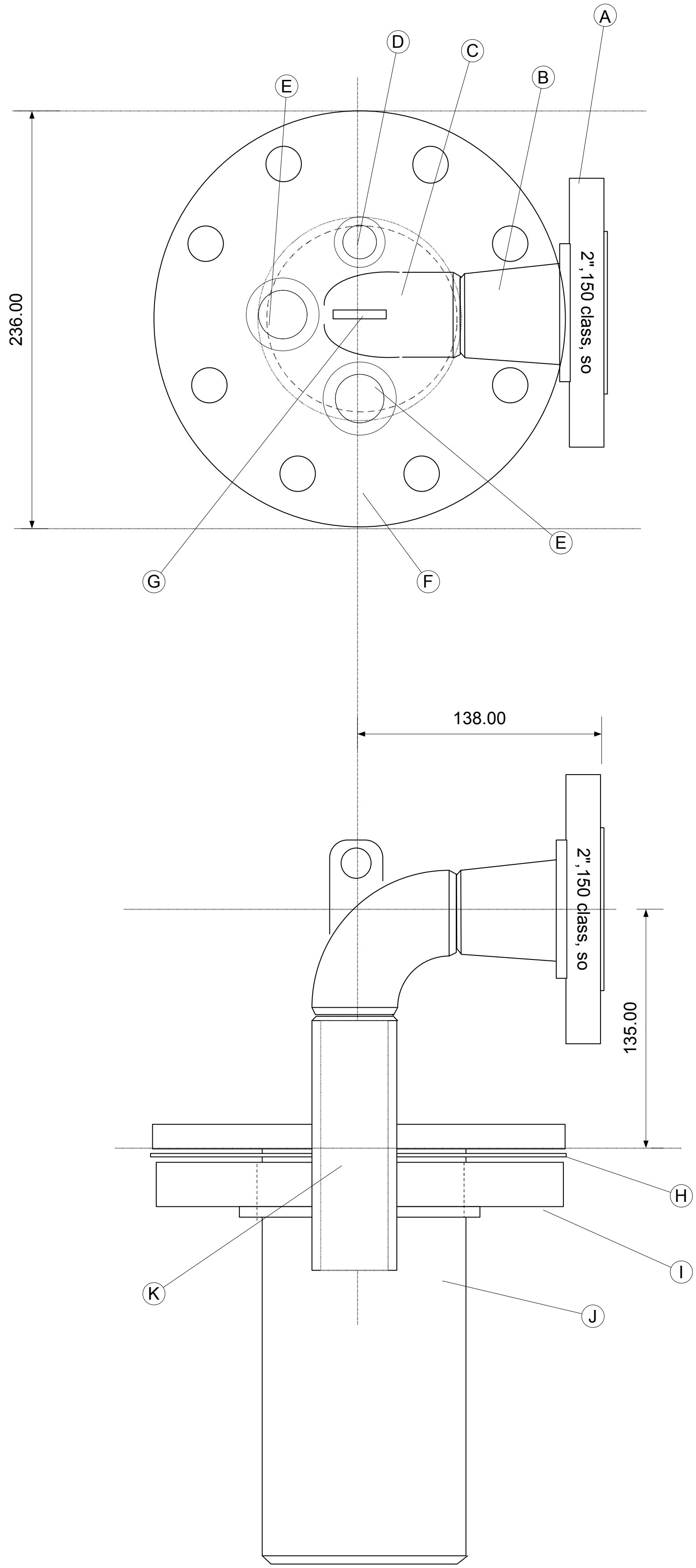
PRECISION
SERVICE & PUMPS INC.

1334 RIVERSIDE ROAD
ABBOTSFORD BC V2S-8J2

ANVIL RANGE MINNING CORPORATION
SHALLOW AQUIFER CAPTURE PROJECT

PUMP CONTAINER AND
SITE PIPING

WORK ORDER 6982	DRAWN BY ML
DRAWING NUMBER 6982-01	SCALE 1:25



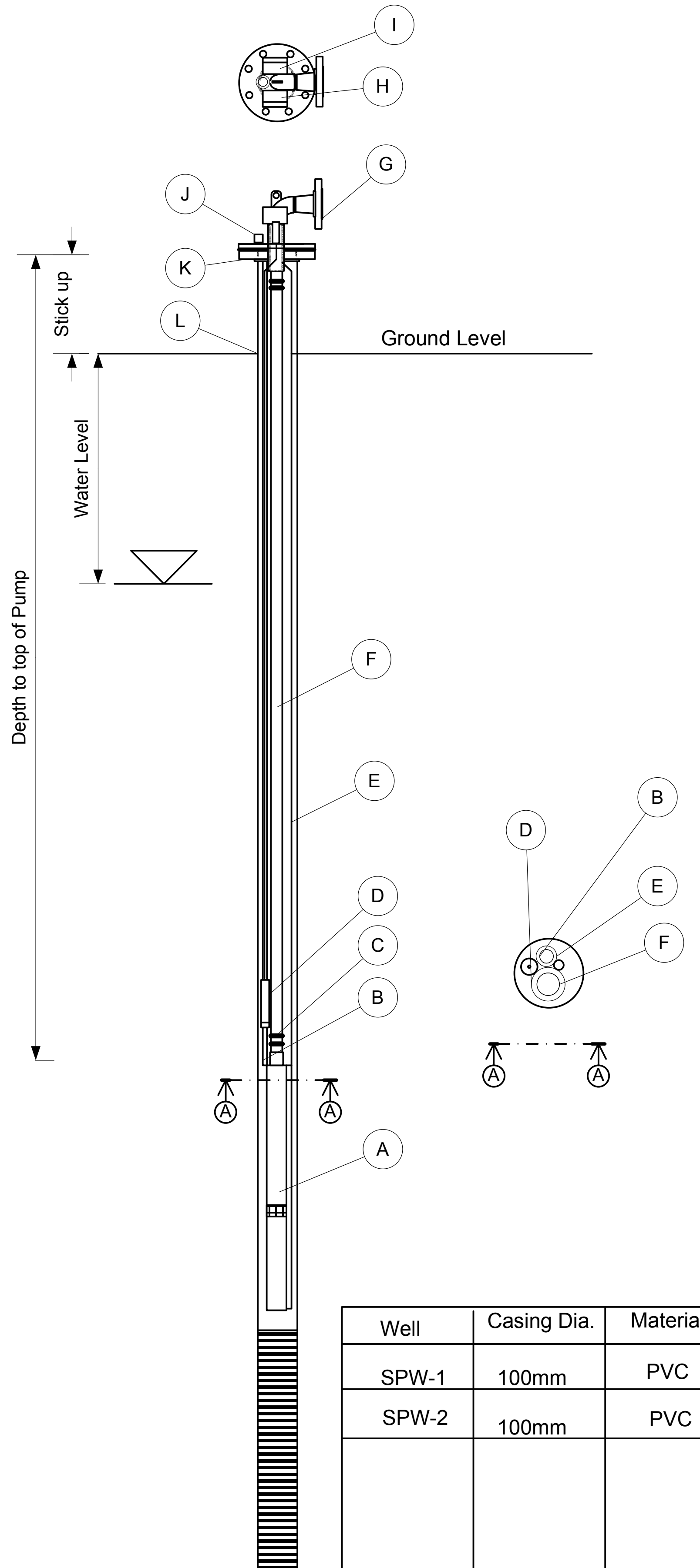
A, 50MM Flange 150lb, RF, SO, Carbon steel.	
B, 50mmX38mm, W.O. Concentric Reducer	
C, 38mm, Long Radius, 90 Degree elbow, W.O.	
D, 14mm, Threaded half coupling	
E, 18mm, Threaded Half Coupling	
F, 14mm , MS plate	
G, 7mm, lifting lug, c/w 18mm hole	
H, 100mm, Red rubber flange gasket, 150lb	
I, 100mm, Vanstone PVC flange, Solvent weld.	
J, 100mm PVC well Casing, (Existing)	
K, 38mm, Threaded half nipple 12"	

0.0 mm. 60.0 mm100.0 mm. 200.0 mm.

PRECISION SERVICE & PUMPS INC. www.precision-pumps.com	**Anvil Range Mining Corp** **Shallow Well Capture Well**	Work Order 6982	Date 16/01/09
1334 RIVERSIDE ROAD ABBOTSFORD BC V2S 8J2	**Well head Detail , SPW1, SPW2**	Drawing 6982-03	Drawing by ML

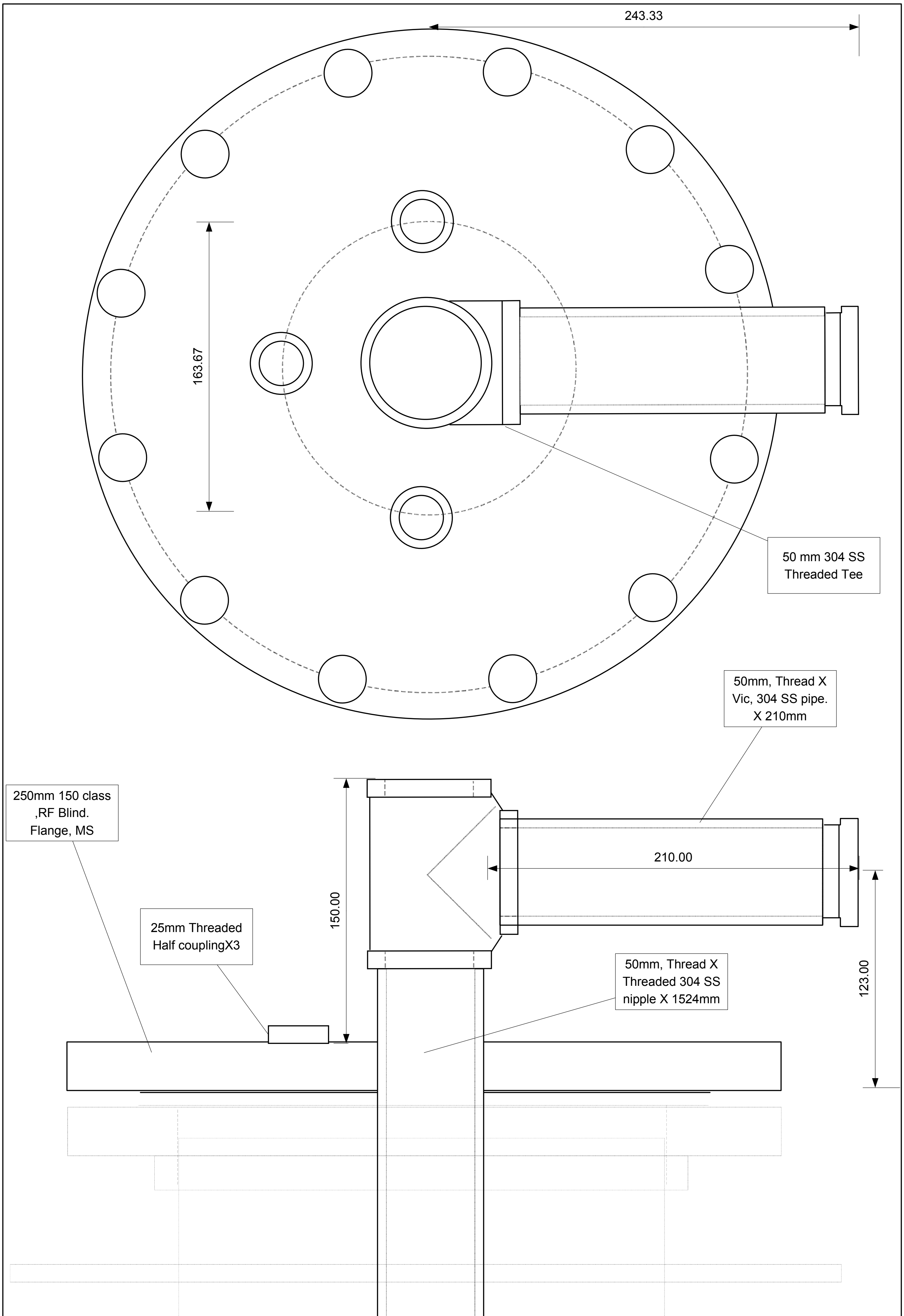
Description

A- Grundfos 22SQ05B-120, 230/1/60 pump and motor
B- 19mm PVC class 200 dip tube
C- 38mm, Stainless steel gear clamps
D- E&H Waterpilot FMX167-F2AMC113
E- Power cable,#12-4 sub wire TWU
F- 38mm Polyethelene pipe, Pump Drop, 160 psi CSA
G- 100mmX50mm, Flange x Flange fab well head
H- E&H 100mX100mm Junction box, Plastic
I- Scepter 100mmx100mmx50mm, Junction Box
J- 19mm Brass plug
K- 100mm Van Stone Flange , PVC
L- 100mm PVC well Casing, Existing

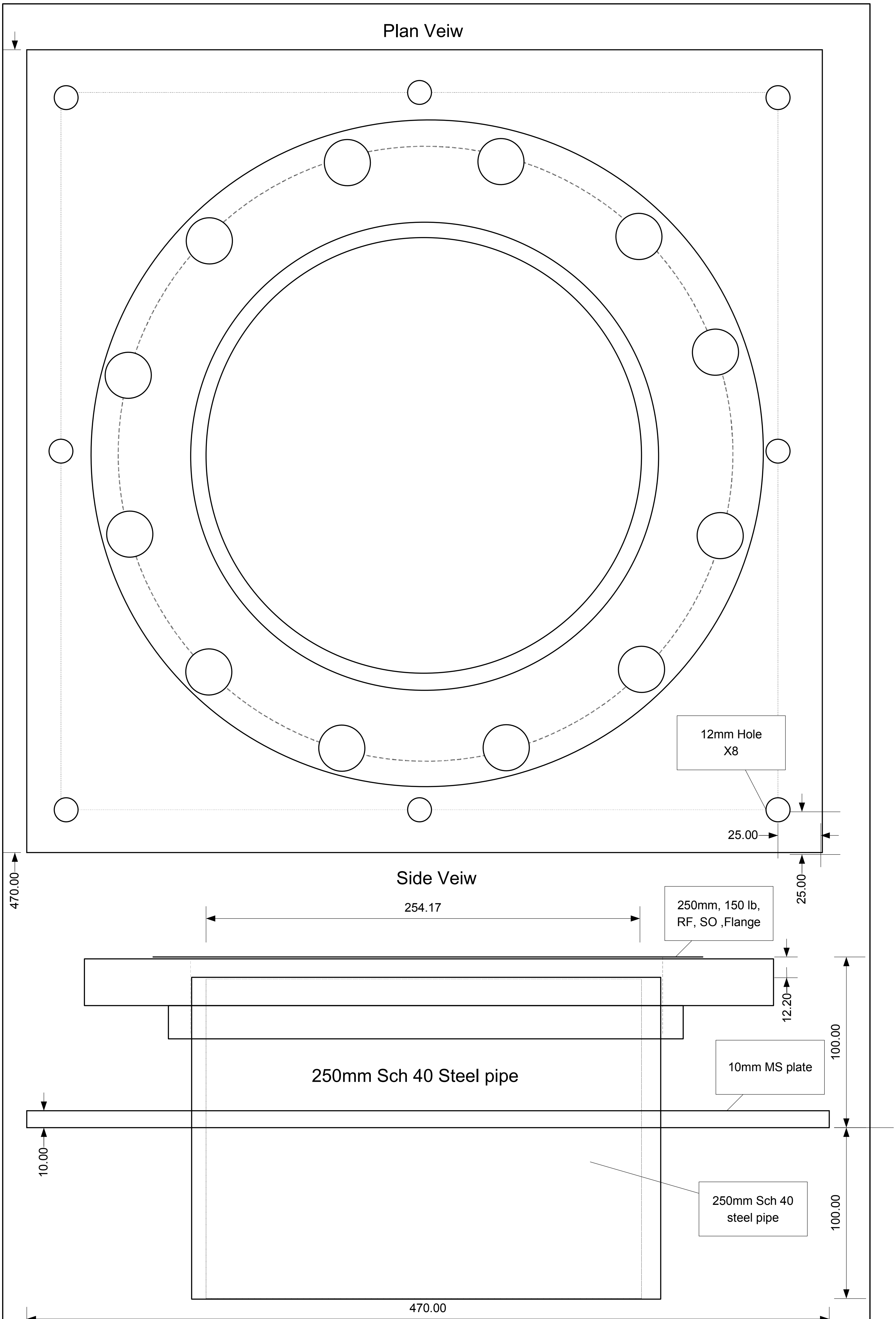


Well	Casing Dia.	Material	Stick up	Top ofPump	Water Level
SPW-1	100mm	PVC	.95m	19m	3.2m
SPW-2	100mm	PVC	1.0m	9.5m	4.9m

Precision Service & Pumps Inc. **1334 Riverside Rd** **Abbotsford ,BC** **V2S 8J2**	**TITLE** **Anvil Range Mining Corp, Deep Aquifer well**
	FILENAME **6982-04, SPW1,2, DETAI, PDFL.VSD**
DATE 1/17/2009	SIZE / FSCM NO / DWG NO 6982-04 / REV
DRAWN BY MLAMONT	SCALE 1:20 / SHEET 1 OF 2



Precision Service and Pumps,Inc. **1334 Riverside Road** **Abbotsford, B.C.** **V2S 8J2**	TITLE ANVIL RANGE MINING CORP, SHALLOW AQUIFER, SUMP				
	FILENAME 6982 SUMP WELL HEAD.PDF.VSD				
Date 22/01/09	SIZE	FSCM NO	DWG NO 6982-05		REV
DRAWN BY M LAMONT	SCALE 1 : 2.5			SHEET 1 OF 2	



Precision Service and Pumps Inc. **1334 Riverside Rd,** **Abbotsford, BC**	TITLE	ANVIL RANGE MINING CORP, SHALLOW AQUIFER, SUMP			
	FILENAME	6982 SUMP WELL HEAD.PDF.VSD			
DATE 10/28/2005	SIZE	FSCM NO	DWG NO 6982-06	REV	
DRAWN BY M LAMONT	SCALE	1 : 2.5		SHEET	2 OF 2

Appendix F.2
Electrical Components

21-Jan-2009	Approval	R.A.	A
DATE	ISSUED FOR	BY	REV. NO.

R. Adanjo	09-01-21
PREPARED BY	DATE

APPROVED BY	DATE

APPROVED BY	DATE

1. SCOPE OF WORK

1.1 The Work

The Work shall include, but not be limited to, the integration of all separate components shown on the drawings and/or required to make a complete and operable system.

Unless specifically noted or listed otherwise, "Installation" of cable shall include the installation, termination and all necessary and specified material and equipment. All cables must indicate proper cable and phasing marking.

Unless specifically noted or listed otherwise, "Installation" of equipment shall include the installation, fabrication of mounting supports and all necessary and specified material and equipment.

Tagging, testing, calibration, commissioning, and start-up of all new equipment.

1.2 Definitions

Where mentioned in this document as "the code", it refers to the Canadian Electrical Code, C22.1-06 Part I.

1.3 Electrical

1.3.1 Electrical Power Source:

1.3.1.1 Install the 75kVA transformer in close vicinity to the generator. This is a field fit installation.

1.3.1.2 Install the 200A and the 80A fuse disconnect, in close vicinity to the generator. This is a field fit installation.

1.3.1.3 Bury the provided electrical rods or plate at opposite corners of the generator, or where it deems appropriate according to site conditions. Ensure installation is according to Section 10-700 of the code.

1.3.1.4 Bond between the grounding rods and all the metallic parts of the generator, transformer and fuse disconnects with a #6 AWG bare copper conductor. Ensure metallic parts are all bonded appropriately.

1.3.1.5 Connect the generator X0 point with the #6 AWG bare copper conductor to one of the grounding rods.

1.3.1.6 Connect the secondary (600V) side of the 75kVA transformer X0 point to the other grounding rod with the #6 AWG bare copper conductor.

1.3.1.7 Interconnect the generator to the 200A fuse disconnect (FD02).

1.3.1.8 Install the 3c 250MCM ACWU cable (FD02-TX03-P1) from the 200A fuse disconnect (FD02) to the primary side of the 75kVA transformer (TX03). Ensure the primary side of the transformer is connected in a delta formation, to tap setting 4. Use cable grounding conductor to further bond the metallic equipment.

1.3.1.9 Interconnect the secondary side of the 75kVA transformer (TX03) to the 80A fuse disconnect (FD04). Ensure the secondary side of the transformer is connected in a wye formation.

1.3.1.10 Install the 3c #2 ACWU cable (FD04-PH05-P1) from the 80A fuse disconnect (FD04) to the sea-can pumphouse (PH05). Strip back the cable, use the TECK connector to fix the cable to the junction box mounted on the outside of the sea-can and terminate the cable at the mains fuse disconnect inside the sea-can. The length of the cable from the generator system to the pipeline must be field fit and installed according to site conditions as long as it is suitably mechanically protected. Ensure the cable's grounding conductor bonds the two fuse disconnects together. Refer to Precisions set of drawings.

1.3.1.11 The contiguous run of the 3c #2 ACWU cable (FD04-PH05-P1) is to be supported along the water pipeline. Along with the two other cables for the heat tracing field panels, the cables are to be strapped to the pipeline at 1 meter intervals at inclinations greater than 15 degrees and everywhere else at 3 meter intervals. The cables must maintain a certain amount of slack between the strapping. Special attention must be made to when strapping of the cables to the pipeline's insulation. All sharp edges must be avoided, and if so deemed necessary provide cushioning material around the strapping, to ensure the insulation is not damaged allowing moisture to enter.

1.3.2 Heat trace system - 600V:

1.3.2.1 Install the supplied Heat Trace Control Panels at the locations identified in drawing 331759-E02.

1.3.2.2 Install the 3c #4 ACWU cable (PH05-HT01-P1) from the sea-can pumphouse to the Heat Trace Control Panel #1 (HT01). At the sea-can pumphouse strip back the cable, use the TECK connector to fix the cable to the junction box mounted on the outside of the sea-can and terminate the cable at the allocated circuit breaker inside the sea-can. Refer to Precision's set of drawings. Ensure the cable's grounding conductor bonds the Heat trace control panel to the sea-can pumphouse.

1.3.2.3 Install the 12c #12 Teck cable (PH05-HT01-C1) from the sea-can pumphouse to the Heat Trace Control Panel #1 (HT01). At the sea-can pumphouse strip back the cable, use the TECK connector to fix the cable to the junction box mounted on the outside of the sea-can and terminate the cable at the allocated control system panel designation inside the sea-can. Refer to Precision's set of drawings. Ensure the cable's grounding conductor bonds the Heat trace control panel to the sea-can pumphouse.

1.3.2.4 Install the 3c #4 ACWU cable (HT01-HT02-P1) from the Heat Trace Control Panel #1 (HT01) to the Heat Trace Control Panel #2 (HT02). Ensure the cable's grounding conductor bonds the two Heat Trace Control Panels together.

1.3.2.5 Install the 12c #12 Teck cable (HT01-HT02-C1) from Heat Trace Control Panel #1 (HT01) to the Heat Trace Control Panel #2 (HT02). Ensure the cable's grounding conductor bonds the Heat trace control panel to the sea-can pumphouse.

1.3.2.6 Install the 3c #4 ACWU cable (HT02-HT03-P1) from the Heat Trace Control Panel #2 (HT02) to the Heat Trace Control Panel #3 (HT03). Ensure the cable's grounding conductor bonds the two Heat Trace Control Panels together.

1.3.2.7 Install the 12c #12 Teck cable (HT02-HT03-C1) from Heat Trace Control Panel #2 (HT02) to the Heat Trace Control Panel #3 (HT03). Ensure the cable's grounding conductor bonds the Heat trace control panel to the sea-can pumphouse.

1.3.2.8 The contiguous run of the power and control cables between the sea-can pumphouse and the heat trace control panels are to be supported along the water pipeline. The cables are to be strapped to the pipeline at 1 meter intervals at inclinations greater than 15 degrees and everywhere else at 3 meter intervals. The cables must maintain a certain amount of slack between the strapping. Special attention must be made at the points where the cables are strapped to the pipeline's insulation. All sharp edges must be avoided, and if so deemed necessary provide cushioning material around the strapping, to ensure the insulation is not damaged allowing moisture to enter.

1.3.2.9 The heat trace cables are to be installed inside the pipeline's conduit and directly terminated in the heat trace controller inside the heat trace control panel. At locations along the pipeline where valves or flanges are installed, the heat trace cable must wrap around these devices and continue along the pipeline's conduit as one continuous run. The heat trace cable is a two-wire type cable, terminated on a three phase system. Ensure each segmented heat trace cable is installed at their designated phase sequence to ensure a balanced three phase system, as shown in drawing 331759-E05. Refer to Urecon installation instructions #1E and #3E for power, end and splicing termination details.

1.3.2.10 At each controller's location install the maintain temperature sensors (HT0X-TS01) on the pipeline as much away as possible from the heat trace cable and directly terminate in the heat trace controller inside the heat trace control panel. Refer to Urecon installation instruction #3E for temperature sensor installation details.

1.3.2.11 At each controller's location install the high temperature limit temperature sensor (HT0X-TS03) on the pipeline, inside the heat trace conduit and directly terminate in the heat trace controller inside the heat trace control panel. Refer to Urecon installation instruction #3E for temperature sensor installation details.

1.3.3 *Heat trace system - 120V:*

1.3.3.1 Install the heat trace controller in its allocated space inside the sea-can.

1.3.3.2 Connect a 2c #12 Teck cable from the allocated circuit from the load center to the power input of the controller. Refer to Urecon installation instruction #44E for wiring details.

1.3.3.3 The heat trace cables are to be installed inside the pipeline's conduit and directly terminated in the heat trace controller inside the sea-can pumphouse. There are two sets of heat trace cables for the two runs of pipelines to the ground well pumps. At locations along the pipeline where valves or flanges are installed, the heat trace cable must wrap around these devices and continue along the pipeline's conduit as one continuous run. The interface wires (power kit) between the heat trace cable and the controller are to be installed inside the flexible conduit up to the allocated junction box and pulled through all the way to the controller inside another flexible conduit inside the sea-can. Both heat trace cables are to terminated at the same terminals on the controller. Refer to drawing 331759-E06 and Urecon installation instructions #1E and #3E for power, end and splicing termination details, and #44E for wiring details.

1.3.3.4 At each ground well pipeline install the two maintain temperature sensors (HT04-TS01 and HT04-TS02) on the pipeline as much away as possible from the heat trace cable. Install the attached control cable via flexible conduit and the allocated junction box, as one continuous length of cable, and terminate in the heat trace controller inside the sea-can pumphouse. Refer to Urecon installation instruction #3E for temperature sensor installation details.

1.3.3.5 In the longest length pipeline to the ground water pump install the high temperature limit temperature sensor (HT0X-TS03) on the pipeline, inside the heat trace conduit. Install the attached control cable via flexible conduit and the allocated junction box, as one continuous length of cable, and terminate in the heat trace controller inside the sea-can pumphouse. Refer to Urecon installation instruction #3E for temperature sensor installation details.

1.3.4 *Pump House:*

1.3.4.1 Install ground water well #1, level sensor.

1.3.4.2 Install and terminate, with the provided cable, the ground water well #1, level sensor control wiring.

1.3.4.3 Install ground water well #1, pump.

1.3.4.4 Install and terminate, with the provided cable, the ground water well #1, pump power cable.

1.3.4.5 Install ground water well #2, level sensor.

1.3.4.6 Install and terminate, with the provided cable, the ground water well #2, level sensor control wiring.

1.3.4.7 Install ground water well #2, pump.

1.3.4.8 Install and terminate, with the provided cable, the ground water well #2, pump power cable.

1.3.4.9 Install Main Sump, level sensor.

1.3.4.10 Install and terminate, with the provided cable, the Main Sump, level sensor control wiring.

1.3.4.11 Install Main Sump, temperature sensor.

1.3.4.12 Install and terminate, with the provided cable, the Main Sump, temperature sensor control wiring.

1.3.4.13 Install Main Sump pump.

1.3.4.14 Install and terminate, with the provided cable, the Main Sump pump power cable.

2. DRAWINGS, and ATTACHMENTS

All Work shall be performed in strict accordance with the following drawings.

2.1 Drawings

The drawing list provides the full list of drawings defining the scope of work to be carried out in terms of the General Services Agreement. Drawings will be issued for construction in accordance with the schedule. In addition to drawings, vendor drawings for new and relocated equipment, if applicable and available, will be issued for reference and clarity.

3. Drawing List

Refer to Appendix A for the list of engineering drawings.

4. Vendor Installation Instructions

Refer to Appendix B for the related vendor installation details

5. Vendor Drawing List

Refer to Appendix C for the list of related vendor drawings.

END OF SECTION

APPENDIX A

Drawing No.	Rev. No.	Drawing Title
331759-E01	B	PUMP HOUSE MAIN POWER FEED
331759-E02	A	HEAT TRACE CONTROL PANEL FIELD INSTALLATION
331759-E03	B	HEAT TRACE CONTROL PANEL EQUIPMENT LAYOUT
331759-E04	B	HEAT TRACE CONTROL PANEL SCHEMATIC DIAGRAM
331759-E05	B	HEAT TRACE CONTROL PANEL WIRING DIAGRAM
331759-E06	A	120Vac HEAT TRACE CONTROLLER WIRING DIAGRAM

END OF SECTION

APPENDIX B

Vendor Installation Instructions

Document File Name	Rev. No.	Document Title
1E1103	/	INSTALLATION INSTRUCTION #1E
3E1103	/	INSTALLATION INSTRUCTION #3E
44E0808	/	INSTALLATION INSTRUCTION #44E

END OF SECTION

URECON
PRE-INSULATED PIPE SYSTEM

St-Lazare, Quebec Tel.: (450) 455-0961
Calmar, Alberta Tel.: (780) 985-3636
Rockledge, Florida Tel.: (321) 638-2364

INSTALLATION INSTRUCTION #1E

THERMOCABLE® FLUOROPOLYMER INSULATED PARALLEL HEATING CABLE

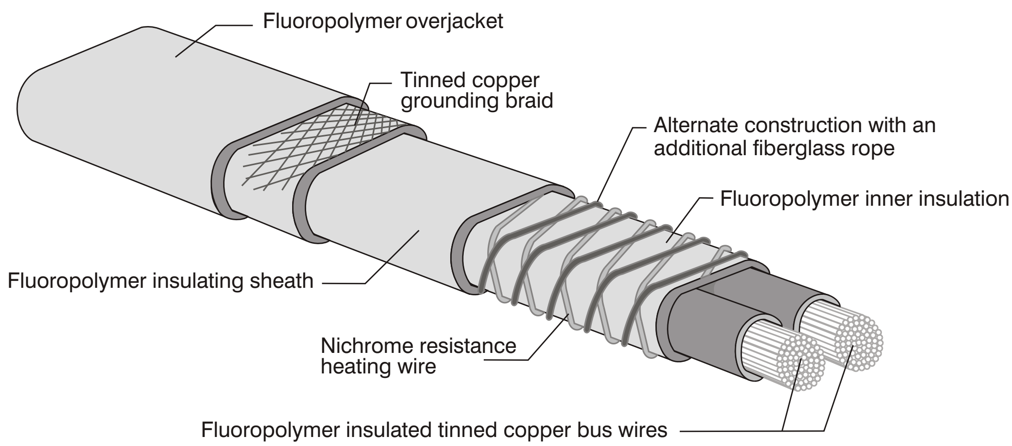
TERMINATION KIT # A1333-COJ

SPLICE KIT # S1334-COJ

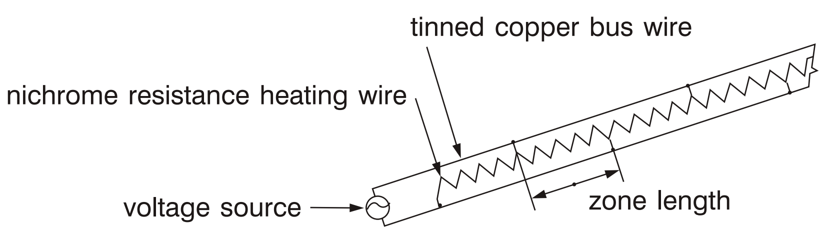
END TERMINATION KIT # E1336-COJ

POWER SPLICE KIT # PS1337-12-COJ

THERMOCABLE® parallel heating strip is used to prevent Urecon pre-insulated pipes from freezing.



THERMOCABLE® fluoropolymer constant watt cut - to - length heat tracing cable is a parallel resistance type heating strip which uses a thermally stable nichrome heating wire, with a series of heating zones. These heating zones produce constant, predictable wattage per meter output. THERMOCABLE® is ideally suited for pulling into trace conduits on Urecon pre-insulated pipe systems.



PROPER HEATING CABLE SELECTION :

Urecon can assist you determining the required heating cable for you application. We have computer design programs to calculate the power requirement of a given pipe/insulation arrangement. The following heat loss charts can also enable you to determine the proper heating cable power output required for your application. These charts are for urethane insulation.

Select the heat loss chart with a temperature differential (∆T) similar or greater than of the proposed installation. The temperature differential (∆T) is the temperature difference between the minimum ambient and the desired maintain temperature of the pipe.

Based on the pipe size and insulation thickness you will find a corresponding heat loss value on the chart. This value expressed in watts / meter *(watts / foot)* of pipe will indicate the minimum power required.

Nominal pipe size		Pipe heat loss @ 10 °C *(18 °F)* ∆T					
		Urethane insulation thickness					
mm	*in*	25 mm *(1 in)*		50 mm *(2 in)*		75 mm *(3 in)*	
		w/m	*w/ft*	w/m	*w/ft*	w/m	*w/ft*
13	*½*	1.5	*0.5*	1.0	*0.3*	0.9	*0.3*
19	*¾*	1.7	*0.5*	1.2	*0.4*	0.9	*0.3*
25	*1*	2.0	*0.6*	1.3	*0.4*	1.1	*0.3*
32	*1¼*	2.3	*0.7*	1.5	*0.5*	1.2	*0.4*
40	*1½*	2.5	*0.8*	1.6	*0.5*	1.3	*0.4*
50	*2*	3.0	*0.9*	1.8	*0.5*	1.4	*0.4*
64	*2½*	3.4	*1.0*	2.1	*0.6*	1.6	*0.5*
75	*3*	4.0	*1.2*	2.4	*0.7*	1.8	*0.5*
100	*4*	4.9	*1.5*	2.8	*0.9*	2.1	*0.6*
150	*6*	6.8	*2.1*	3.8	*1.2*	2.8	*0.9*
200	*8*	8.6	*2.6*	4.7	*1.4*	3.4	*1.0*
250	*10*			5.7	*1.7*	4.1	*1.2*
300	*12*			6.6	*2.0*	4.7	*1.4*
350	*14*			7.2	*2.2*	5.1	*1.6*
400	*16*			8.1	*2.5*	5.7	*1.7*
450	*18*			9.0	*2.7*	6.3	*1.9*
500	*20*			9.9	*3.0*	6.9	*2.1*
550	*22*			10.8	*3.3*	7.5	*2.3*
600	*24*			11.7	*3.6*	8.1	*2.5*

Nominal pipe size		Pipe heat loss @ 20 °C *(36 °F)* ∆T					
		Urethane insulation thickness					
mm	*in*	25 mm *(1 in)*		50 mm *(2 in)*		75 mm *(3 in)*	
		w/m	*w/ft*	w/m	*w/ft*	w/m	*w/ft*
13	*½*	3.0	*0.9*	2.1	*0.6*	1.7	*0.5*
19	*¾*	3.4	*1.0*	2.3	*0.7*	1.9	*0.6*
25	*1*	3.9	*1.2*	2.6	*0.8*	2.1	*0.6*
32	*1¼*	4.6	*1.4*	2.9	*0.9*	2.4	*0.7*
40	*1½*	5.0	*1.5*	3.2	*1.0*	2.5	*0.8*
50	*2*	5.9	*1.8*	3.7	*1.1*	2.9	*0.9*
64	*2½*	6.8	*2.1*	4.1	*1.2*	3.2	*1.0*
75	*3*	8.0	*2.4*	4.7	*1.4*	3.6	*1.1*
100	*4*	9.8	*3.0*	5.7	*1.7*	4.3	*1.3*
150	*6*	13.7	*4.2*	7.6	*2.3*	5.6	*1.7*
200	*8*	17.3	*5.3*	9.5	*2.9*	6.8	*2.1*
250	*10*			11.4	*3.5*	8.1	*2.5*
300	*12*			13.2	*4.0*	9.4	*2.9*
350	*14*			14.4	*4.4*	10.1	*3.1*
400	*16*			16.2	*4.9*	11.3	*3.4*
450	*18*			18.0	*5.5*	12.6	*3.8*
500	*20*			19.8	*6.0*	13.8	*4.2*
550	*22*			21.6	*6.6*	15.0	*4.6*
600	*24*			23.4	*7.1*	16.2	*4.9*

Nominal pipe size		Pipe heat loss @ 30 °C *(54 °F)* ∆T					
		Urethane insulation thickness					
mm	*in*	25 mm *(1 in)*		50 mm *(2 in)*		75 mm *(3 in)*	
		w/m	*w/ft*	w/m	*w/ft*	w/m	*w/ft*
13	*½*	4.4	*1.3*	3.1	*0.9*	2.6	*0.8*
19	*¾*	5.1	*1.6*	3.5	*1.1*	2.8	*0.9*
25	*1*	5.9	*1.8*	3.9	*1.2*	3.2	*1.0*
32	*1¼*	6.8	*2.1*	4.4	*1.3*	3.5	*1.1*
40	*1½*	7.5	*2.3*	4.8	*1.5*	3.8	*1.2*
50	*2*	8.9	*2.7*	5.5	*1.7*	4.3	*1.3*
64	*2½*	10.2	*3.1*	6.2	*1.9*	4.8	*1.5*
75	*3*	12.0	*3.7*	7.1	*2.2*	5.4	*1.6*
100	*4*	14.7	*4.5*	8.5	*2.6*	6.4	*2.0*
150	*6*	20.5	*6.2*	11.5	*3.5*	8.4	*2.6*
200	*8*	25.9	*7.9*	14.2	*4.3*	10.3	*3.1*
250	*10*			17.1	*5.2*	12.2	*3.7*
300	*12*			19.8	*6.0*	14.1	*4.3*
350	*14*			21.6	*6.6*	15.2	*4.6*
400	*16*			24.3	*7.4*	17.0	*5.2*
450	*18*			27.0	*8.2*	18.8	*5.7*
500	*20*			29.7	*9.1*	20.7	*6.3*
550	*22*			32.4	*9.9*	22.5	*6.9*
600	*24*			35.1	*10.7*	24.3	*7.4*

Nominal pipe size		Pipe heat loss @ 40 °C *(72 °F)* ∆T					
		Urethane insulation thickness					
mm	*in*	25 mm *(1 in)*		50 mm *(2 in)*		75 mm *(3 in)*	
		w/m	*w/ft*	w/m	*w/ft*	w/m	*w/ft*
13	*½*	5.9	*1.8*	4.1	*1.2*	3.4	*1.0*
19	*¾*	6.8	*2.1*	4.6	*1.4*	3.8	*1.2*
25	*1*	7.8	*2.4*	5.2	*1.6*	4.2	*1.3*
32	*1¼*	9.1	*2.8*	5.9	*1.8*	4.7	*1.4*
40	*1½*	10.0	*3.0*	6.4	*2.0*	5.1	*1.6*
50	*2*	11.8	*3.6*	7.3	*2.2*	5.7	*1.7*
64	*2½*	13.7	*4.2*	8.3	*2.5*	6.4	*2.0*
75	*3*	16.0	*4.9*	9.5	*2.9*	7.2	*2.2*
100	*4*	19.6	*6.0*	11.4	*3.5*	8.5	*2.6*
150	*6*	27.3	*8.3*	15.3	*4.7*	11.2	*3.4*
200	*8*	34.6	*10.5*	19.0	*5.8*	13.7	*4.2*
250	*10*			22.8	*6.9*	16.3	*5.0*
300	*12*			26.5	*8.1*	18.7	*5.7*
350	*14*			28.7	*8.7*	20.3	*6.2*
400	*16*			32.4	*9.9*	22.7	*6.9*
450	*18*			36.0	*11.0*	25.1	*7.7*
500	*20*			39.6	*12.1*	27.5	*8.4*
550	*22*			43.2	*13.2*	30.0	*9.1*
600	*24*			46.8	*14.3*	32.9	*10.0*

Nominal pipe size		Pipe heat loss @ 50 °C *(90 °F)* ∆T					
		Urethane insulation thickness					
mm	in	25 mm *(1 in)*		50 mm *(2 in)*		75 mm *(3 in)*	
		w/m	w/ft	w/m	w/ft	w/m	w/ft
13	½	7.4	2.3	5.2	1.6	4.3	1.3
19	¾	8.5	2.6	5.8	1.8	4.7	1.4
25	1	9.8	3.0	6.5	2.0	5.3	1.6
32	1¼	11.4	3.5	7.4	2.3	5.9	1.8
40	1½	12.5	3.8	8.0	2.4	6.3	1.9
50	2	14.8	4.5	9.1	2.8	7.2	2.2
64	2½	17.1	5.2	10.4	3.2	8.0	2.4
75	3	20.0	6.1	11.8	3.6	9.0	2.7
100	4	24.5	7.5	14.2	4.3	10.7	3.3
150	6	34.2	10.4	19.1	5.8	14.0	4.3
200	8	43.2	13.2	23.7	7.2	17.1	5.2
250	10			28.5	8.7	20.4	6.2
300	12			33.1	10.1	23.4	7.1
350	14			35.9	10.9	25.3	7.7
400	16			40.5	12.3	28.4	8.7
450	18			45.0	13.7	31.4	9.6
500	20			49.5	15.1	34.4	10.5
550	22			54.0	16.5	37.4	11.4
600	24			58.6	17.9	40.5	12.3

Nominal pipe size		Pipe heat loss @ 60 °C *(108 °F)* ∆T					
		Urethane insulation thickness					
mm	in	25 mm *(1 in)*		50 mm *(2 in)*		75 mm *(3 in)*	
		w/m	w/ft	w/m	w/ft	w/m	w/ft
13	½	8.9	2.7	6.2	1.9	5.2	1.6
19	¾	10.2	3.1	6.9	2.1	5.7	1.7
25	1	11.7	3.6	7.8	2.4	6.3	1.9
32	1¼	13.7	4.2	8.8	2.7	7.1	2.2
40	1½	15.1	4.6	9.6	2.9	7.6	2.3
50	2	17.7	5.4	11.0	3.4	8.6	2.6
64	2½	20.5	6.2	12.4	3.8	9.6	2.9
75	3	23.9	7.3	14.2	4.3	10.9	3.3
100	4	29.4	9.0	17.0	5.2	12.8	3.9
150	6	41.0	12.5	22.9	7.0	16.8	5.1
200	8	51.9	15.8	28.4	8.7	20.5	6.2
250	10			34.2	10.4	24.4	7.4
300	12			39.7	12.1	28.1	8.6
350	14			43.1	13.1	30.4	9.3
400	16			48.5	14.8	34.0	10.4
450	18			54.0	16.5	37.7	11.5
500	20			59.4	18.1	41.3	12.6
550	22			64.8	19.8	44.9	13.7
600	24			70.3	21.4	48.6	14.8

Insulation type	Insulation "K" factor	Correction factor
Urethane foam	0.17	1.00
Polyisocyanurate	0.18	1.06
Fiberglass	0.25	1.47
Mineral wool	0.30	1.76
Calcium silicate	0.37	2.18
Cellular glass	0.40	2.35

If the insulation used is not urethane foam, this pipe heat loss value has to be adjusted accordingly. Other types of insulation are not as efficient and require more power to achieve the same results. Refer to the above table to determine the correction factor corresponding to the insulation used. Multiply the heat loss obtained initially by that correction factor. Select a heating cable power output with at least that much power.

Caution : On plastic pipe, the heating cable power output is limited to 13 watts/meter *(4 watts/foot)* when using the standard 65 °C *(149 °F)* high limit cutout setting on the thermostat. If the power requirement of your piping system is greater than this limit of 13 watts/meter *(4 watts/foot)*, multiple runs of lower wattage heating cables totaling the power requirement must be used.

In certain cases, a 16 watts/meter (5 watts/foot) cable can be used if the high limit cutout setting on the thermostat is raised. Please contact a Urecon office for details.

THERMOCABLE® is provided with a metallic grounding braid conforming to the latest electrical codes, a fluoropolymer over jacket is also provided for the ease of pulling into conduits.

This heating cable can be used on any type of metal or plastic pipe. It is available in several watt densities and voltages as indicated in the following table (page 4).

All cables except C8-120-COJ have # 12 AWG bus wires, C8-120-COJ is intended for short runs (house services) and has #16 AWG bus wires. Be sure that you are using the proper termination or splice kit before commencing installation.

THERMOCABLE® and accessories are CSA approved for wet locations.

URECON THERMOCABLE® CONSTANT WATT TRACE CABLE FOR PRE-INSULATED PIPES

Part number	Color	Watts		Volts	Bus wire AWG	Maximum circuit length		Approximate zone length	
		per meter	per foot			meters	feet	cm	inches
120 VOLT THERMOCABLE®									
C7-120-COJ	Blue	7	2	120	12	140	450	92	36
C8-120-COJ	Red	8	2.4	120	16	80	275	92	36
C13-120-COJ	Yellow	13	4	120	12	125	400	61	24
240 VOLT THERMOCABLE®									
C10-240-COJ	Green	10	3	240	12	245	800	152	60
C13-240-COJ	Red	13	4	240	12	245	800	127	50
C16-240-COJ	Brown	16	5	240	12	215	700	107	42
C20-240-COJ	Orange	20	6	240	12	200	650	107	42
C26-240-COJ	White	26	8	240	12	175	570	92	36
575 VOLT THERMOCABLE®									
C13-575-COJ	Clear	13	4	575	12	425	1400	183	72
C20-575-COJ	Violet	20	6	575	12	365	1200	183	72

NOTE:

Alternate voltages: should THERMOCABLE® be connected to less (or more) than its rated voltage, the actual thermal output will be reduced or increased. Calculate the actual thermal output as follows:

$$\text{ACTUAL THERMAL OUTPUT} = \frac{\text{CONNECTED VOLTS}^2}{\text{RATED VOLTS}^2} \times \text{THERMOCABLE® RATED THERMAL OUTPUT}$$

ACCESSORIES FOR THERMOCABLE®:

A1333-COJ	Power and end termination kit for THERMOCABLE®.
S1334-COJ	In-line splice kit for THERMOCABLE®.
E1336-COJ	Three-pack end termination kit for all THERMOCABLE®.
PS1337-12-COJ	Splice kit for #12 AWG bus wires THERMOCABLE® to power leads.
A-300	Aluminum tape roll 5 cm *(2 in)* wide x 45 m *(150 ft)* long.

Note: Only Urecon electrical accessories such as power terminations, end terminations and splices are certified for use with THERMOCABLE ®.

INSTALLATION OF THERMOCABLE® IN A TRACE CONDUIT ON URECON PRE-INSULATED PIPE TO PREVENT FREEZING:

When the pre-insulated pipe has been joined, the urethane block should be removed (bell and spigot systems) or the cutback area at each connection should be left exposed to assist in the installation of the heat tracing cable.

If the pipe is to be buried and the trench is dry, the pipe can be laid in the trench. The joint area should be accessible from underneath to permit the later installation of the heat shrink wrap. If the trench is wet then the pipe should be left in a dry area, on the side of the trench until the cable has been installed (polyethylene pipe with butt fused joints only).

Before inserting the cable the following items should be considered:

Read the Thermocable® as well as the Power Feed Kit (if applicable) installation instructions thoroughly before commencing the installation.

The positions of the power points should be located and marked along the route. It is usually most convenient to position power points at pipe connections. This will eliminate the need to penetrate the insulation somewhere between pipe joints.

The proper voltage and correct thermostat(s) should be available for each power point. It is useful to provide a numbering system for the power points and to assign these numbers to the appropriate electrical components. Follow the engineer's tracing layout drawing if one exists. The correct heat tracing cable must be selected for each pipe and power point. Extra care must be taken to ensure that the heating cables are installed correctly, and that the correct wattage and voltage cable has been selected for installation. Caution, verify the identifying print on the cable before installing it into the conduit. Never connect the wrong voltage to the cable.

Ensure that the final position of the conduit after the pipe has been installed, is clearly identified. Usually the conduit is positioned on the top of the pipe if it will normally be full of liquid. If the pipe is normally only partially full, the conduit should be installed in the lower quadrant. If the pipe is to be moved after installation of the cable and after covering the joint areas, it will be necessary to mark the position of the conduit on the insulation jacket. When the pipe is in its final position this mark should be in the correct position, either on top, or in the lower quadrant depending on the pipe service.

The conduit should be inspected to ensure that it is free of debris, obstructions and standing water.

The following steps describe the preferred method for inserting the heat tracing cable, at least two workers are required.

1. Pull a few feet of cable from the reel and install a heat shrink end cap (for moisture sealing as per the instructions on page 7). Note: On small heat trace channel, the heat shrink tube has to be installed after the cable has been pulled (step 5).

2. Push the end cap into the conduit at the power point position and continue pushing the cable until it emerges at the first cutback area. Pay off the cable from the reel so that it does not twist or kink. This can be simplified by mounting the cable reel on a pair of wooden "horses". While the cable is paying off the reel examine it for cuts, "bruises" or any other defects. Defects should be removed and the cables spliced using a THERMOCABLE® splice kit. If the cable is difficult to push, retract it, cup some powder lubricant (talc) in one hand and apply it to the cable while pushing. If this does not solve the problem insert a "fish tape" through the conduit from the opposite end and attach it to the cable. Use a combined push and pull to insert the cable. If this is not successful it will be necessary to cut open the pipe insulation and remove the obstruction.

3. As the end of the cable emerges at the first cut-back area, the second worker gently pulls the cable forward.

4. Insert the end cap into the conduit on the next length of pipe and continue the insertion method. In this manner the cable can be "threaded" from one length to the next until the heating circuit has been completely installed.

5. Verify that the end cap has not been damaged during the threading operation, if it has, cut it off and install a new one. Be sure that the bus wires are NOT TOUCHING. If the end cap is in good condition, it is now time to install the heat shrink tube if this was not done in step 1.

6. It is more convenient to terminate the heat tracing cable circuit at a pipe connection. It allows for easier access in the event that maintenance is required. The section of cable between the last indentation and the end cap is non-heating. The "cold" end on the next cable circuit can be over-lapped at this position to ensure continuous heating. If the cable circuit is to be terminated within a pipe length between two connections ensure that the "cold end" on the cable is as short as possible. The position of the end of each circuit should be noted on the "as-built" drawings and with a solid stake driven into the ground beside the pipe.

7. The next cable circuit in the same direction down the pipeline should be installed from the next power point position in the same manner as previously described. When it is inserted into the final length of pipe its length should be adjusted by moving up more "slack" and by cutting the cable and repositioning the end cap.

8. After the pipe and cable have been subjected to the specified acceptance tests and recorded in the commissioning log, the insulation at the pipe connections can be completed and heat shrink sleeves installed. Power feed kits must be installed at this time according to their specific installation instructions.

9. The commissioning log should become part of the "as built" records after witnessing by the owner.

10. Install the standard insulation half shells tightly over the cutback area, line up the groove in the halfshell over the conduit ends and cable (or insert the urethane block on bell and spigot systems).

11. Wrap the heat shrink sleeve around the half shells (or urethane block) and shrink into place. If the pipe is metal jacketed, cover the halfshell with the pre-rolled metal cover supplied, caulking all seams against water ingress.

PREVENT OVERHEATING AND POSSIBLE PLASTIC PIPE DAMAGE BY:

- Installing the correct wattage cable on the proper pipe (cables are color coded for easy identification).
- Connecting the correct voltage to the cable to produce the desired wattage.
- Having no heating cable installed closer than 13 mm *(½ in)* of any exposed combustible surface.
- Always use a thermostat to control the cable.
- Always use a dual sensing electronic thermostat with high temperature cutout on plastic pipes (high temperature cutout setting should be verified with Urecon).
- Installing the thermostat as per the installation instructions taking special care to ensure that the high temperature sensor is securely attached to an **ACTIVE** zone of the heating cable, and the controlling sensor is securely attached to the pipe 180° away from the cable **UNDER THE INSULATION.**
- Not energizing before the installation is complete.
- Installing so the heating cable is not crossed, grouped or touching itself.
- The heating cable is not applied to various diameters of pipe (or a network) and controlled from one controller (because of varying heat loss, each pipe diameter normally requires a separately controlled tracer).
- Ensuring that the heating cable is not trapped by insulation, especially where half shells are applied at pipe joints or at fittings, particular caution must be exercised when Portafoam® field sprayed foam is applied.
- Never connect power while the heating cable is on the reel, or in the shipping container.

AVOID DAMAGE TO HEATING CABLE AND PREVENT POSSIBLE FREEZING BY:

- Handling with normal care, when pulling in long circuits avoid walking or driving over cable during and after installation.
- Never use a mechanical pulling device (winch, etc.).
- Not bending to a diameter of less than 50 mm *(2 in)*.
- Not installing when the ambient temperature is below -40 °C *(-40 °F)*.
- If connected to generated power, avoid high voltage spikes (especially on 575 V circuits).
- Never use THERMOCABLE® for internal tracing (inside the pipe).
- Not exceeding the maximum circuit length as indicated in the following table.

BEFORE YOU START:

Parallel heating sets are field assembled. Be sure you have the proper termination, splice or power feed kits required for the installation. Be sure you have the following tools required and some aluminum foil tape to hold the sensors in place:

- Sharp knife or wire stripping tool.
- Side cutters.
- 25mm *(1 in)* adjustable wrench.
- Propane torch such as Thomas and Betts SIT-1 or equivalent heat source.
- Thomas and Betts crimping tool.

INSTALLING THE HEATING CABLE:

It is important to understand how the cable works and to locate the indents (nodes) where the nichrome heating element alternately makes contact with the bus wires. If not cut at the correct location, a 'dead zone' may occur causing small diameter pipes to freeze, or for the controller high temperature limit sensor to be installed on a 'dead zone' possibly causing damage to the pipe, if plastic. Follow the 'cutting' instructions carefully.

INSTALLATION OF A1333-COJ TERMINATION KIT.

Power and end termination kit contains the following components:

- One strain relief connector including two form fitting bushings of different sizes.
- One 13 mm *(½ in)* locknut.
- One 90 cm *(36 in)* roll of Teflon® tape.
- One blue insulated butt splice connector for #14-16 AWG wires.
- 30 cm *(12 in)* of #14 AWG green grounding wire.
- One yellow insulated butt splice connector for #12 AWG wire.
- 30 cm *(12 in)* of #12 AWG green grounding wire.
- One heat shrink end cap.
- One heat shrink tube.

INSTALLATION OF END TERMINATION KIT # E1336-COJ (INCLUDED IN TERMINATION KIT # A1333-COJ).

Remote end termination kit contains the following components:

- Three heat shrink end caps.
- Three heat shrink tubes.
- One 90 cm *(36 in)* roll of Teflon® tape.

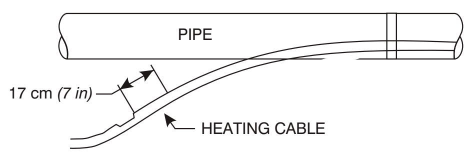
TERMINATING THE THERMOCABLE®

IMPORTANT

THERMOCABLE® IS A PARALLEL HEAT TRACING SYSTEM – DO NOT CONNECT OR TIE COPPER BUS WIRES TOGETHER

POWER TERMINATION

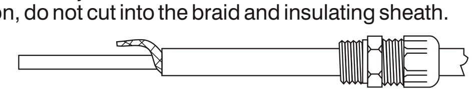
1. At the supply end allow sufficient cable to reach the junction box, plus approximately 20 cm *(8 in)* for connection tails. Cut approximately 17 cm *(7 in)* from indentation.



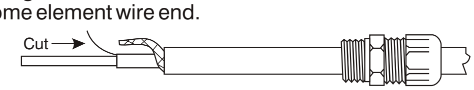
2. Choose the appropriate form fitting bushing to suit the THERMOCABLE® size. Use the bushing with the small opening for C8-120-COJ and the one with the larger opening for all the other THERMOCABLE®. Insert the bushing into the connector body, put the compression ring over the bushing and screw on the nut.

3. Slide the strain relief connector over the cable.

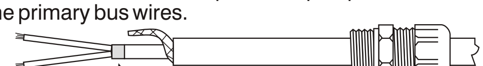
4. Remove 20 cm *(8 in)* of overjacket by scoring around and down the middle of the jacket. Unravel the braid and twist into a pigtail. Caution, do not cut into the braid and insulating sheath.



5. Remove the insulating sheath for approximately 15 cm *(6 in)*. On cables with a fiberglass rope, remove the rope by unwinding it all the way against the insulation and cut. Remove the exposed nichrome heating wire back to the center layer of insulation and cut. Take care not to cut through the insulation on the bus wires. Apply Teflon® tape over no more than 10 mm *(3/8 in)* on each of the insulating sheath and inner insulation to insulate the bare nichrome element wire end.

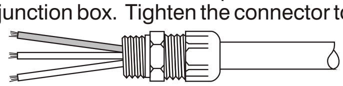


6. Remove the inner insulation jacket by sliding the knife blade between the two bus wires up to the taped position. Do not nick or cut the primary bus wires.



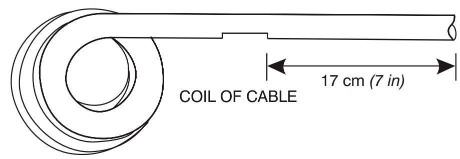
7. On C8-120-COJ THERMOCABLE®, using the blue butt splice, connect the #14 AWG green wire supplied to the pigtail. On the other THERMOCABLE®, use the yellow butt splice to connect the #12 AWG green wire supplied to the pigtail. Remove 7 mm *(¼ in)* of insulation from each wire end. Use an approved tool to crimp the butt splice connector.

8. Slide the strain relief connector into position and connect into a thermostat or junction box. Tighten the connector to compress the bushing.

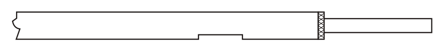


END TERMINATION

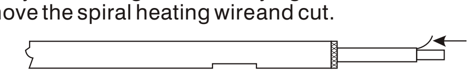
1. Cut cable approximately 17 cm *(7 in)* from indentation, as shown.



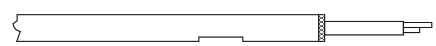
2. Remove 10 cm *(4 in)* of overjacket by scoring around and down the middle of the jacket. Unravel the braid and cut it close to the overjacket. Caution, do not cut into the insulating sheath.



3. Cut back the layer of insulating sheath approximately 13 mm *(1/2 in)*. On cables with a fiberglass rope, remove the rope by unwinding it all the way against the insulation and cut. Remove the spiral heating wire and cut.

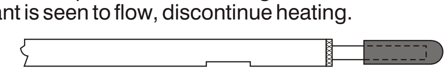


4. Cut back the layer of inner insulation jacket and remove to expose the two insulated bus wires. Cut 7 mm *(1/4 in)* from the bus wire on the indentation side.

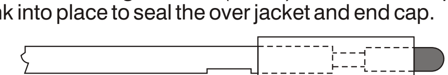


5. Wrap the Teflon® tape around each conductor and over a maximum of 10 mm *(3/8 in)* of the insulating sheath taking care to cover the ends of the conductors and overlapping the tape to a minimum of half it's width. DO NOT CONNECT THE TWO BUS WIRES TOGETHER, THIS WILL CAUSE A SHORT CIRCUIT.

6. Slide the expanded heat shrinkable cap over the end of the cable. Shrink the cap by applying heat from the closed end towards the open end. Cap starts to shrink at 135 °C (275 °F), as heat is applied move the heat source around the cap to ensure even shrinkage. When the cap has shrunk enough to conform to the cable, and sealant is seen to flow, discontinue heating.



7. Slide the heat shrink over the end cap, grounding braid and overjacket, leaving 12 mm *(1/2 in)* of the end cap protruding. Shrink into place to seal the over jacket and end cap.



INSTALLATION OF # S1334-COJ SPLICE KIT.

Splice kit contain the following components :

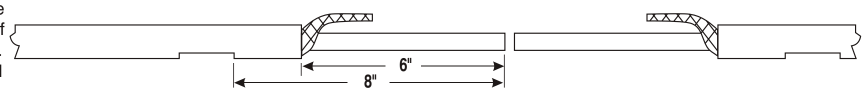
- One 90 cm *(36 in)* roll of Teflon® tape.
- Four blue insulated butt splice connectors for #14-16 AWG wires.
- 30 cm *(12 in)* of #14 AWG green grounding wire.
- Four yellow insulated butt splice connectors for #12 AWG wire.
- 30 cm *(12 in)* of #12 AWG green grounding wire.
- One short heat shrink tube 25 cm *(10 in)* long.
- One long heat shrink tube 30 cm *(12 in)* long.

SPLICING PROCEDURE FOR THERMOCABLE®:

Locate the nichrome heating wire connection nodes, be sure to cut the strip at the correct location as per the following diagram to avoid possible 'dead zones'.

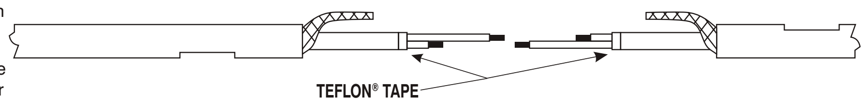
SPLICING PROCEDURE:

1. Cut cable 20 cm *(8 in)* from the heater zone indent and remove 15 cm *(6 in)* of overjacket by scoring around and down the middle of the jacket. Caution, do not cut into the braid and insulating sheath. Unravel the braid and twist into a pigtail. Repeat the same for the end of the other cable to be spliced.



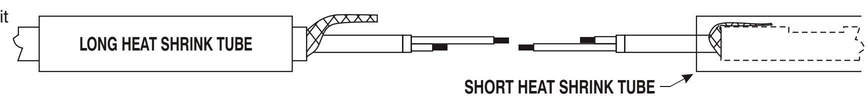
2. Remove 7 cm *(3 in)* of insulating sheath. Prepare cable ends by removing the fiberglass rope (on cables having one) and the exposed nichrome heating wire back to the center insulating sheath and cut. Take care not to cut through the insulation on the bus wires.

3. Cut one alternate bus wire on each cable to 3 cm *(1 in)*. Remove 7 mm *(¼ in)* of insulation from each wire end. Apply Teflon® tape over no more than 10 mm *(3/8 in)* on each of the insulating sheath and inner insulation to insulate the bare nichrome element wire end.

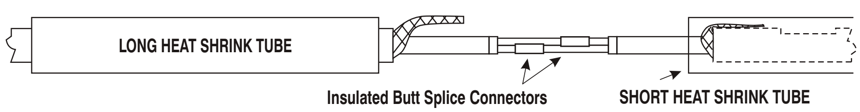


4. Slide the long heat shrink tube over the end of one cable and push it back 30 cm *(12 in)* out of the way.

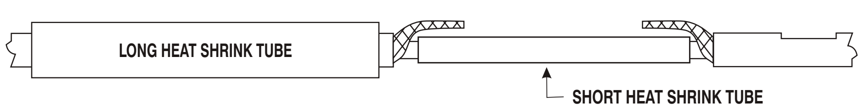
5. Slide the short/smaller diameter heat shrink tube over the bus wires and braid of the other cable end.



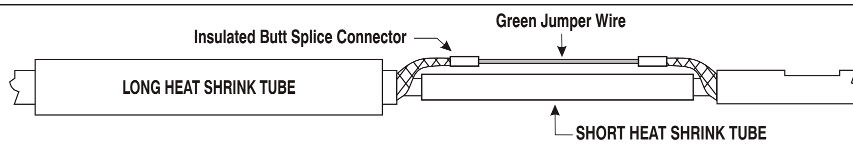
6. Position the insulated butt splice connectors over the copper bus wires and crimp into place. Use an approved installation tool for the installation of the crimp connectors. **Note : Use the blue butt splice connectors only on C8-120-COJ THERMOCABLE® and use the yellow butt splice connectors on all other THERMOCABLE® having #12 AWG bus wires.**



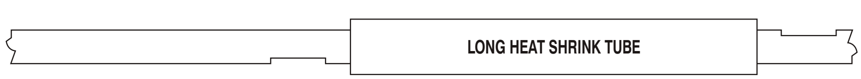
7. Slide the short heat shrink tube up and centered over the butt splices. Shrink into place.



8. Join the two pigtailed braids directly, or with the green jumper wire using the butt splice connectors. Here again the blue butt splices and #14 AWG wire are used only on C8-120-COJ and the yellow butt splices and #12 AWG wire are used on all other THERMOCABLE® having #12 AWG bus wires.



9. Slide the long heat shrink tube over the entire spliced assembly , center it and shrink into position.



10. Never exceed the maximum circuit length permitted and always control the cable with a thermostat. Use a thermostat with a high temperature limit on plastic pipes.

INSTALLATION OF # PS1337-12-COJ POWER FEED SPLICE KIT (FOR ALL CABLES EXCEPT C8-120-COJ)

Power feed splice kit contain the following components :

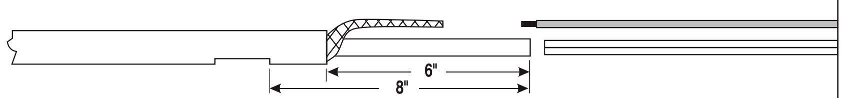
- One 90 cm *(36 in)* roll of Teflon® tape.
- Three yellow insulated butt splice connectors for #12 AWG wire.
- One short heat shrink tube 25 cm *(10 in)* long.
- One long heat shrink tube 30 cm *(12 in)* long.
- One heat shrink end cap.
- One heat shrink tube 15 cm *(6 in)* long.

PROCEDURE TO SPLICE THERMOCABLE® TO POWER WIRING:

Locate the nichrome heating wire connection node, be sure to cut the heating cable at the correct location as per the following diagram to avoid unnecessary "dead zone". Use approved # 12 AWG 600 V insulated wiring such as TEW, RW90 or RWU90 of the appropriate length to splice to the THERMOCABLE®.

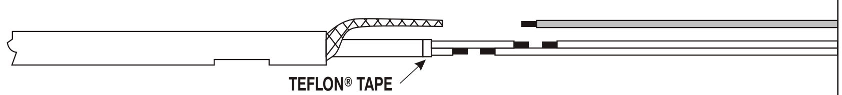
SPLICING PROCEDURE :

(1) Cut cable 20 cm *(8 in)* from the heater zone indent and remove 15 cm *(6 in)* of overjacket by scoring around and down the middle of the jacket. Caution, do not cut into the braid and insulating sheath. Unravel the braid and twist into a 7 cm *(3 in)* long pigtail.



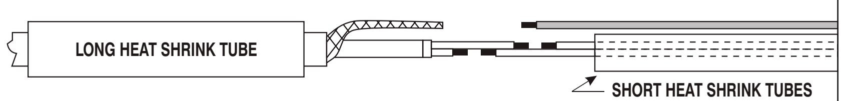
(2) Remove 7 cm *(3 in)* of insulating sheath. Prepare cable ends by removing the fiberglass rope (on cables having one) and the exposed nichrome heating wire back to the center insulating sheath and cut. Take care not to cut through the insulation on the bus wires.

(3) Cut one bus wire to 3 cm *(1 in)*. Remove 7 mm *(¼ in)* of insulation from each bus wire end. Apply Teflon® tape over no more than 10 mm *(3/8 in)* on each of the insulating sheath and inner insulation to insulate the bare nichrome element wire end.

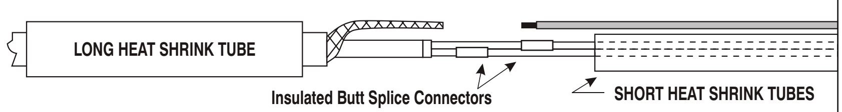


(4) Slide the long heat shrink tube over the end of the heating cable and push it back 30 cm *(12 in)* out of the way.

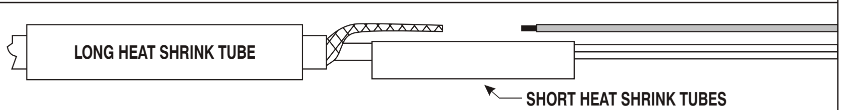
(5) Slide the short/smaller diameter heat shrink tube over the two power wires and push it back out of the way.



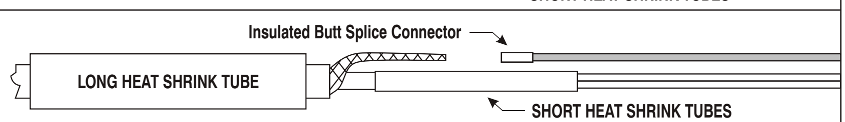
(6) Position the yellow insulated butt splice connectors over the heating cable bus wires and #12 AWG power wires and crimp into place. Use an approved installation tool for the installation of the crimp connectors.



(7) Slide the short heat shrink tube over the splice and against the pigtailed braid. Shrink into place.

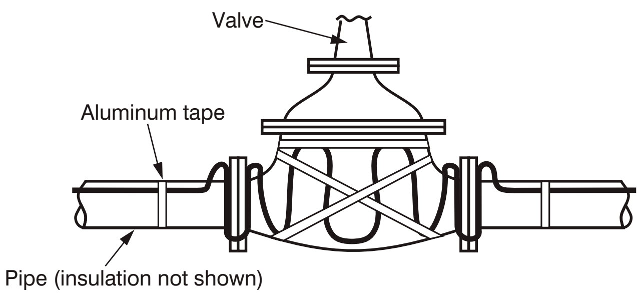


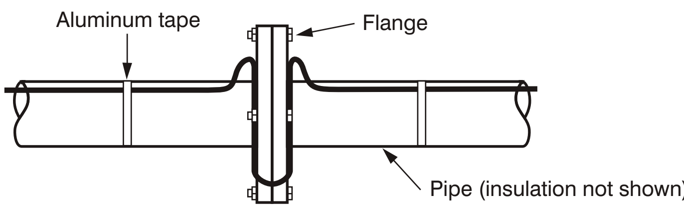
(8) Splice the pigtailed braid to the #12 AWG grounding wire using a yellow insulated butt splice connector.



(9) Slide the long heat shrink tube over the entire spliced assembly , center it and shrink into position.

(10) Never exceed the maximum circuit length permitted and always control the cable with a thermostat. Use a thermostat with a high temperature limit on plastic pipes.





EXTRA CABLE ALLOWANCE

Nominal pipe size		Flange (pair)		Gate valve	
mm	*(in)*	cm	*(in)*	cm	*(in)*
13	*½*	23	*9*	30	*12*
19	*¾*	23	*9*	30	*12*
25	*1*	30	*12*	30	*12*
32	*1¼*	30	*12*	38	*15*
40	*1½*	38	*15*	46	*18*
50	*2*	38	*15*	61	*24*
64	*2½*	46	*18*	61	*24*
75	*3*	46	*18*	76	*30*
100	*4*	61	*24*	91	*36*
150	*6*	61	*24*	107	*42*
200	*8*	76	*30*	122	*48*
250	*10*	91	*36*	137	*54*
300	*12*	107	*42*	152	*60*
350	*14*	122	*48*	168	*66*
400	*16*	137	*54*	183	*72*
450	*18*	168	*66*	213	*84*
500	*20*	183	*72*	229	*90*
550	*22*	198	*78*	229	*90*
600	*24*	213	*84*	244	*96*

IMPORTANT:

- Prior and after installation, check the heating cable with a 500 volt (minimum) insulation tester (megger) between each conductor and ground. Values shall not be less than one megohm, in accordance with Table 24 of the Canadian Electrical Code, Part 1.
- Using a multimeter, measure the cable resistance and record in the commissioning log for future reference.
- Metal structures or materials used for the support of, or on which the heating cable is installed, shall be grounded in accordance with section10 of the Canadian Electrical Code, Rule 62-310(3). The grounding braid must also be electrically grounded at the power source.
- Never use THERMOCABLE® for internal tracing (inside the pipe).
- Always use a thermostat with high temperature limit (for plastic pipe) and make sure the sensor(s) is (are) properly located on the pipe, under the insulation.
- The heating cable must not become embedded in the insulation.
- Energize heating circuit with proper voltage.

URECON
PRE-INSULATED PIPE

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RECON
PRE-INSULATED PIPE SYSTEM

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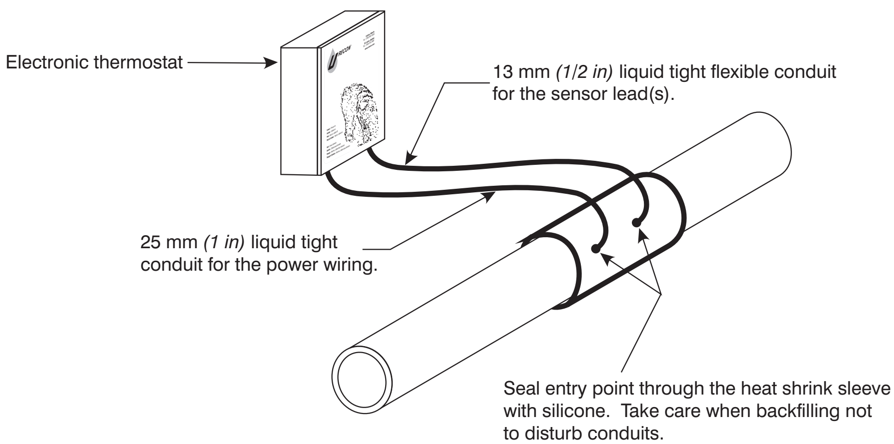
INSTALLATION INSTRUCTION #3E

PFK-1 (Power feed kit)

One PFK-1 power feed kit contains all the necessary electrical components to connect two THERMOCABLE® to an electronic thermostat of the UTC series. The thermostat may be located up to 6 m *(20 ft)* away from the pipe (PFK's for longer distances are available by special order).



Each kit contains:

ITEM	QUANTITY	DESCRIPTION
		Components for the installation and connection of the heating cable
1	2 x 7 m	# 12 AWG, three-conductor power wiring.
2	6 m	25 mm *(1 in)* liquid tight flexible conduit (assembled to items 3 and 4).
3	2	Connector to join the 25 mm *(1 in)* flexible conduit to the thermostat and to the plastic shoe (assembled to items 2 and 4).
4	1	Plastic shoe (assembled to items 3 and 4).
5	1	Sealing ring for item 3 (at the thermostat).

6	2	PS1337-12-COJ splice kit to splice # 12 AWG bus wire THERMOCABLE® to the power wiring.

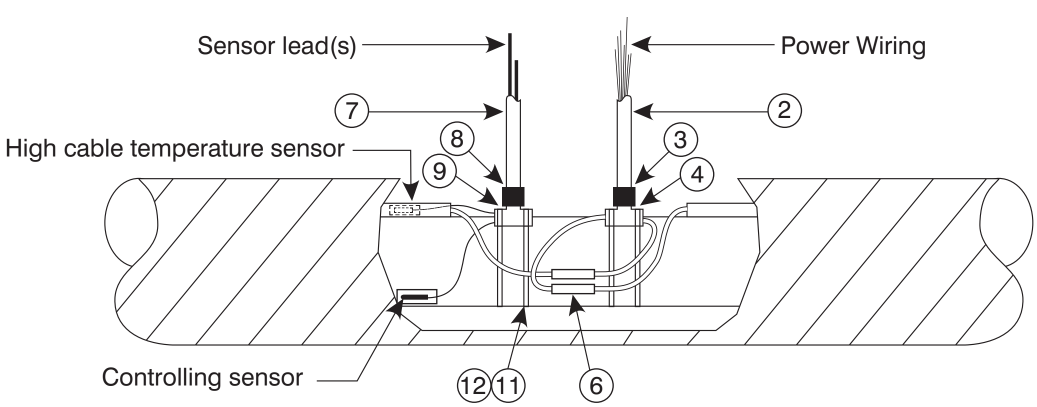
Components for the installation of the sensor(s)

7	6 m	13 mm *(½ in)* liquid tight flexible conduit (assembled to items 8 and 9).
8	2	Connector to join the 13 mm *(½ in)* flexible conduit to the thermostat and to the plastic shoe (assembled to items 7 and 9).
9	1	Plastic shoe (assembled to items 7 and 8).
10	1	Sealing ring for item 8 (at the thermostat).

Miscellaneous components

11	4	13 mm *(½ in)* wide x 2 m *(6 ft 6 in)* long stainless steel strap, to fasten the plastic shoes to the pipe.
12	4	Band-it clip to secure strap.
13	1	Silicone caulking, to seal conduit entry points through the heat shrink sleeve.
14	1	Installation instruction # 24 for heat shrink wrap.

NOTE: Item numbers are keyed to those on the diagram.



Assembly instruction:

1) Install the thermostat in an appropriate location within 6 m *(20 ft)* of the pipeline.

2) Normally the power feed kit is attached to the pipe at a pipe joint, where the insulation is removed. If it is desired to make the connection at a point other than the pipe joint, you will have to remove 450 mm *(18 in)* of jacket and insulation exposing the pipe and trace conduit. Cut and remove the jacket and insulation carefully so as not to nick or damage the pipe. Ensure that the insulation faces on the pipe are square to the axis of the pipe.

3) Cut a 300 mm *(12 in)* length of trace conduit without damaging the hidden THERMOCABLE® if it has already been installed.

4) Cut the 13 mm *(½ in)* and 25 mm *(1 in)* liquid tight flexible conduits to the appropriate length.

5) Cut two appropriate sized holes in the center of the heat shrink sleeve to permit a snug passage ot the two conduits. Remove the connectors and the shoes from the conduits. Pull the conduits through the holes in the heat shrink sleeve ensuring that the mastic adhesive side of the sleeve is facing the pipe.

6) Reinstall the connectors and plastic pipe shoes.

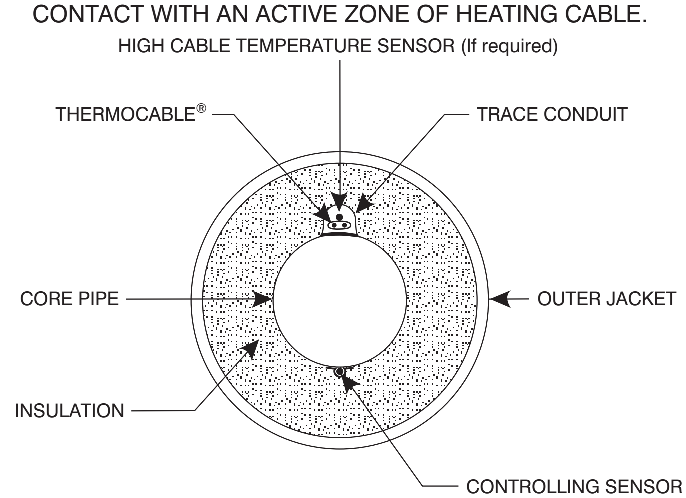
7) Using the connectors provided (ensuring that the gasket is on the exterior side), connect the liquid tight flexible conduits to the bottom of the thermostat enclosure.

8) When more than one temperature sensor is used, they have to be identified according to their use i.e. : controlling sensor or high cable temperature sensor (on plastic pipe) in order to connect them to the proper terminals. As a general rule, when multiple sensors are required, they can be supplied with two different color lead wires.

9) Pull the sensor wire(s) through the 13 mm *(½ in)* conduit. Connect the sensor(s) to the proper terminals in the thermostat. Install the sensor(s) in their proper location with aluminum tape; the high cable temperature sensor is to be taped to an active zone of the THERMOCABLE® (not the cold lead) within the trace channel, the controlling sensor is to be taped directly to the pipe 180° away from the heating cable. If the thermostat is controlling a pipe which enters a heated building, the sensors must be located at least 3 m *(10 ft)* away from the outside wall to avoid inaccurate temperature sensing. **The accurate identification and positioning of the sensors is absolutely essential to the efficient and safe operation of the system.**

IMPORTANT

PLACE THE HIGH CABLE TEMPERATURE SENSOR IN CONTACT WITH AN ACTIVE ZONE OF HEATING CABLE.



IMPORTANT

TAPE THE CONTROLLING SENSOR DIRECTLY TO THE PIPE, 180° FROM THE HEATING CABLE, UNDER THE INSULATION.

10) Pull the power wiring through the 25 mm *(1 in)* flexible conduit. Splice the power wiring to the heating cable following the THERMOCABLE® installation instructions for the power splice. Connect to the appropriate terminals in the thermostat in accordance with the installation instructions supplied. **NOTE: In severe conditions, it is preferable to bring the heating cable(s) through the conduit directly to the thermostat without any splice and power wiring. In the case of heating cables with a power output of 13 watts/meter *(4 watts/foot)* or greater, a dedicated flexible conduit should be used for each cable.**

11) Attach the two plastic shoes to the pipe in the same longitudinal axis and secure with the Band-it clamps, tighten with a screwdriver. Ensure that the pipe is continuously heat traced by overlapping the power wiring and entering the shoe on the opposite side to the heat tracing circuit.

12) Trim the insulation half shells to ensure a tight fit in the insulation void on the pipe. Notch out two holes to permit passage of the two flexible liquid tight conduits.

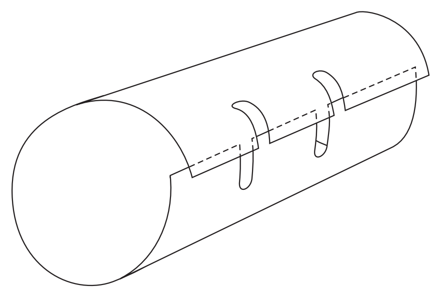
13) Before installing the insulation, test the heat tracing circuit(s) to ensure that the thermostat and THERMOCABLE® are operating properly.

14) Apply silicone caulking liberally around the neck of the plastic shoes and install the half shells.

15) Pull down the heat shrink sleeve and install as per the installation instruction supplied.

16) The flexible conduit should be positioned and protected so that it does not become damaged by passing traffic. If the pipe is to be buried, the conduit should be well protected during the backfilling operation so that it is not torn away from the pipe.

17) If the piping installation is metal jacketed, a similar metal jacket should now be installed on the joint, by cutting notches in the overlapping edges as shown in the following illustration. The final overlap should face down. Caulking should be used to seal all cracks.



Rolled metal cover, field cut to accomodate two PFK conduits.

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INSTALLATION INSTRUCTION #44E

ELECTRONIC THERMOSTAT

Model No. UTC-2030-(program code #)
and
Model No. UTC-2230-(program code #)
(with 2-pole circuit breaker)
and
Contactor version

These electronic thermostats are designed to control one or more heating cables having a total current draw that does not exceed 30 A for the relay version and up to 60 A for the contactor version. They can be fitted with up to three temperature sensors as required by the application. Because separate temperature sensors are used, they may be installed on the pipe during the initial installation phase while the controller itself may only be installed at a later date.

Features include:

- Universal power supply allowing operation at 120 to 240 Vac without wiring modifications.
- Internal ground fault detection circuitry eliminating the need for an external ground fault device. Alarm only or alarm and trip is activated when ground fault condition is present.
- Three temperature sensor inputs: TS1 for pipe temperature control, TS2 (when enabled) for pipe temperature control at another location on the piping system and TS3 (when enabled) to serve as a high temperature limit for plastic piping protection. An alarm is activated when an enabled “open” or “shorted” sensor is detected.
- Low temperature alarm on both controlling sensors TS1 and TS2. Alarm level is factory set at a dedicated level for each sensor.
- On-off control with a 1°C *(1.8 °F)* temperature differential for accurate control of piping systems. This close tolerance control can save thousands of kilowatt-hours of power consumption and is ideal to control electric tracing systems in locations where power is costly.
- Override input (factory programmable): timed between 1-48 hours or non-timed.
- Auto-cycle function (when enabled) momentarily turns on heating cable at 24 hours interval to monitor ground fault condition of the load.
- One three-color LED indicator lamp mounted on the door of the controller operates as follows:
  - Green: When illuminated, the power supply to the controller is ‘on’ and the pipe temperature at the sensor is above the setpoint. When extinguished, the power supply is ‘off’.
  - Amber: When illuminated, the temperature controller is calling for heat.
  - Red: When illuminated, this indicates that one of the alarms has been triggered. Controller is not calling for heat.
  - Amber and Red (alternating): This indicates that one of the alarms has been triggered. Controller is calling for heat.
- Non-volatile memory retains all programmed parameters in the event of a power outage.

Conducted and radiated emissions FCC/DOC statement of compliance

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This Class B digital apparatus complies with Canadian ICES-003.

Installation:

- Be sure that the personnel involved in the installation and servicing is qualified and familiar with electrical equipment, their ratings and applicable codes.
- The wide ambient operating temperature range of the temperature controller allows installation in any convenient location. Considerations should include exposure to weather elements and accessibility for maintenance and testing.
- Mounting hole positions are shown on the drawings in annexes A, B and C.
- Backplate should be removed from the enclosure before any holes are drilled or cut to prevent damage due to flying debris.
- Conduit/cable entries should be made on the bottom of the enclosure to reduce the possibility of water entry. Avoid having holes drilled on the sides adjacent to the electronic components.
- The user may choose to drill 3 mm *(1/8 in)* drain holes on the bottom of the enclosure on both the left and right sides (note that drilling holes in the enclosure compromises the Nema 4 rating).
- Use connector bushings suitable for the enclosure type and install such that the completed installation remains waterproof.

Wiring:

- Always verify wiring connections before applying power to the controller. To avoid injury or equipment damage, do not install or remove wiring while controller is powered.
- To minimize chances of loose connections, lever-operated spring-loaded terminals are used for signal wiring.
- Use shielded, twisted, three-conductor wire for the extension of the RTD leads.
- Use shielded, twisted, two-conductor wire for the extension of the thermistor leads.
- Shields on the temperature sensor wiring should be grounded only at the controller end using the appropriate terminals provided (# 4, 8 and 15).

  Note: Some sensor constructions may have continuity between the drain wire and the metal housing at the tip; in this case, the drain wire should not be connected to ground. Drain wire continuity should be verified with a digital multi-meter.
- To minimize the risk of damages to the controller due to a cable fault, the integrity of the heating cable should be verified by:
  - ✤ Performing a high voltage insulation test.
  - ✤ Measuring the load resistance with an ohmmeter.
  - ✤ In both cases, the results should be recorded for future reference.

Sensor type:

This temperature controller can be factory programmed to operate with one of two different types of temperature sensor. By default, the controller is programmed for 100 ohms @ 0 °C *(32 °F)* Platinum RTD sensor(s). It can also be programmed for 2 252 ohms @ 25 °C *(77 °F)* thermistor(s) on special request. The last two digits of the controller's catalog number indicate the programming code. Control program codes from 01 to 49 are for use with RTDs and codes from 51 to 99 are for thermistors. Ensure that the proper type of temperature sensor is used with the controller. Program codes are listed in annex E and is identified by a label on the electronics.

Sensor location:

- Install the temperature sensor(s) with aluminum foil tape to enhance heat transfer.
- The controlling sensor is to be taped directly to the pipe wall, 180° away from the heating cable.
- The controlling sensor(s) TS1 and TS2 (when feature enabled) should be located at the expected coldest point(s) of the piping system.
- If controlling a pipe entering a heated building, the sensor(s) must be located at least 3 m *(10 ft)* away from the outside wall to avoid inaccurate temperature sensing.
- The high cable temperature sensor (TS3) is to be taped to an active heating zone of the heating cable (not to the cold lead), within the heat trace channel.

Note: The accurate identification and positioning of the sensor(s) are essential for an efficient and safe operation of the system.

Troubleshooting :

Temperature sensor failure :

This alarm will indicate that one of the sensors is not operating properly. The temperature sensor may fail due to an "open" or "shorted" condition. Ensure that you are using the correct type of sensor i.e. : 3-wire RTD or 2-wire thermistor (refer to program code table in annex E), and that it is wired correctly.

Probable causes of alarm :

- Incorrect or damaged field wiring, "open" leads or excess resistance due to broken or damaged wires or loose connections.
- Damaged or inoperative temperature sensor.
- Wrong type of sensor used.

When using RTDs :

- Ensure that the RTD is a 3-wire 100 ohms @ 0 °C *(32 °F)* Platinum type.
- Disconnect the RTD wiring from the input terminals.
- Measure the resistance between the source (white) and sense (black) leads at the controller. It should not exceed 40 ohms. Excessive lead resistance will cause a sensor failure alarm and must be corrected. Look for loose terminals, excessive lead length or insufficient wire gauge and correct as necessary.
- Measure the resistance between the source (white) or sense (black) lead and the common (red) lead of the RTD at the controller. It should be between 84 and 178 ohms depending on the probe temperature and lead resistance. Refer to the resistance table in annex F.
- Verify that the RTD is wired correctly. Refer to the wiring diagram in annex D.
- Ensure that the RTD extension wire (when used) is grounded at one end only, normally at the controller terminal.

When using thermistors :

- Ensure that the thermistor is a 2-wire 2 252 ohms @ 25 °C *(77 °F)* NTC thermistor.
- Disconnect the thermistor wiring from the input terminals.
- Measure the resistance between both leads of the thermistor at the controller. It should be between 75,593 and 152 ohms depending on the probe temperature and lead resistance. Refer to the resistance table in annex F.
- Verify that the thermistor is wired correctly. Refer to the wiring diagram in annex D.
- Ensure that the thermistor extension wire (when used) is grounded at one end only, normally at the controller terminal.

Low temperature alarm (when enabled) :

This alarm will appear when the temperature at the sensor decreases below the low temperature setpoint.

Probable causes of alarm :

- Alarm setpoint too close to maintain temperature setpoint.
- Flow of cold liquid.
- Empty pipe venting out in the atmosphere.
- Damaged or missing thermal insulation.
- Heating cable not sized properly for the application.
- Damaged heating cable.
- Recent power outage allowing pipe to cool under setpoint.

Seemingly incorrect temperature :

Disconnect the temperature sensor from the input terminals at the controller.

When using RTDs :

- To evaluate the temperature at an RTD, measure the resistance from source or sense lead wire to the common lead wire and substract the resistance measured between source and sense lead wires. The resulting value can be cross-referenced to the table in annex F.

When using thermistors :

- To evaluate the temperature at a thermistor, measure the resistance between both leads. The resulting value can be cross-referenced to the table in annex F.

In both cases, you can usually determine if the temperature obtained from the list is representative of the conditions on the pipe. If you have more than one sensor installed, you can compare the readings. Note that when comparing values of a sensor on the pipe with a sensor on the heating cable, you should ensure that the heating cable has been de-energized for a substantial period of time to allow for both sensors to be in similar temperature environments.

GFI alarm :

This alarm is caused by a ground fault leakage current in excess of the setting.

Probable causes of alarm :

- Alarm level set too close to normal leakage current.
- Damaged cable insulation or moisture presence.
- Poor cable splice or termination.
- Moisture in enclosure that provides a conductive ground path sufficient to trigger the alarm.

UTC-2030 SPECIFICATIONS:

Alarm output : 1 A max, 240 Vac max., 50/60 Hz, SPDT (form C) relay output configured for "fail-safe" operation.

Approvals : CSA "C" - "US" for ordinary locations.

Enclosure: Nema 4, gray painted steel with ¼ turn latch.

Indicator light: Nema 4 multi-function three color LED.

Input voltage range : 120-240 Vac, 50/60 Hz.

Monitoring and alarming : The electronics monitor low temperature, ground fault current and open / shorted temperature sensor(s).

Operating ambient temp.: -40 to +40 °C *(-40 to +104 °F).*

Power output : 2-pole relay output rated 30 A - 240 Vac.

Terminal blocks:

Power terminals for #22 to #8 AWG

Power in:	L1, N or L2.
Heater out:	H1, N or H2

Signal terminals for #28 to #12 AWG

Sensors:	TS1:	#1-2-3-4.
	TS2:	#5-6-7-8.
	TS3:	#12-13-14-15.
	Alarm relay:	#9-10-11.
	Alarm reset:	#16-17.
	Override input:	#18-19.

Valid temperature range: -40 to +100 °C *(-40 to +212 °F).*

FACTORY PROGRAMMABLE:

Auto-cycle : When the temperature controller is energized, and then at 24 hours intervals, the controller performs an auto-cycle test by turning on the load to measure the ground fault leakage current. If the measured ground fault current is above the set level, the ground fault current alarm is activated.

Ground fault detection : Factory adjustable to trip or alarm only. Setting @ 30 or 100 ma.

Remote override : The user may force the unit on/off via a remote dry contact. Factory adjustable to operate in timed (1-48 hours) or non-timed mode.

Temperature control : three 3-wire 100 Ω @ 0 °C *(32 °F)* Platinum RTD (alpha=0,00385 Ω/Ω/°C), lead compensated to 20 Ω per lead.
or
three 2-wire 2 252 Ω @ 25 °C *(77 °F)* NTC Thermistor.

Deadband : 1 to 5 °C *(1.8 to 9 °F)* see ANNEX E.

Control temperature setpoint range: -5 to 75 °C *(23 to 167 °F)* see ANNEX E.

Low temperature alarm : Feature can be enabled to provide low temperature alarm on TS1 and TS2.

Low temperature setpoint range: -10 to 75 °C *(14 to 167 °F)* see ANNEX E.

High cable temperature: The third temperature sensor (referred to as TS3) is used as a high cable temperature limit for plastic piping system protection. When TS3 is enabled, the high limit feature will override demand for heat and shut off the load when a high cable temperature condition is reached.

High temperature set point range: 25 to 100 °C *(77 to 212 °F)* see ANNEX E.

UTC-2230 SPECIFICATIONS :

Same specifications as the UTC-2030, with the addition of :

Circuit breaker : 2-pole, 30 A, 240 Vac, pre-wired to the temperature control board.

Terminal blocks: Incoming power lugs at the circuit breaker for: #14 to #4 AWG

CONTACTOR VERSION SPECIFICATIONS :

Same specifications as the UTC-2030, except for the following :

Sequence of number is : UTC-VPAA-xx

'V' in the catalog number denotes the operating voltage, i.e. : 2 for 208, 4 for 480 or 6 for 600 .

'P' in the catalog number denotes the number of poles on the circuit breaker, i.e. : 2 or 3.

'AA' in the catalog number denotes the amperage of the circuit breaker,
i.e. : 15, 20, 25, 30, 35, 40, 45, 50 or 60.

'xx' in the catalog number denotes the control program code (see annex E).

Input voltage : 208, 480 or 600 Vac, 50/60 Hz, 3-phase / 4-wire.

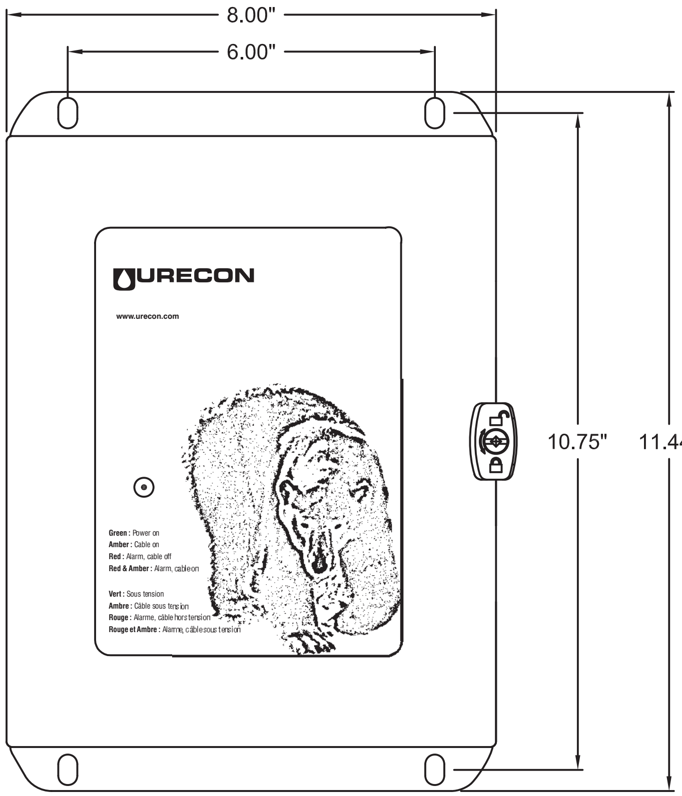
Power output : 3-pole contactor output rated 60 A - 600 V ac.

Terminal blocks:

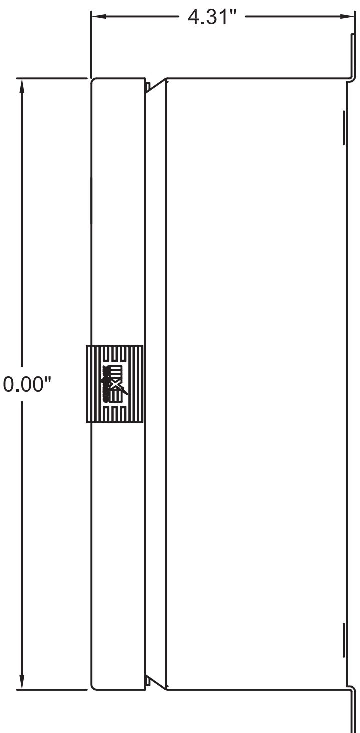
Power in terminals;	L1, L2 and L3:	#14 to # 4 AWG
Heater terminals;	H1, H2 and H3:	#14 to # 3 AWG
Neutral terminals:		#14 to # 6 AWG

ANNEXE / ANNEX **A**

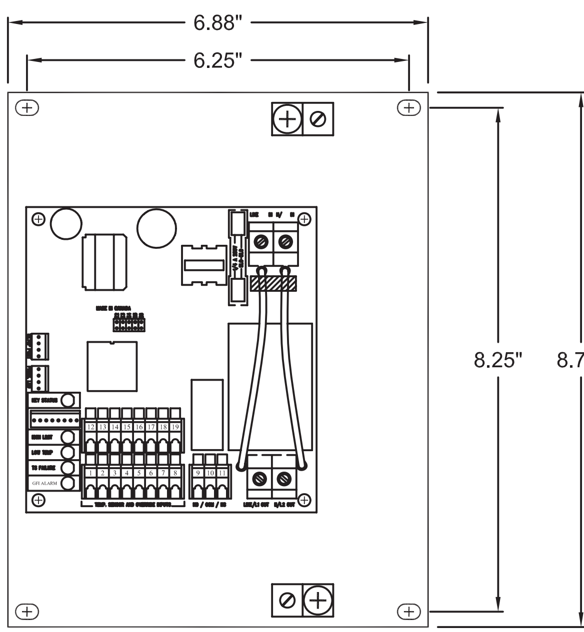
UTC-2030
Thermostat électronique / Electronic thermostat



ÉLÉVATION / FRONT VIEW



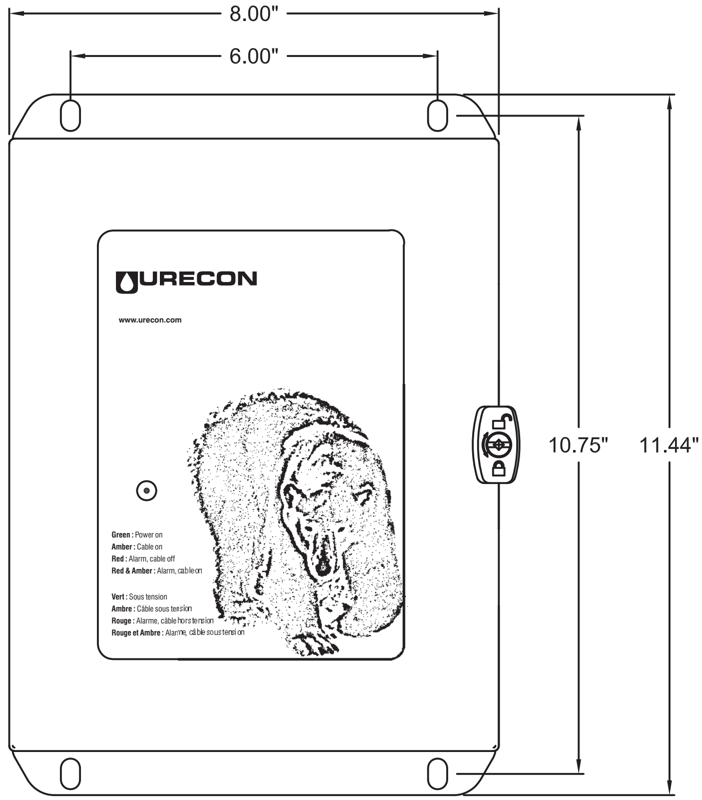
PROFIL / LEFT SIDE VIEW



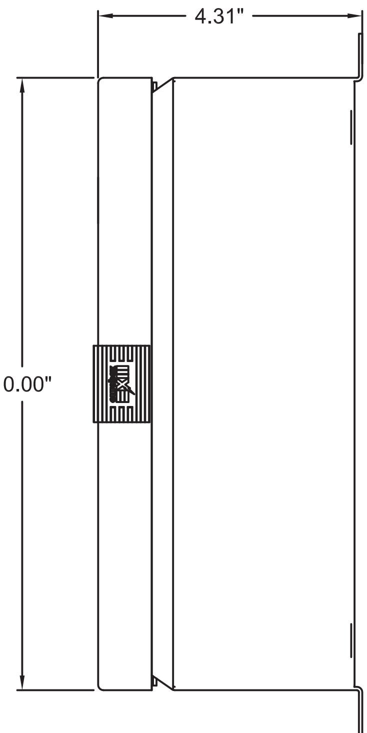
PLAQUE DE FOND / BACKPLATE

ANNEXE / ANNEX **B**

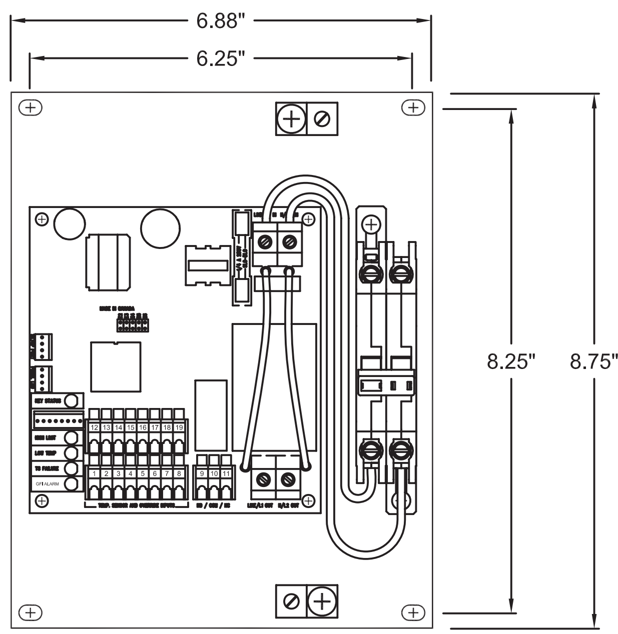
UTC-2230
Thermostat électronique / Electronic thermostat



ÉLÉVATION / FRONT VIEW

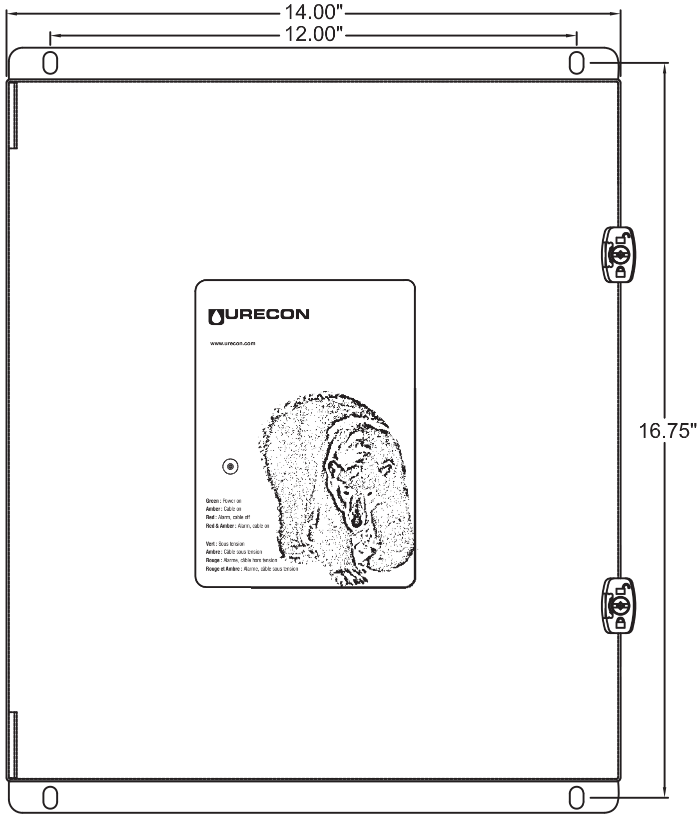


PROFIL / LEFT SIDE VIEW

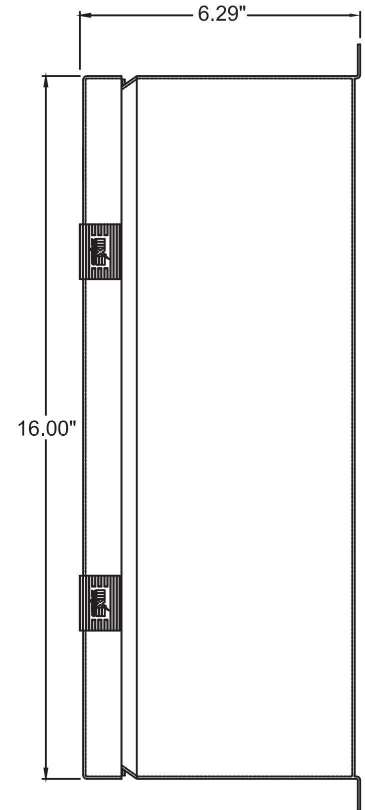


PLAQUE DE FOND / BACKPLATE

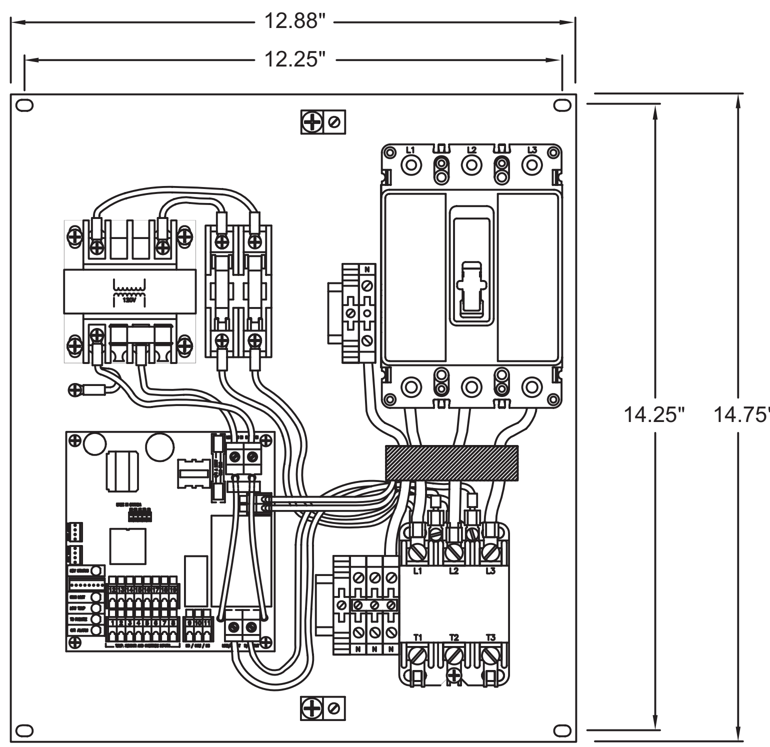
Thermostat électronique à contacteur / Contactor version electronic thermostat



ÉLÉVATION / FRONT VIEW

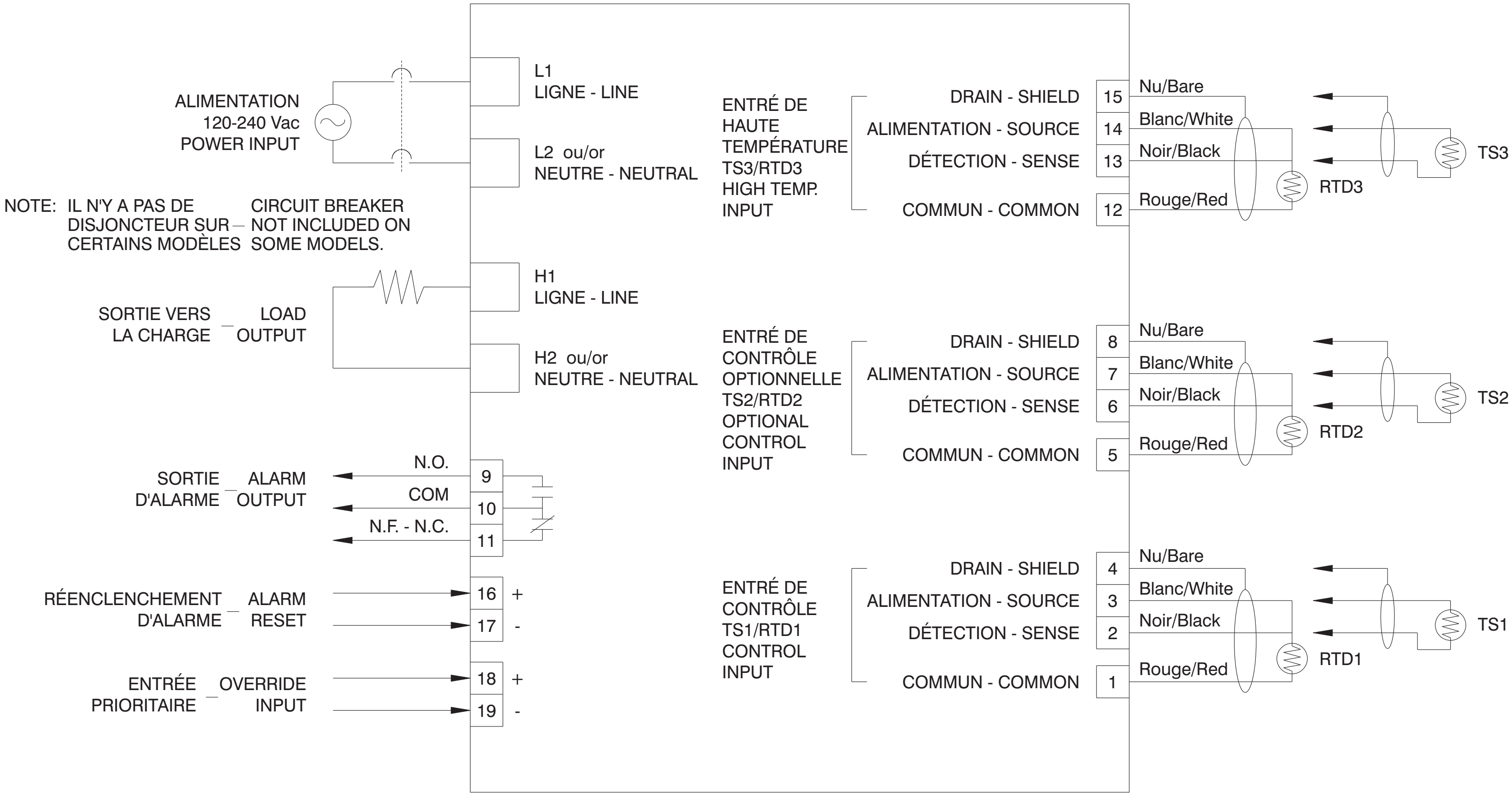


PROFIL / LEFT SIDE VIEW



PLAQUE DE FOND / BACKPLATE

Schéma de câblage / Wiring Diagram



ANNEXE / ANNEX **E**

UTC-2030-xx, UTC-2230-xx, UTC-VPAA-xx

xx doit être remplacé par le code de programmation approprié

xx is to be replaced by the appropriate program code number

Type de tuyau / Pipe type	code de programmation pour RTD RTD program code	Capteur de contrôle TS1 (alarme en indice) Température Controlling sensor TS1 (alarm in subscript)	Capteur de contrôle TS2 (alarme en indice) Température Controlling sensor TS2 (alarm in subscript)	Capteur de haute température TS3 Température High temperature sensor TS3	code de programmation pour thermistance Thermistor program code
POUR TUYAU DE PLASTIQUE FOR PLASTIC PIPE	01	3 °C (*37.4 °F*)	–	65 °C (*149 °F*)	51
	02	3_{1} °C (*$37.4_{33.8}$ °F*)	–	65 °C (*149 °F*)	52
	03	5 °C (*41 °F*)	–	65 °C (*149 °F*)	53
	04	5_{3} °C (*$41_{37.4}$ °F*)	–	65 °C (*149 °F*)	54
	05	10 °C (*50 °F*)	–	65 °C (*149 °F*)	55
	06	10_{5} °C (*50_{41} °F*)	–	65 °C (*149 °F*)	56
	07	15 °C (*59 °F*)	–	65 °C (*149 °F*)	57
	08	15_{10} °C (*59_{50} °F*)	–	65 °C (*149 °F*)	58
	11	3 °C (*37.4 °F*)	3 °C (*37.4 °F*)	65 °C (*149 °F*)	61
	12	3_{1} °C (*$37.4_{33.8}$ °F*)	3_{1} °C (*$37.4_{33.8}$ °F*)	65 °C (*149 °F*)	62
	13	5 °C (*41 °F*)	5 °C (*41 °F*)	65 °C (*149 °F*)	63
	14	5_{3} °C (*$41_{37.4}$ °F*)	5_{3} °C (*$41_{37.4}$ °F*)	65 °C (*149 °F*)	64
	15	10 °C (*50 °F*)	10 °C (*50 °F*)	65 °C (*149 °F*)	65
	16	10_{5} °C (*50_{41} °F*)	10_{5} °C (*50_{41} °F*)	65 °C (*149 °F*)	66
	17	15 °C (*59 °F*)	15 °C (*59 °F*)	65 °C (*149 °F*)	67
	18	15_{10} °C (*59_{50} °F*)	15_{10} °C (*59_{50} °F*)	65 °C (*149 °F*)	68
POUR TUYAU DE MÉTAL FOR METAL PIPE	21	3 °C (*37.4 °F*)	–	–	71
	22	3_{1} °C (*$37.4_{33.8}$ °F*)	–	–	72
	23	5 °C (*41 °F*)	–	–	73
	24	5_{3} °C (*$41_{37.4}$ °F*)	–	–	74
	25	10 °C (*50 °F*)	–	–	75
	26	10_{5} °C (*50_{41} °F*)	–	–	76
	27	15 °C (*59 °F*)	–	–	77
	28	15_{10} °C (*59_{50} °F*)	–	–	78
	31	3 °C (*37.4 °F*)	3 °C (*37.4 °F*)	–	81
	32	3_{1} °C (*$37.4_{33.8}$ °F*)	3_{1} °C (*$37.4_{33.8}$ °F*)	–	82
	33	5 °C (*41 °F*)	5 °C (*41 °F*)	–	83
	34	5_{3} °C (*$41_{37.4}$ °F*)	5_{3} °C (*$41_{37.4}$ °F*)	–	84
	35	10 °C (*50 °F*)	10 °C (*50 °F*)	–	85
	36	10_{5} °C (*50_{41} °F*)	10_{5} °C (*50_{41} °F*)	–	86
	37	15 °C (*59 °F*)	15 °C (*59 °F*)	–	87
	38	15_{10} °C (*59_{50} °F*)	15_{10} °C (*59_{50} °F*)	–	88

Capteurs de température utilisés avec les thermostats électroniques de la série UTC.

Temperature sensors used with the UTC line of electronic thermostats.

Thermistance / Thermistor (Modèle précedent / Previous model) **de / of 2 252 ohms @ 25 °C *(77 °F)***	
Température Temperature	**Résistance Resistance**
-40 °C *(-40 °F)*	75 593 Ω
-35 °C *(-31 °F)*	54 542 Ω
-30 °C *(-22 °F)*	39 789 Ω
-25 °C *(-13 °F)*	29 331 Ω
-20 °C *(-4 °F)*	21 839 Ω
-15 °C *(5 °F)*	16 416 Ω
-10 °C *(14 °F)*	12 453 Ω
-5 °C *(23 °F)*	9 529,2 Ω
0 °C *(32 °F)*	7 353,0 Ω
5 °C *(41 °F)*	5 719,1 Ω
10 °C *(50 °F)*	4 482,3 Ω
15 °C *(59 °F)*	3 538,8 Ω
20 °C *(68 °F)*	2 813,6 Ω
25 °C *(77 °F)*	2 252,0 Ω
30 °C *(86 °F)*	1 814,2 Ω
35 °C *(95 °F)*	1 470,6 Ω
40 °C *(104 °F)*	1 192,2 Ω
45 °C *(113 °F)*	983,4 Ω
50 °C *(122 °F)*	810,9 Ω
55 °C *(131 °F)*	672,2 Ω
60 °C *(140 °F)*	560,1 Ω
65 °C *(149 °F)*	468,9 Ω
70 °C *(158 °F)*	394,5 Ω
75 °C *(167 °F)*	333,3 Ω
80 °C *(176 °F)*	282,9 Ω
85 °C *(185 °F)*	241,1 Ω
90 °C *(194 °F)*	206,3 Ω
95 °C *(203 °F)*	177,2 Ω
100 °C *(212 °F)*	152,8 Ω

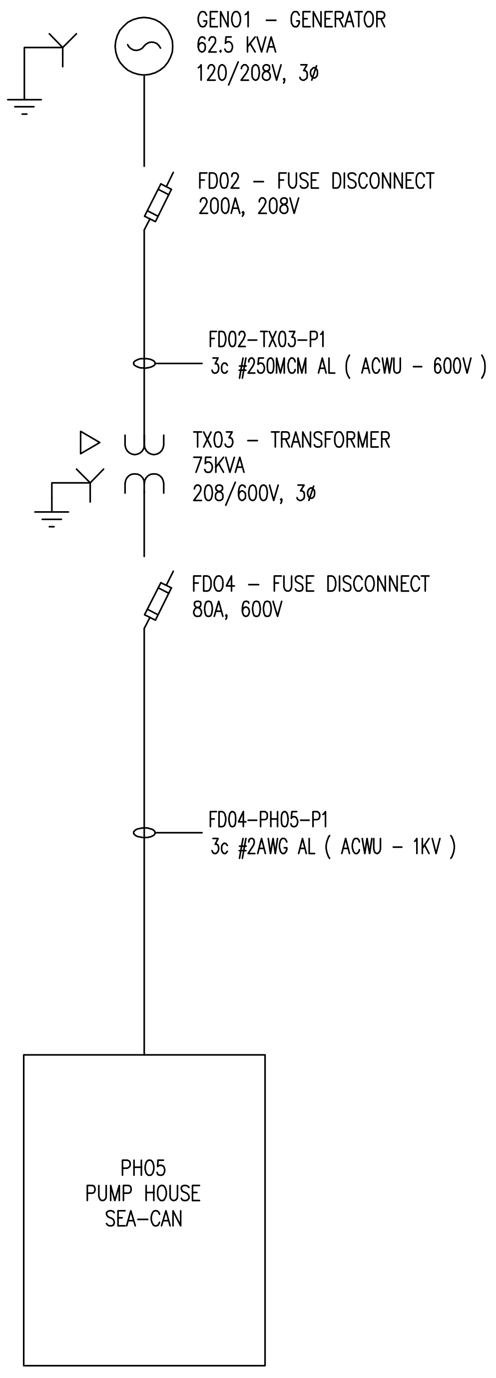
RTD de Platine / Platinum RTD (Modèle courant / Current model) **de / of 100 ohms @ 0 °C *(32 °F)***	
Température Temperature	**Résistance Resistance**
-40 °C *(-40 °F)*	84,27 Ω
-35 °C *(-31 °F)*	86,25 Ω
-30 °C *(-22 °F)*	88,22 Ω
-25 °C *(-13 °F)*	90,19 Ω
-20 °C *(-4 °F)*	92,16 Ω
-15 °C *(5 °F)*	94,12 Ω
-10 °C *(14 °F)*	96,09 Ω
-5 °C *(23 °F)*	98,04 Ω
0 °C *(32 °F)*	100,00 Ω
5 °C *(41 °F)*	101,95 Ω
10 °C *(50 °F)*	103,90 Ω
15 °C *(59 °F)*	105,85 Ω
20 °C *(68 °F)*	107,79 Ω
25 °C *(77 °F)*	109,73 Ω
30 °C *(86 °F)*	111,67 Ω
35 °C *(95 °F)*	113,61 Ω
40 °C *(104 °F)*	115,54 Ω
45 °C *(113 °F)*	117,47 Ω
50 °C *(122 °F)*	119,40 Ω
55 °C *(131 °F)*	121,32 Ω
60 °C *(140 °F)*	123,24 Ω
65 °C *(149 °F)*	125,16 Ω
70 °C *(158 °F)*	127,07 Ω
75 °C *(167 °F)*	128,98 Ω
80 °C *(176 °F)*	130,89 Ω
85 °C *(185 °F)*	132,80 Ω
90 °C *(194 °F)*	134,70 Ω
95 °C *(203 °F)*	136,60 Ω
100 °C *(212 °F)*	138,50 Ω

APPENDIX C

Vendor Drawing List

Drawing No.	Rev. No.	Drawing Title

END OF SECTION



NOTES:

1. GROUND RODS FOR GENERATOR & TRANSFORMER TO BE INTERCONNECTED BY MEANS OF #6AWG BARE COPPER CONDUCTOR.

2. BOND BETWEEN ALL METALLIC EQUIPMENT: USE MAIN POWER FEED GROUND CONDUCTOR TO ENSURE BONDING BETWEEN PUMP-HOUSE SEA-CAN & GENERATOR.

FOR APPROVAL
JANUARY 21, 2009

SRK Consulting
Engineers and Scientists
Vancouver B.C.

HATCH™

HATCH JOB NO.: 331759
FILE NAME: 331759-E01.dwg

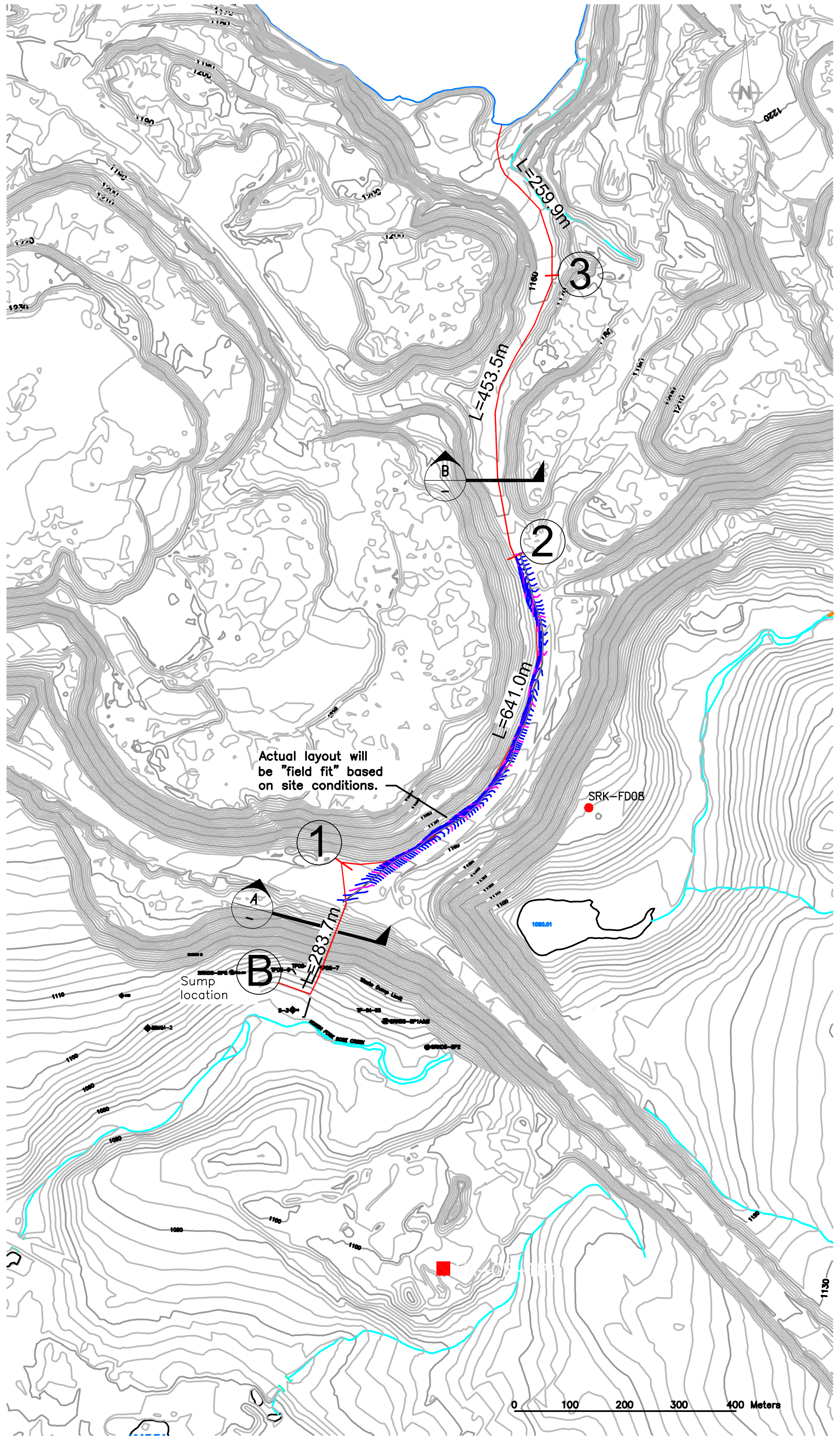
NO	DESCRIPTION	BY	DATE
B	GENERAL REVISION	VA	01/21/09
A	NEW DRAWING	VA	01/15/09

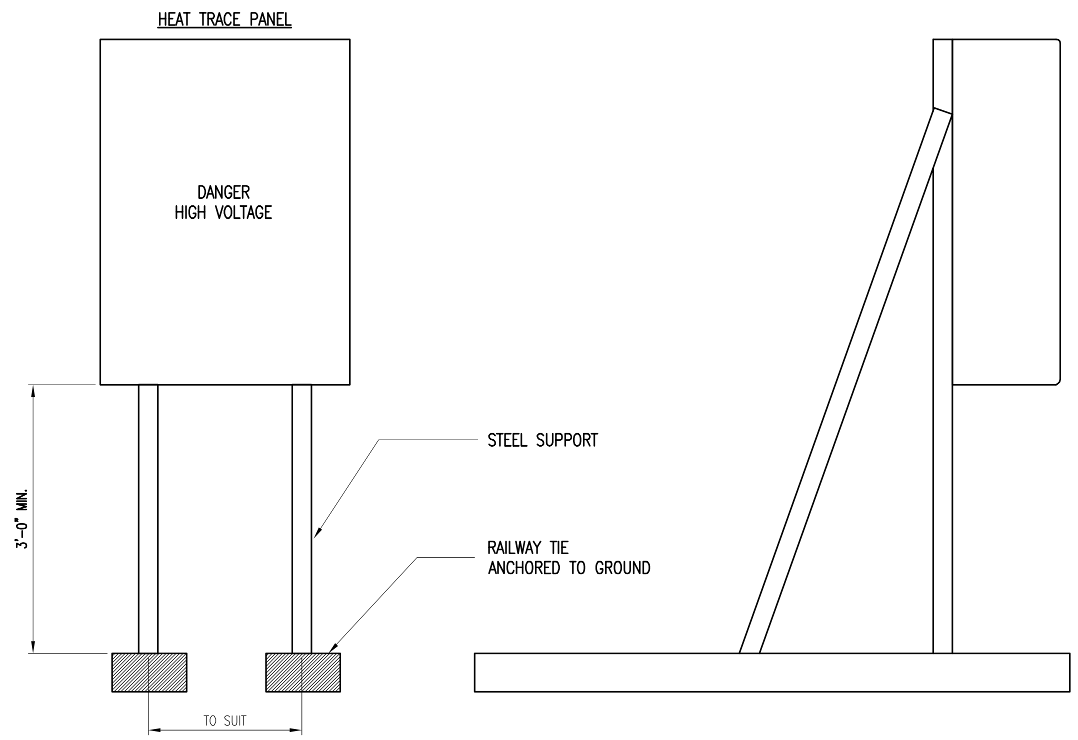
REVISION

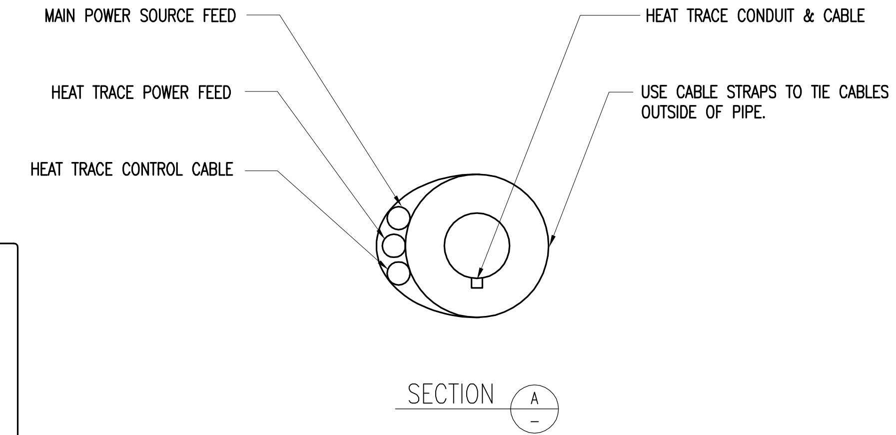
S-WELL PUMP HOUSE PROJECT

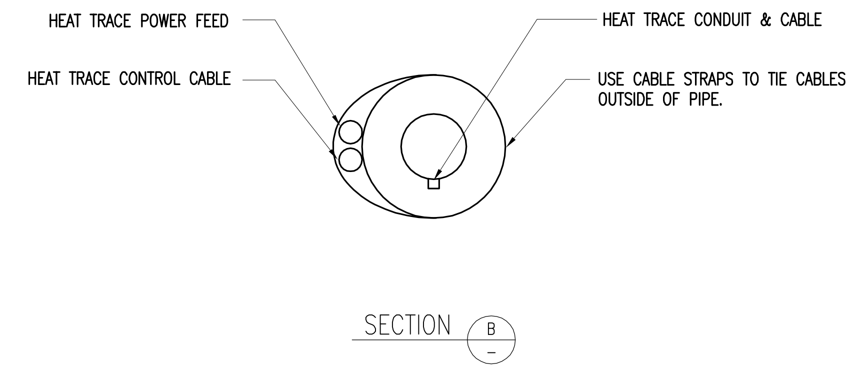
PUMP HOUSE
MAIN POWER FEED

DATE:	APPROVED:	DWG. No.	REV.
JAN/09	–	331759-E01	B









NOTES:

1. HEAT TRACE CONTROL PANELS LOCATED AT POINTS MARKED 1, 2, & 3, PUMPHOUSE LOCATED AT POINT B (APPROXIMATE).

2. CABLES MUST BE STRAPPED TO PIPE LINE AT 1 METER INTERVALS ALONG INCLINATIONS OF GREATER THAN 15° AND EVERY WHERE ELSE AT 3 METER INTERVALS. MAINTAIN SLACK ON CABLES BETWEEN STRAPPING.

3. HEAT TRACE INSTALLATION DETAIL REFER TO URECON INSTALLATION INSTRUCTION #3E.

FOR APPROVAL
JANUARY 15, 2009

SRK Consulting
Engineers and Scientists
Vancouver B.C.

HATCH™

HATCH JOB NO.: 331759
FILE NAME: 331759–E02.dwg

NO	DESCRIPTION	DATE
A	NEW DRAWING	JAN/09

REVISION

S-WELL PUMP HOUSE PROJECT

HEAT TRACE CONTROL PANEL
FIELD INSTALLATION

DATE:	APPROVED:	DWG. No.	REV.
JAN/09	–	331759-E02	A

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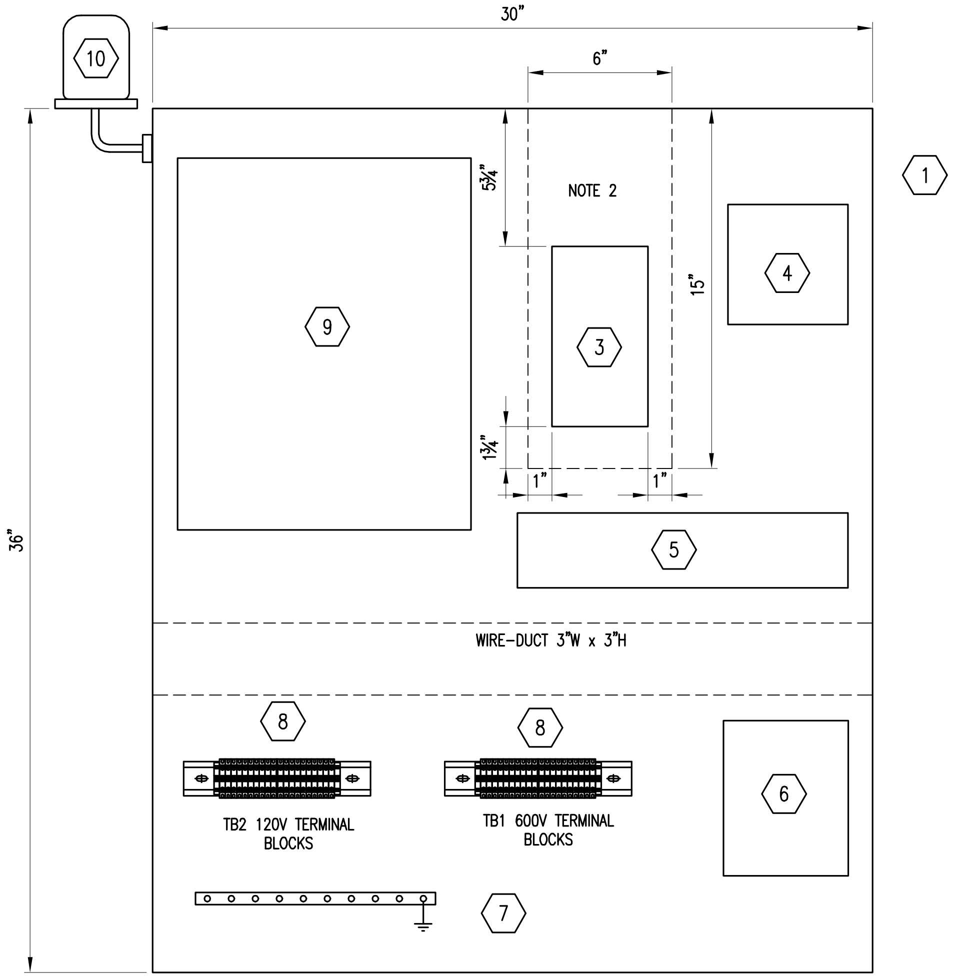
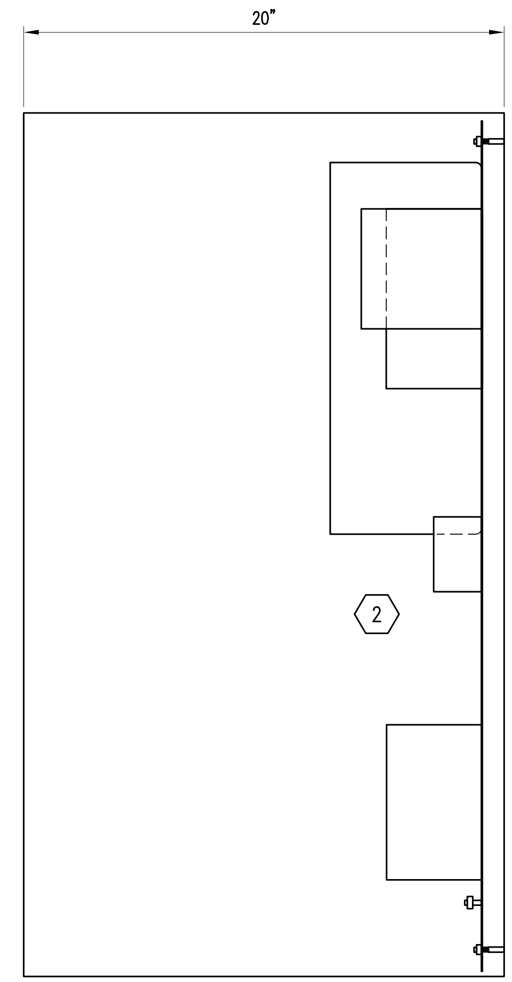


FRONT VIEW



SIDE VIEW

EQUIPMENT LIST

ITEM	NOTE 1 QTY	DESCRIPTION
1	1	A36H30DLP STEEL ENCLOSURE, 36"H X 30"W X 20"D, NEMA TYPE 4, WALL MOUNTED, SINGLE HINGED DOOR
2	1	A36P30 – BACK PANEL (HOFFMAN)
3	1	DAH4001B 400W HEATER.
4	1	MARCUS M0750N 750 VA CONTROL TRANSFORMER SINGLE PHASE
5	1	DISCONNECT FUSES & CIRCUIT BREAKERS
6	1	15A 3 – POLE CIRCUIT BREAKER
7	1	GROUNDING BAR
8	24	TERMINAL BLOCKS, 120V & 600V
9	1	UTC-6315-03 HEAT TRACE CONTROLLER IN CONJUCTION WITH HEAT TRACE CABLE TYPE: C13-575-C0J.
10	1	120 VAC BEACON CONTINUOUS LIGHT (GREEN).

NOTES:

1. QUANTITY PER PANEL BASIS
2. MINIMUN DIMENSION ENVELOPE

FOR APPROVAL
FEBRUARY 6, 2009

SRK Consulting
Engineers and Scientists
Vancouver B.C.

HATCH™

HATCH JOB NO.: 331759
FILE NAME: 331759-E03.dwg

NO	DESCRIPTION		DATE
C	GENERAL REVISION	VA	02/06/09
B	GENERAL REVISION	VA	01/21/09
A	NEW DRAWING	VA	01/15/09

REVISION

S-WELL PUMP HOUSE PROJECT

HEAT TRACE CONTROL PANEL
EQUIPMENT LAYOUT

DATE:	APPROVED:	DWG. No.	REV.
JAN/09	–	331759-E03	C

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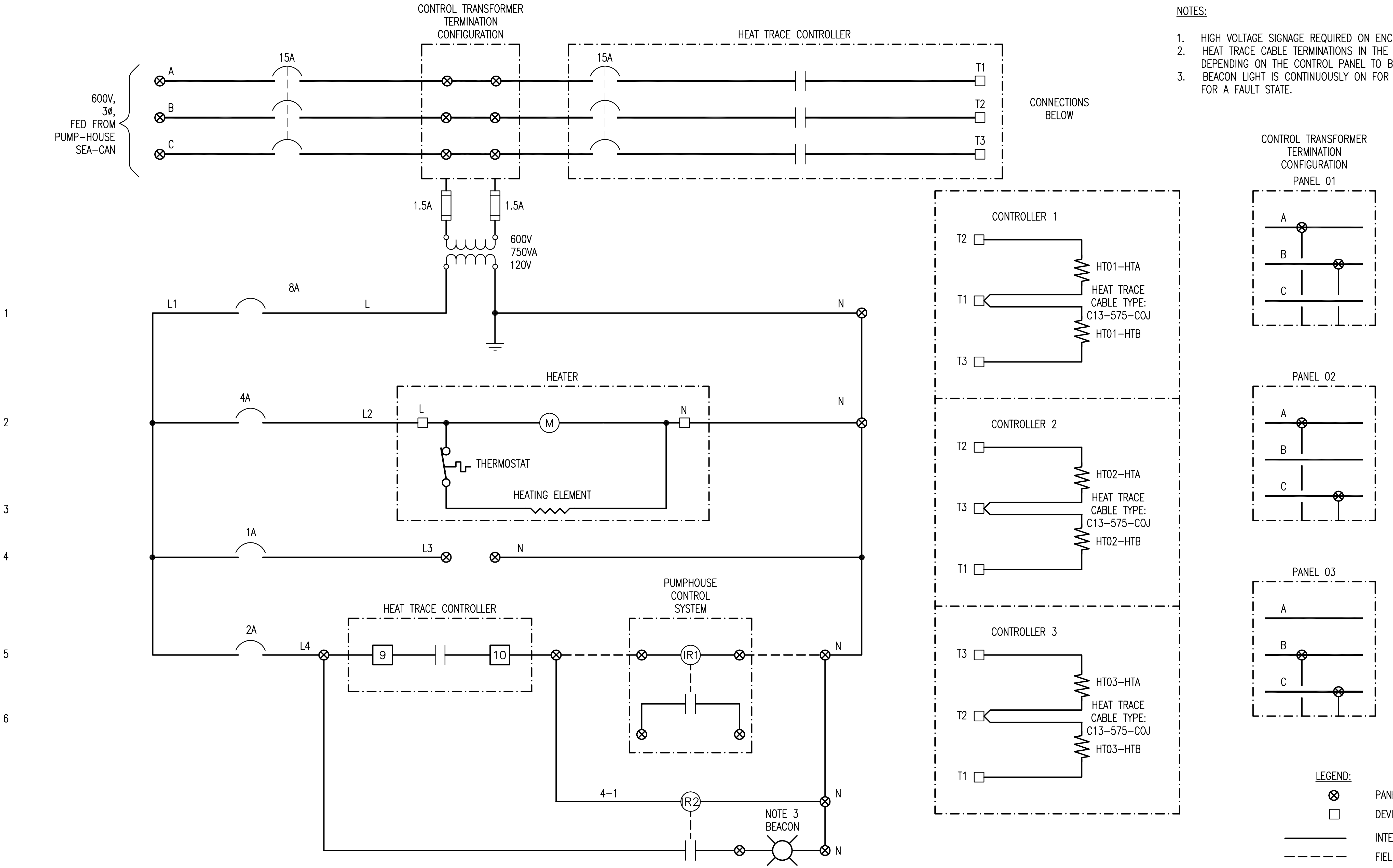
NOTES:

1. HIGH VOLTAGE SIGNAGE REQUIRED ON ENCLOSURE'S FRONT DOOR.
2. HEAT TRACE CABLE TERMINATIONS IN THE CONTROLLER VARY DEPENDING ON THE CONTROL PANEL TO BALANCETHE 3 PHASE SYSTEM
3. BEACON LIGHT IS CONTINUOUSLY ON FOR NORMAL OPERATION AND OFF FOR A FAULT STATE.



LEGEND:

- ⊗ PANEL TERMINALS
- ☐ DEVICE TERMINALS
- ——— INTERNAL WIRING
- - - - - FIELD WIRING

FOR APPROVAL
FEBRUARY 6, 2009

SRK Consulting Engineers and Scientists Vancouver B.C.

HATCH™

NO	DESCRIPTION		DATE
C	GENERAL REVISION	VA	02/06/09
B	GENERAL REVISION	VA	01/21/09
A	NEW DRAWING	VA	01/15/09

REVISION

HATCH JOB NO.: 331759
FILE NAME: 331759-E04.dwg

S-WELL PUMP HOUSE PROJECT

HEAT TRACE CONTROL PANEL SCHEMATIC DIAGRAM

DATE:	APPROVED:	DWG. No.	REV.
JAN/09	–	331759-E04	C

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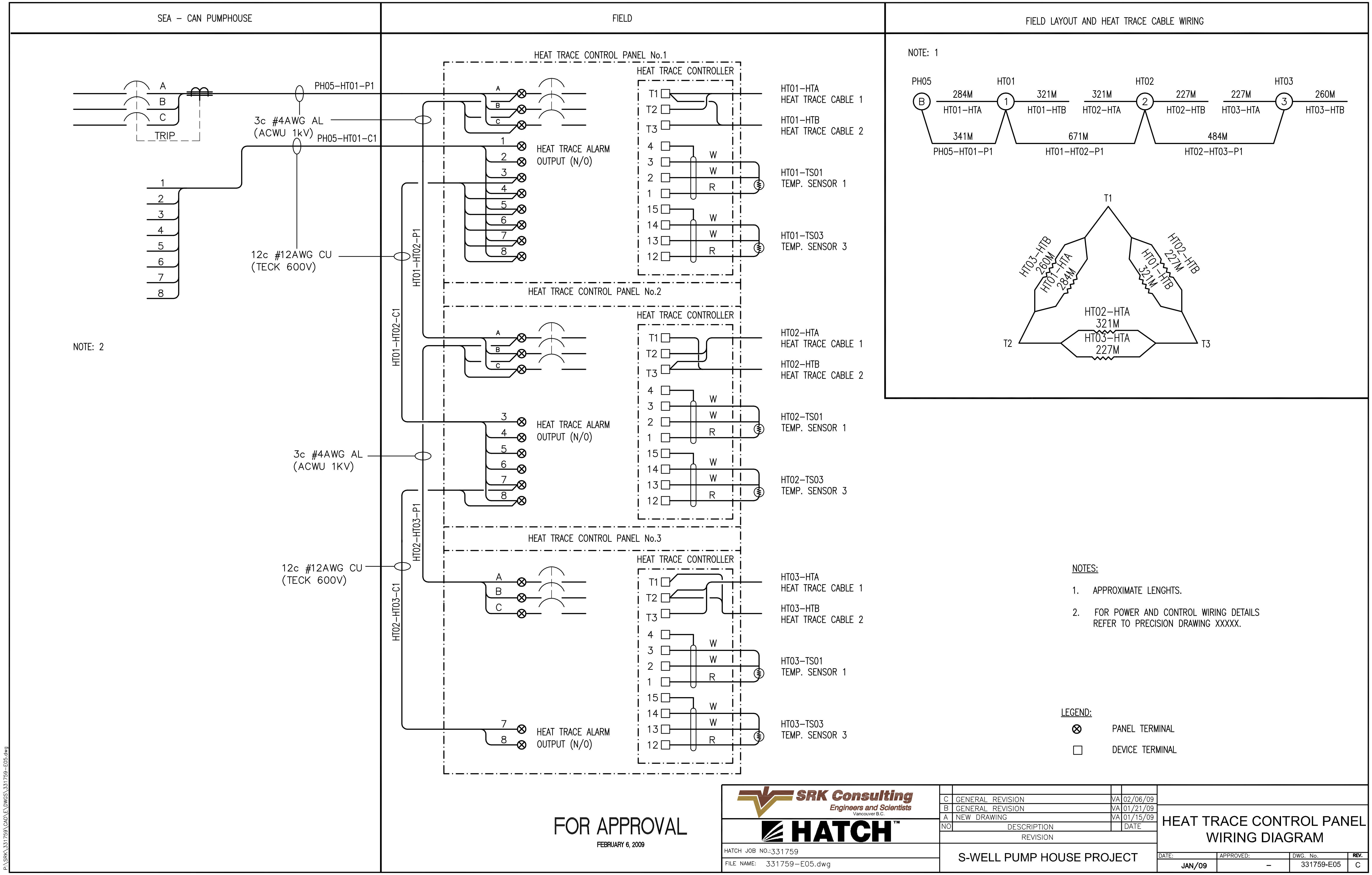

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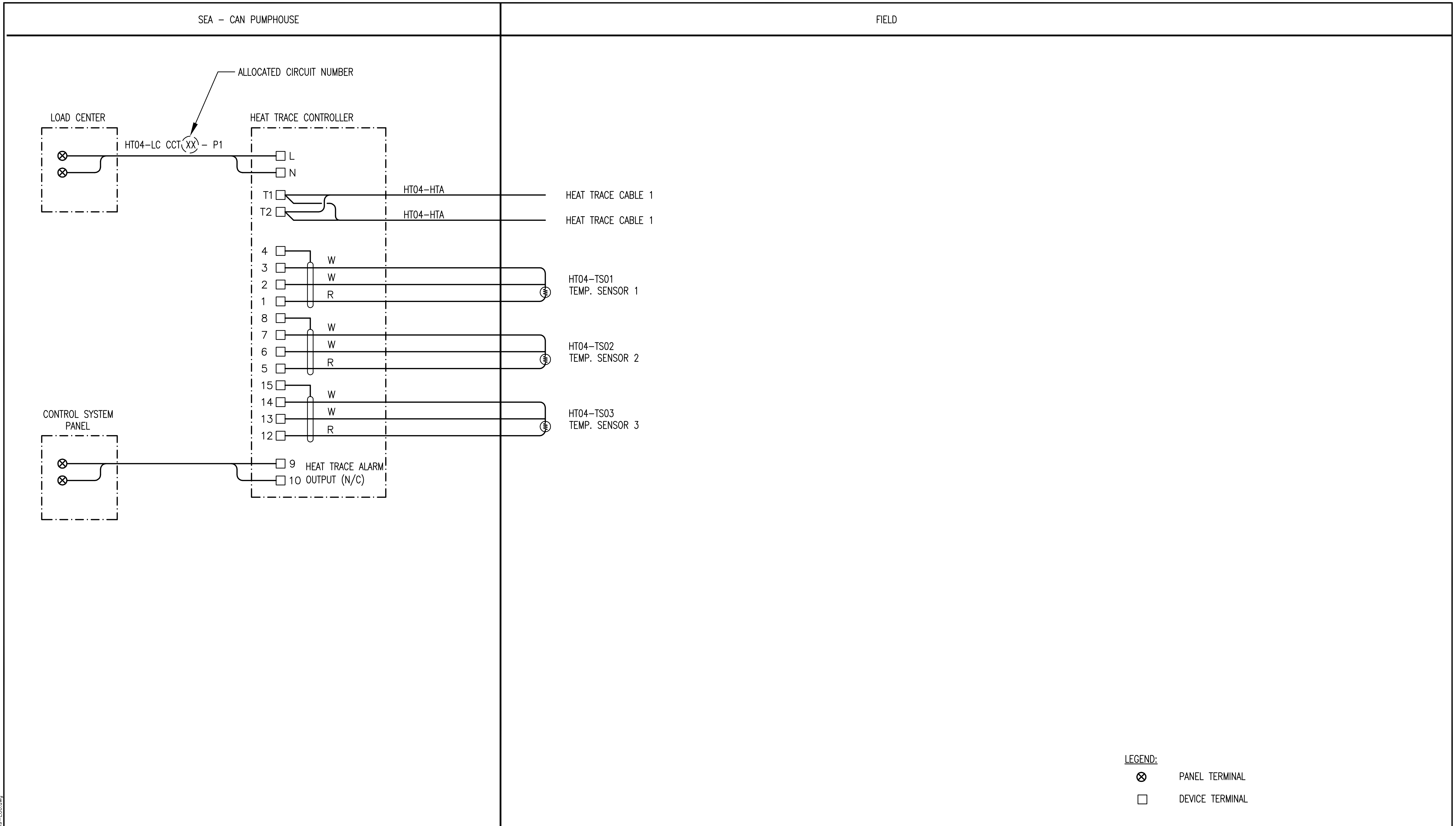

FOR APPROVAL
FEBRUARY 6, 2009

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Engineers and Scientists
Vancouver B.C.

HATCH™

HATCH JOB NO.: 331759
FILE NAME: 331759-E06.dwg

NO	DESCRIPTION		DATE
B	GENERAL REVISION	VA	02/06/09
A	NEW DRAWING	VA	01/21/09

REVISION

S-WELL PUMP HOUSE PROJECT

120VAC HEAT TRACE
WIRING DIAGRAM

DATE:	APPROVED:	DWG. No.	REV.
JAN/09	–	331759-E06	B

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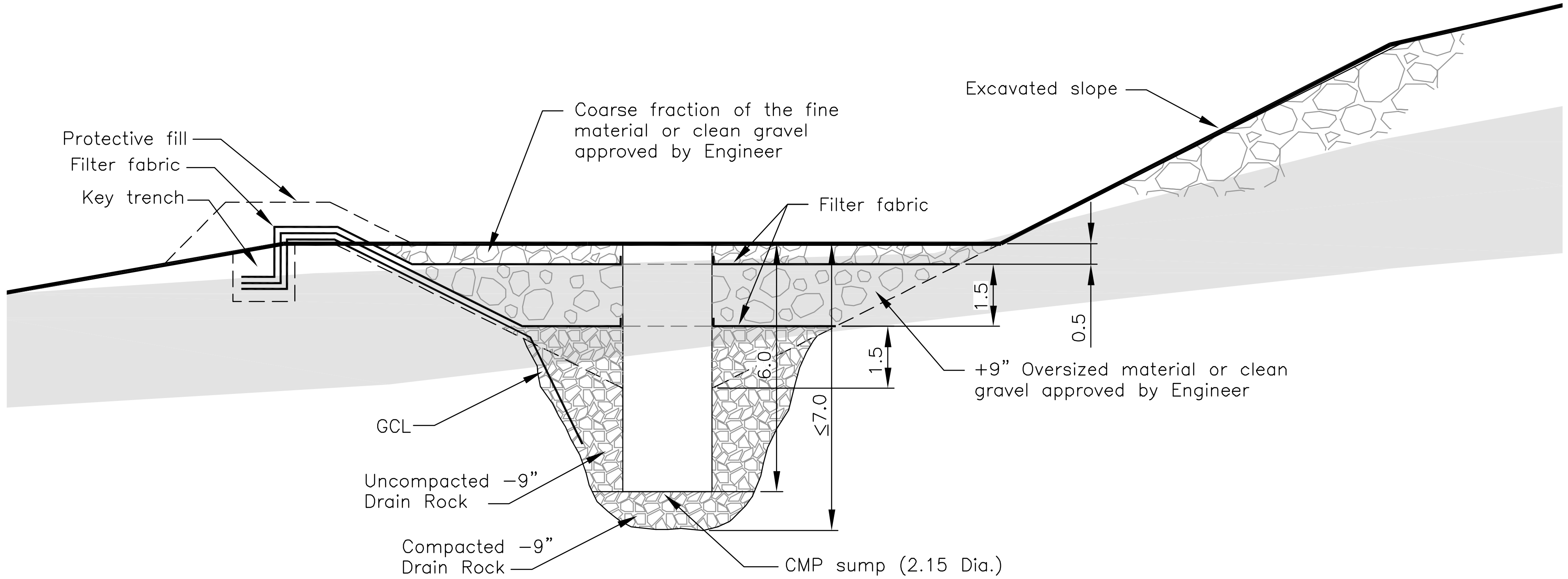
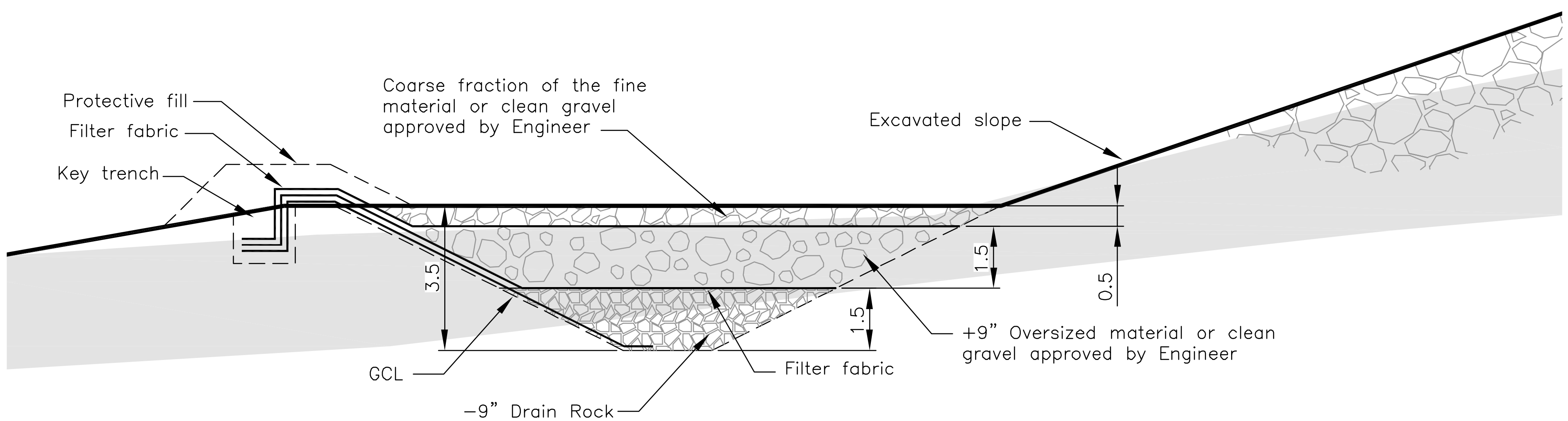
Appendix F.3

Interceptor Trench



Section 4 – Trench and Pipe Details



Section 5 – Trench and Pipe Details

Scale 0 2 4 6 8 10 Metres

SRK Consulting
Engineers and Scientists
Vancouver B.C.

SRK JOB NO.: 1CD003.120
FILE NAME: S-Wells SK310-420.dwg

Deloitte & Touche

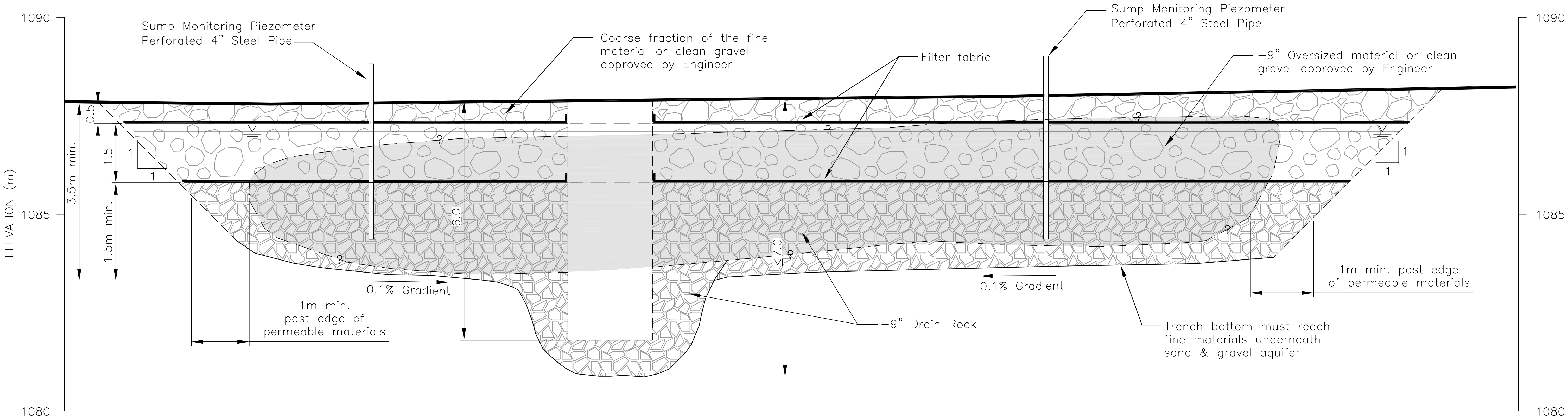
S-WELLS ACTION PLAN

S-Wells Shallow Aquifer Groundwater Collection

Backfill Details - (Typical)
Sheet 1 of 2

DATE:	APPROVED:	FIGURE:
Dec. 2008	CS	SW-SK410

J:\01_SITES\FARO\1000_Deloitte_from GE_Projects\Acad-Faro\2008 Acad Dwgs\S-Wells SK310-420.dwg



Section 6 – Trench and Pipes detail
(Front View looking up slope)

NOTE:

All dimensions and elevtations in Metres unless otherwise noted.

Scale 0 1 2 3 4 5 Metres

SRK Consulting
Engineers and Scientists
Vancouver B.C.

SRK JOB NO.: 1CD003.120
FILE NAME: S–Wells SK310–430.dwg

Deloitte & Touche

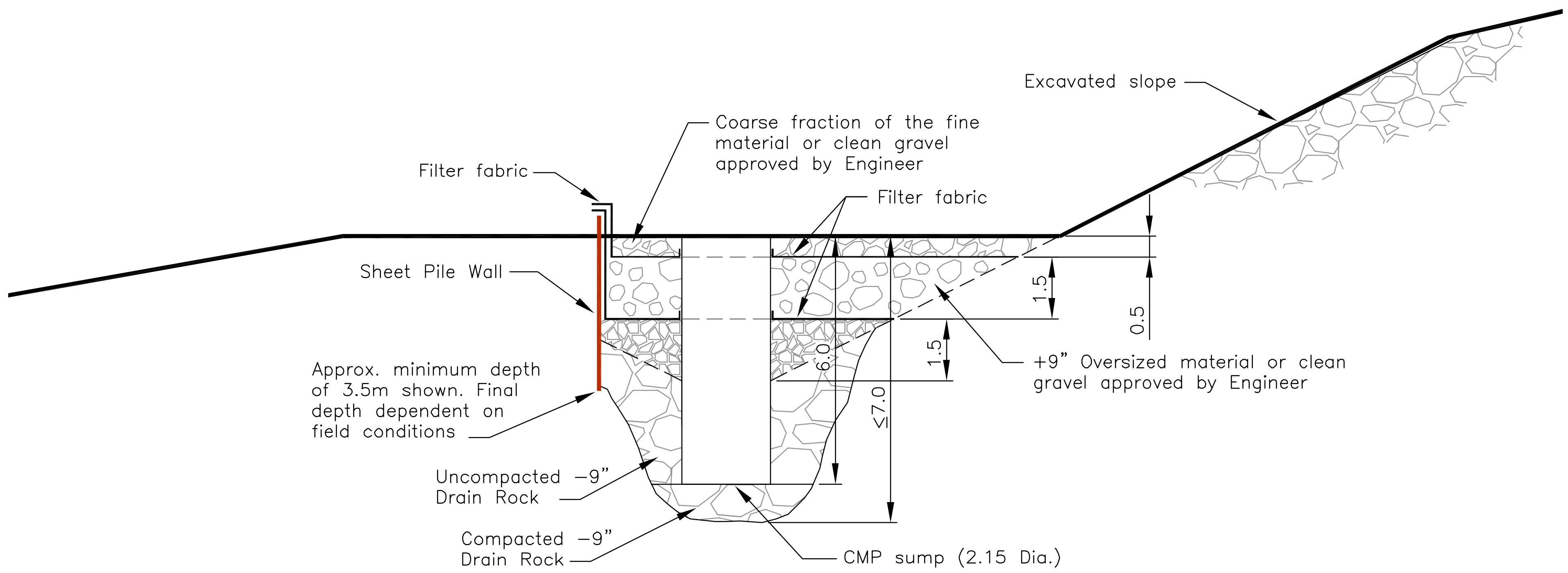
S-WELLS ACTION PLAN

S-Wells Shallow Aquifer Groundwater Collection

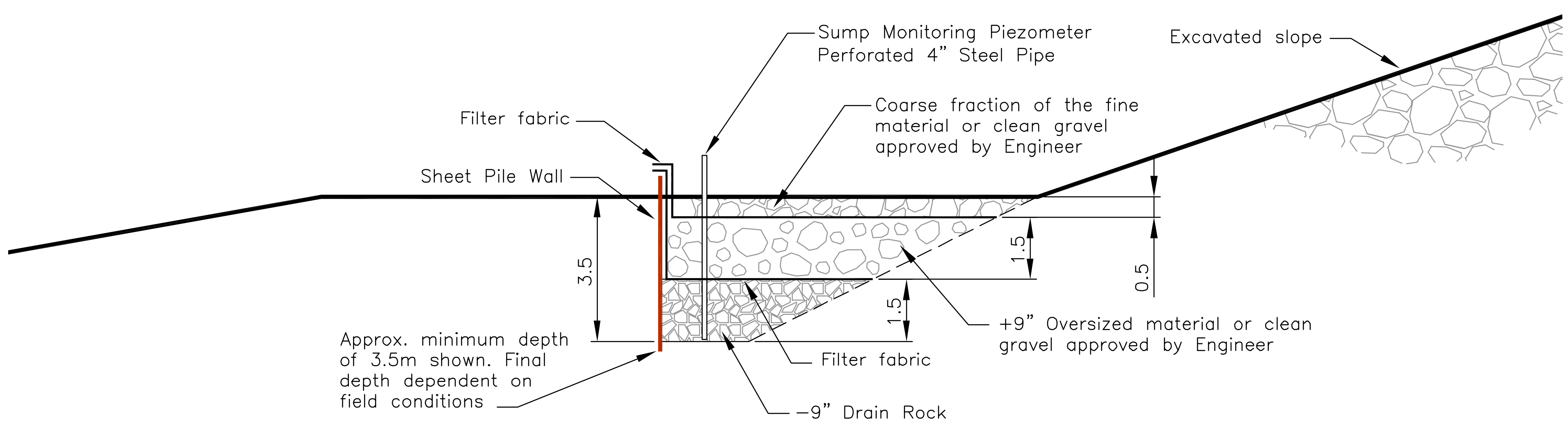
Backfill Details - (Typical)
Sheet 2 of 2

DATE:	APPROVED:	FIGURE:
Dec. 2008	CS	SW-SK420

J:\01_SITES\FARO\1000_Deloitte_from GE_Projects\Acad-Faro\2008 Acad Dwgs\S-Wells SK310-430.dwg



Section 4 – Trench and Pipe Details
(Profile View)



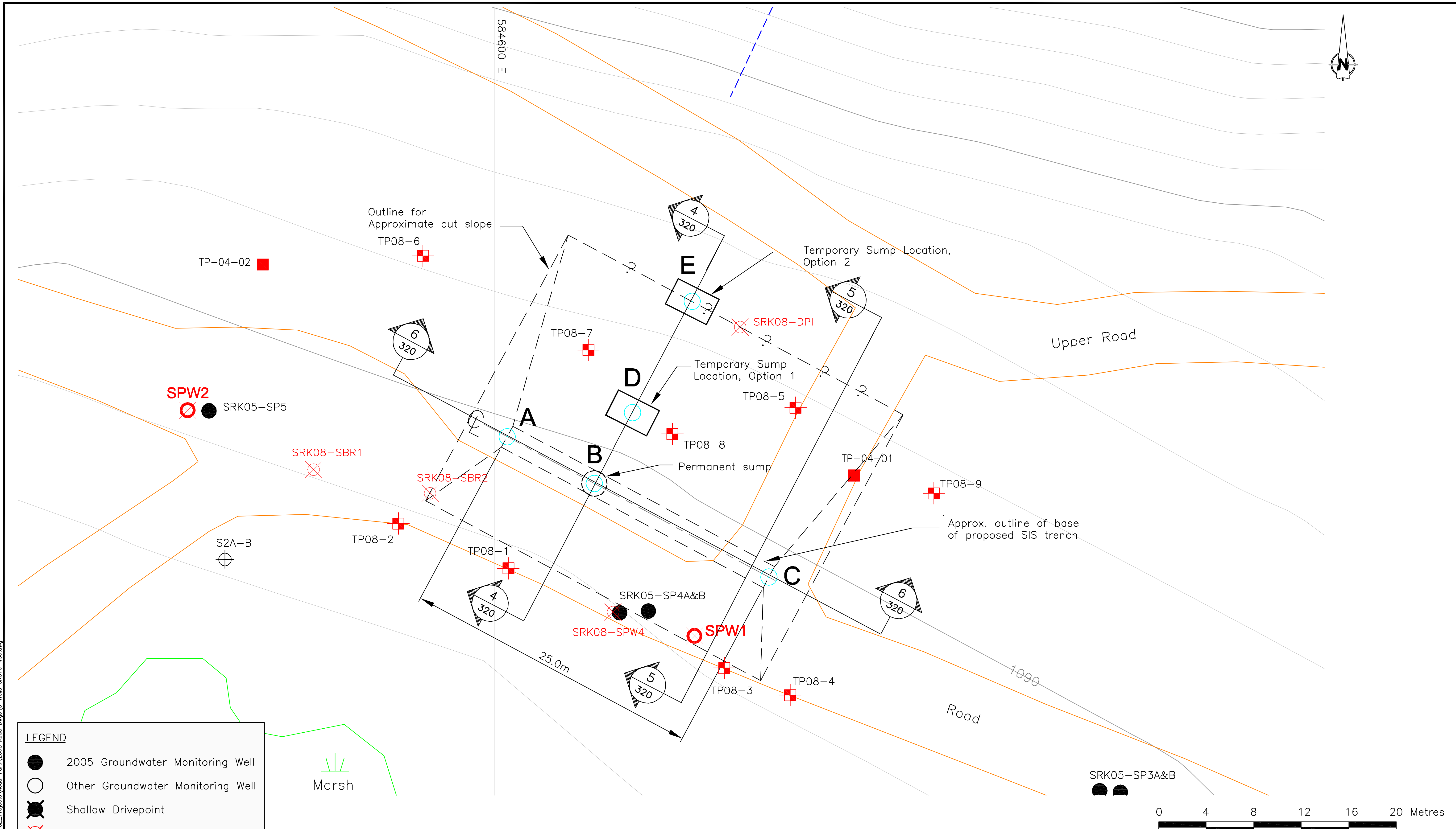
Section 5 – Trench and Pipe Details
(Profle View)

NOTE:

All dimensions and elevtations in Metres unless otherwise noted.

Scale 0 2 4 6 8 10 Metres

SRK Consulting Engineers and Scientists Vancouver B.C.	Deloitte & Touche	S-Wells Shallow Aquifer Groundwater Collection
SRK JOB NO.: 1CD003.120	S-WELLS ACTION PLAN	Contigency Option Sheet Piles
FILE NAME: S-Wells SK310-430.dwg		DATE: Dec. 2008 APPROVED: CS FIGURE: SW-SK430



LEGEND

- 2005 Groundwater Monitoring Well
- Other Groundwater Monitoring Well
- Shallow Drivepoint
- NFRC Monitoring Station
- S–Cluster Monitoring Well
- Test Pit (2004)
- Test Pit (2008)

SRK CONSULTING
Faro Mine, Yukon
Contour Interval: 2m
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, Zone 8
Compiled by The ORTHOSHOP, Calgary, September 2003
WO 8856

Trench and Sump Coordinates

Points	Easting	Northing
A	584,601.08	6,912,953.79
B	584,608.42	6,912,949.85
C	584,623.11	6,912,941.97
D	584,611.63	6,912,955.83
E	584,616.65	6,912,965.19

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Vancouver B.C.

Deloitte & Touche

S-Wells Shallow Aquifer Groundwater Collection

SIS Trench Location
and Excavation Limits

SRK JOB NO.: 1CD003.120
FILE NAME: S-Wells SK310-430.dwg

S-WELLS ACTION PLAN

DATE: Dec. 2008
APPROVED: CS/DM
FIGURE: SW-SK310

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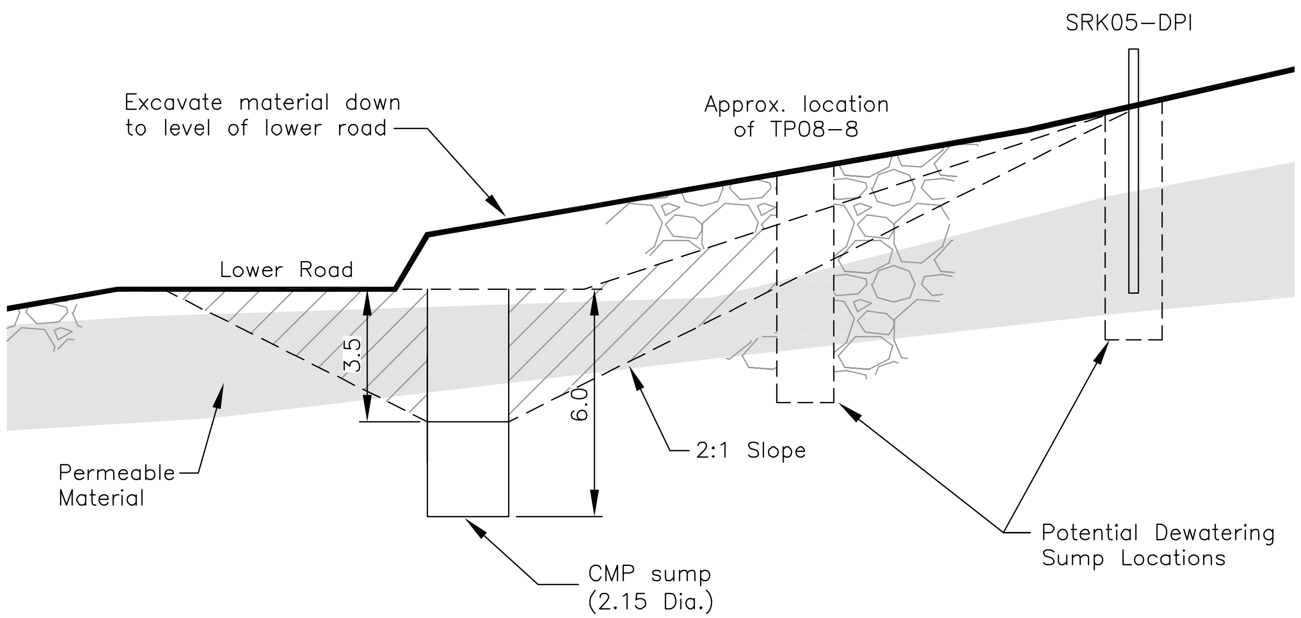
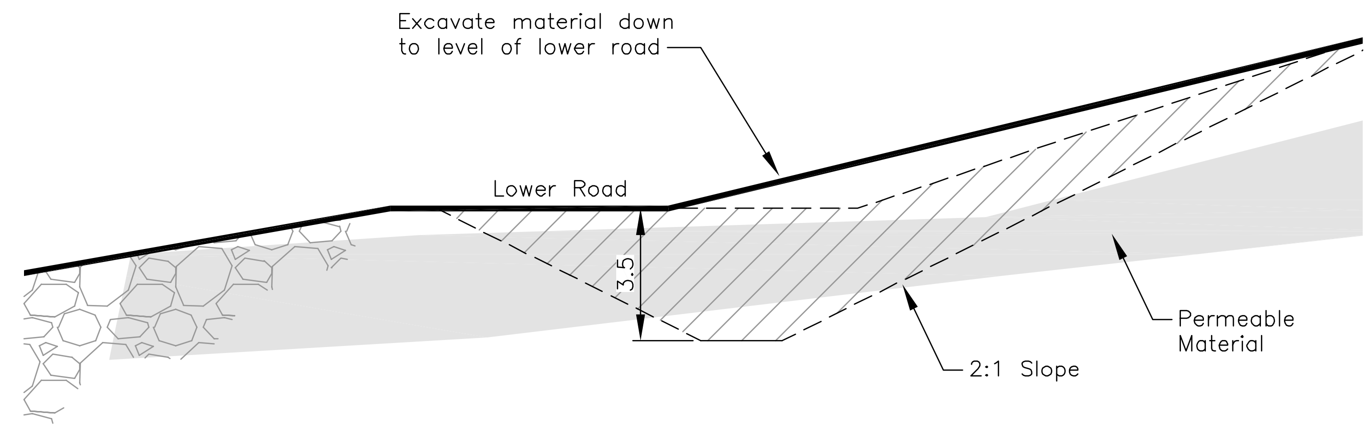


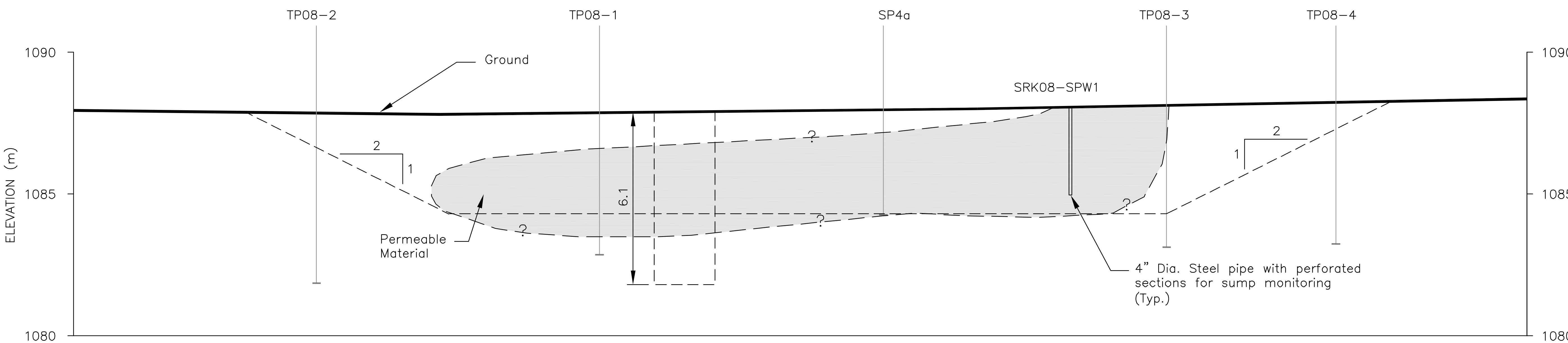
Section 4 – Trench and Pipe Details

0 2 4 6 8 10
Scale in Metres



Section 5 – Trench and Pipe Details

0 2 4 6 8 10
Scale in Metres



Section 6 – Trench and Pipes detail

0 1 2 3 4 5
Scale in Metres

SRK Consulting
Engineers and Scientists
Vancouver B.C.

SRK JOB NO.: 1CD003.120
FILE NAME: S–Wells SK310–430.dwg

Deloitte & Touche

S-WELLS ACTION PLAN

S-Wells Shallow Aquifer Groundwater Collection

Shallow Aquifer
Cross Sections

DATE:	APPROVED:	FIGURE:
Dec. 2008	CS	SW-SK320

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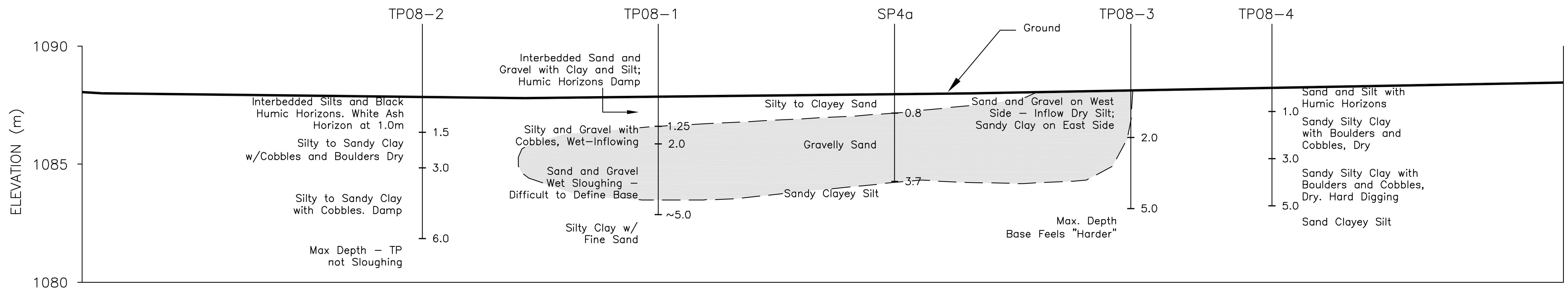
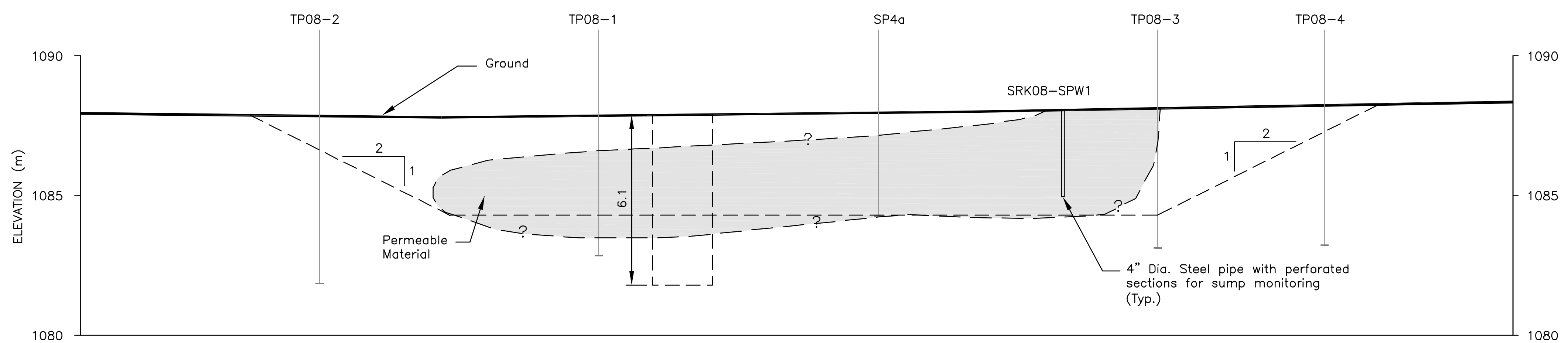


Section 3 – Stratigraphy



Section 3 – Trench and Pipes detail

Scale A 0 5 10 15 20 Metres

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Engineers and Scientists
Vancouver B.C.

Deloitte & Touche

S-Wells Shallow Aquifer Groundwater Collection

Shallow Aquifer Cross Sections

SRK JOB NO.: 1CD003.120

FILE NAME: S–Wells SK310–430.dwg

S-WELLS ACTION PLAN

DATE: Dec. 2008

APPROVED: CS

FIGURE: SW-SK230

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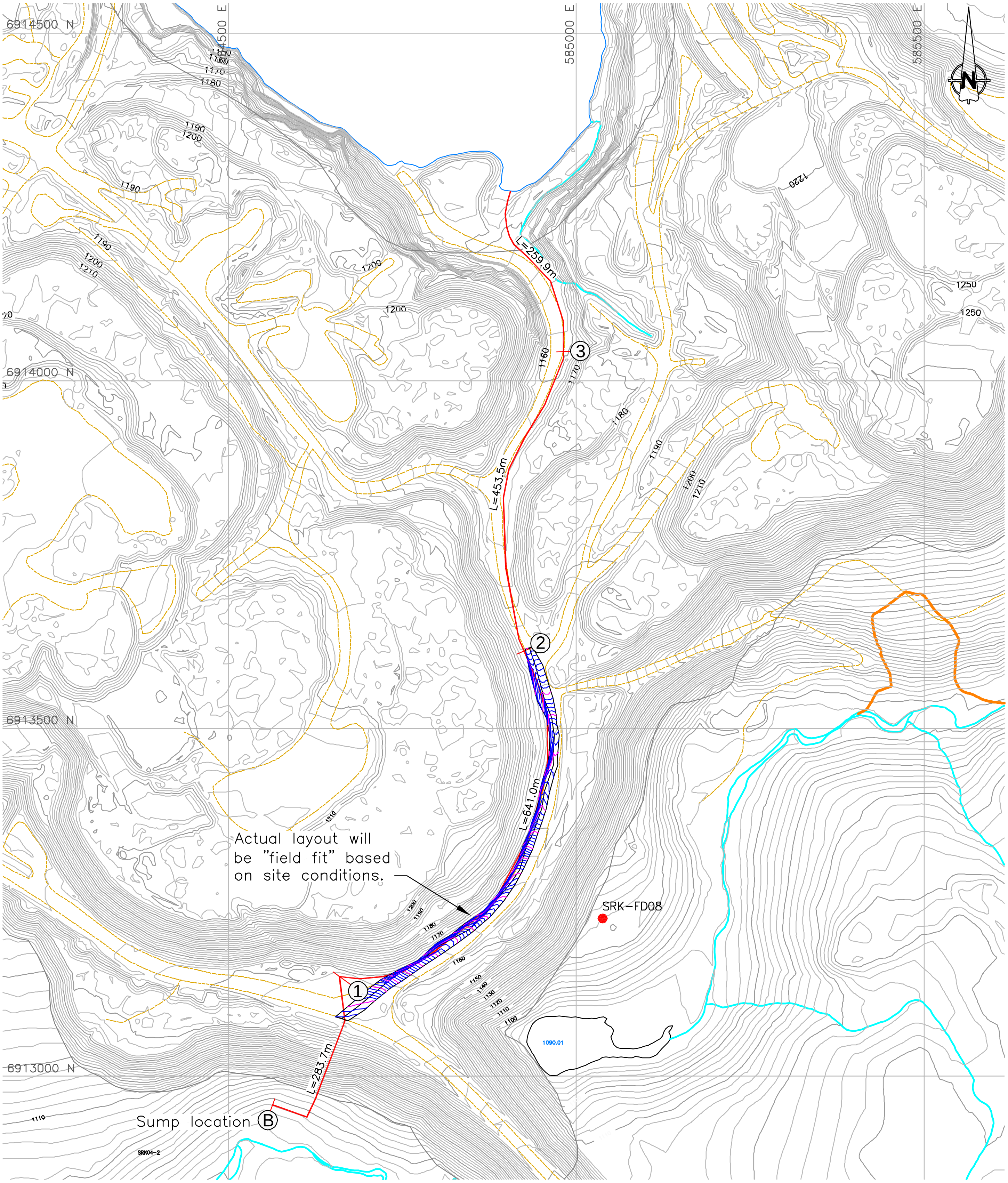
Appendix F.4
Pipeline Components



1:7500

0 100 200 300 400 Meters

SRK Consulting Engineers and Scientists Vancouver B.C.	Deloitte & Touche	Faro SIS
		Pipeline Alignment
SRK JOB NO.: 1CD003.112.0200	FARO MINE SITE	DATE: Dec. 2008
FILE NAME: 2008 Faro Site Plan_SIS.dwg		APPROVED: CS
		FIGURE: SW-SK300

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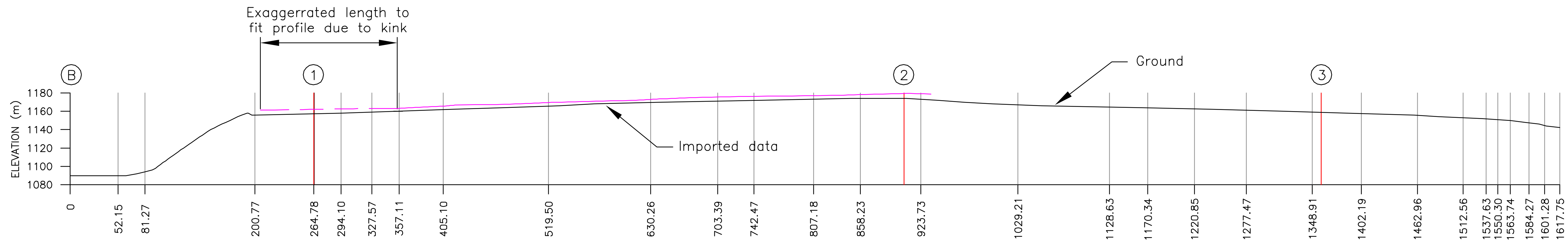
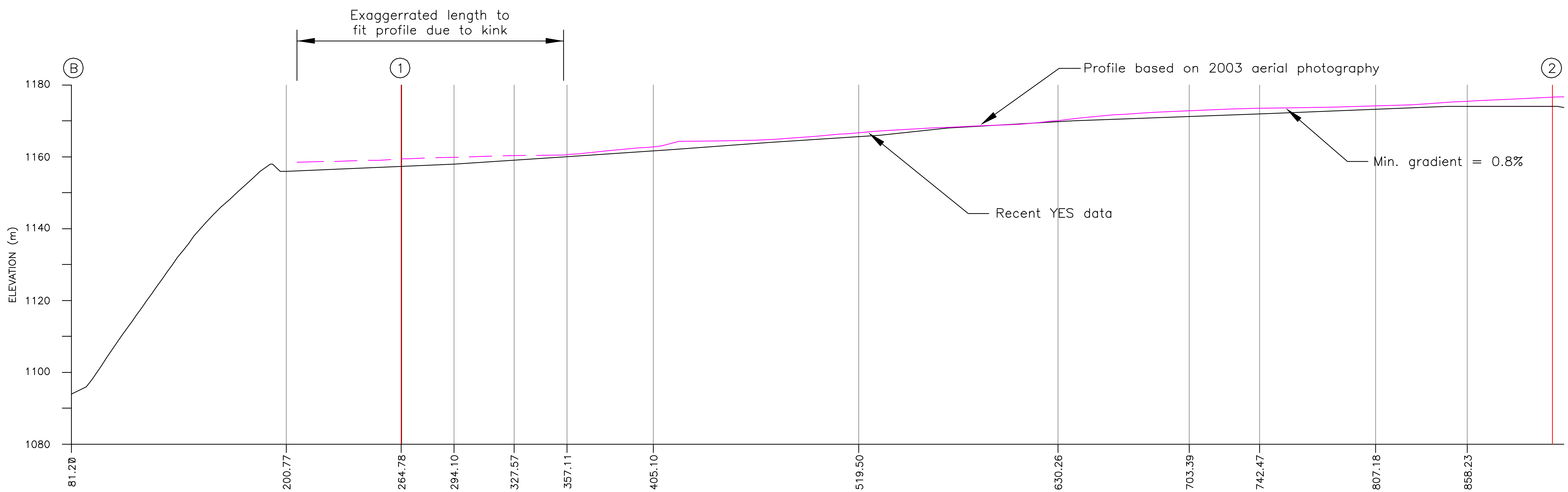


PIPELINE PROFILE
Scale A



PIPELINE PROFILE
Scale B (2X Vertical exaggeration)

Scale A 0 50 100 150 200 250 Meters

Scale B 0 25 50 75 100 125 Metres

SRK Consulting
Engineers and Scientists
Vancouver B.C.

Deloitte & Touche

Faro SIS

Pipeline Profile

FARO MINE SITE

SRK JOB NO.: 1CD003.120

FILE NAME: 2008 Faro Site Plan_SIS.dwg

DATE: Dec. 2008

APPROVED: CS

FIGURE: SW-SK310

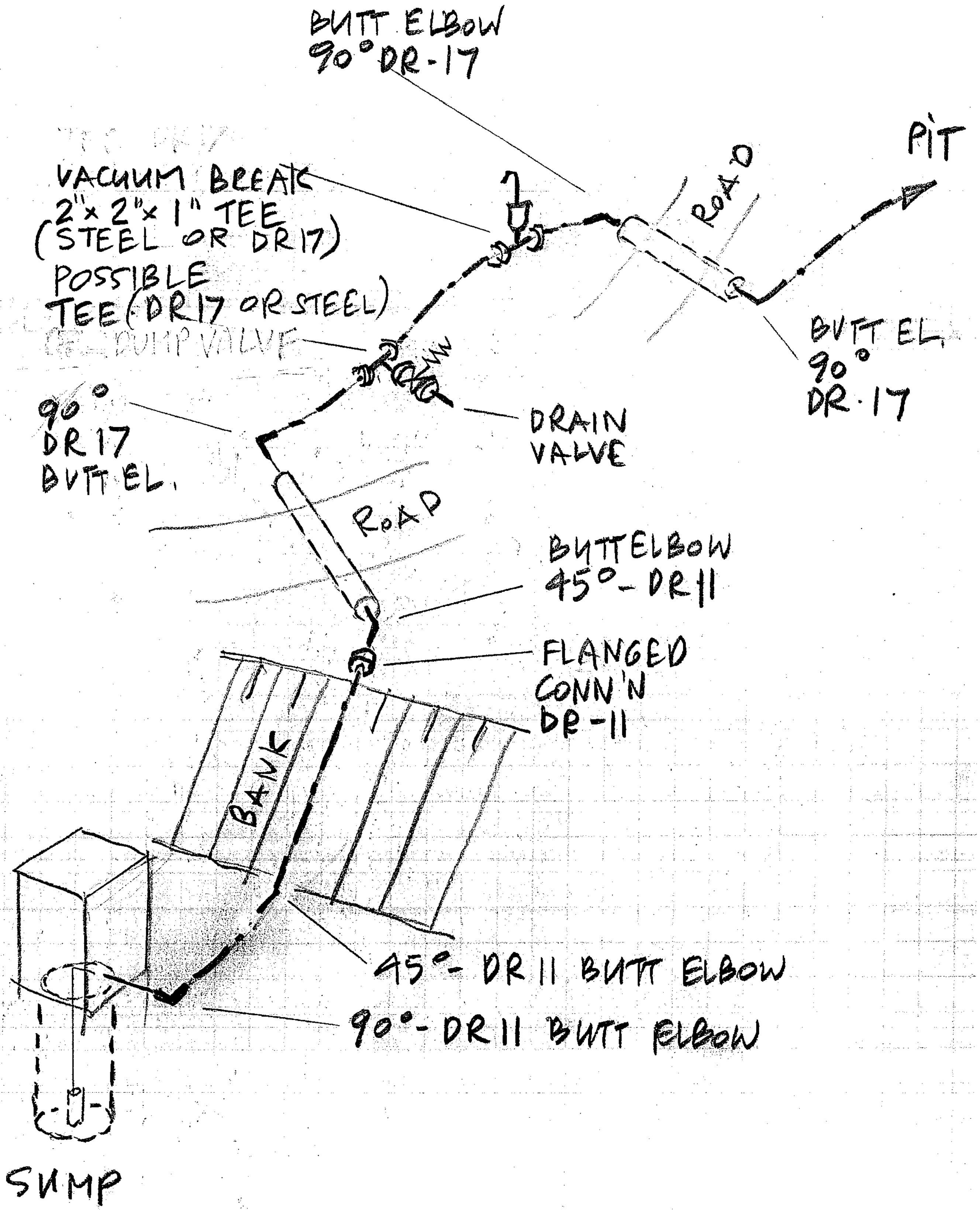
J:\01_SITES\FARO\1000_Deloitte_from GE_Projects\Acad-Faro\2008 Acad Dwgs\2008 Faro Site Plan_SIS.dwg

HATCH

CALCULATION SHEET

SHEET NO.	
1	OF

DESCRIPTION	PROJECT NO.	MADE BY	CHECKED BY
FITTING COUNT	331759	MP DATE DEC 17	DATE



HATCH	CALCULATION SHEET	SHEET NO. 2 OF

DESCRIPTION	PROJECT NO.	MADE BY	CHECKED BY
FITTING COUNT	331759	MP DATE DEC 17	DATE

BILL OF MATERIALS

1. IPS FLANGE ADAPTER 2" DIA, DR 11 HDPE — 2
2. IPS FLANGE ADAPTER 2" DIA, DR 17 HDPE — 5
3. DUCTILE IRON IPS BACK-UP RING, 2" — 7
4. IPS FLANGE ADAPTER GASKET 2" DIA, PTFE GYLON 3540 OR EQ — 1
5. 150# FLANGE GASKET 2" DIA, PTFE GYLON 3540 OR EQ — 6
6. BUTT 90° ELBOW 2" DIA, DR 11 HDPE — 4
7. BUTT 45° ELBOW 2" DIA, DR 11 HDPE — 2
8. BUTT 45° ELBOW 2" DIA, DR 17 HDPE (PROVISIONAL) — 6
9. INSULATION KIT FOR BUTT 90° ELBOW — 4
10. INSULATION KIT FOR BUTT 45° ELBOW — 8

HATCH	CALCULATION SHEET	SHEET NO. 3 OF

DESCRIPTION	PROJECT NO.	MADE BY	CHECKED BY
FITTING COUNT	331759	MP DATE DEC 17	DATE

BILL OF MAT'S CONTINUED:

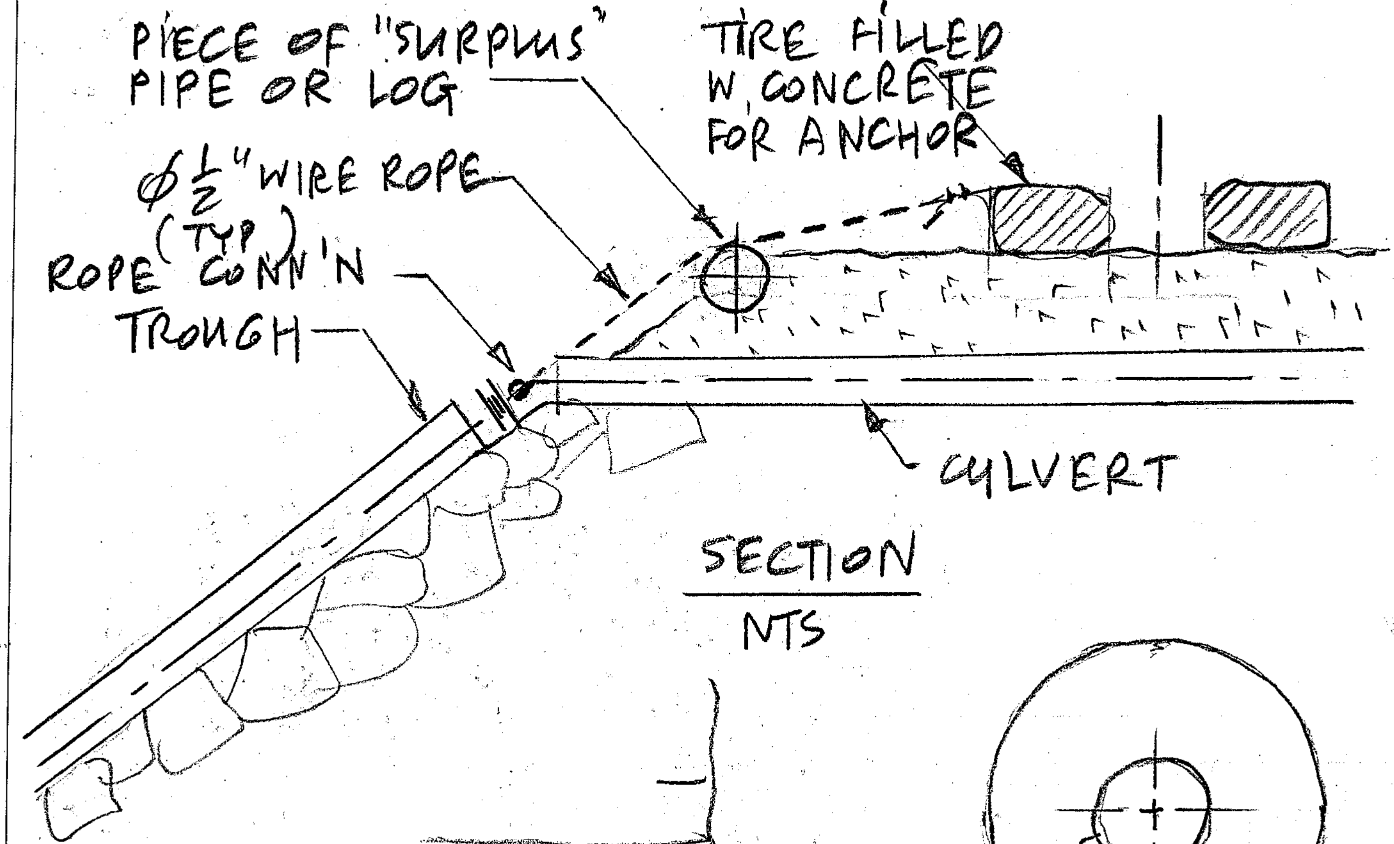
11.	STEEL TEE 2"×2"×2" 150 # FLANGES (PROVISIONAL	1
12.	STEEL TEE 2"×2"×1" 150 # FLANGES c/w 1" NPT BRANCH	1
13,	SCHED 40 1" NPT CLOSE NIPPLE (FOR MOUNTING VACUUM BREAK - INLET & OUTLET)	2
14.	5/8" DIA BOLTS FOR FLANGED CONNECTIONS – 4.5" LG	30
15.	5/8" EYEBOLTS – 6.0" LG	2
16.	INSULATION "KIT" FOR FLANGED CONNECTION	1
17.	INSULATION "KIT" FOR TEE & DRAIN VALVE (CUSTOM)	1
18.	INSULATION "KIT" FOR TEE & VACUUM BREAK (CUSTOM)	1

HATCH

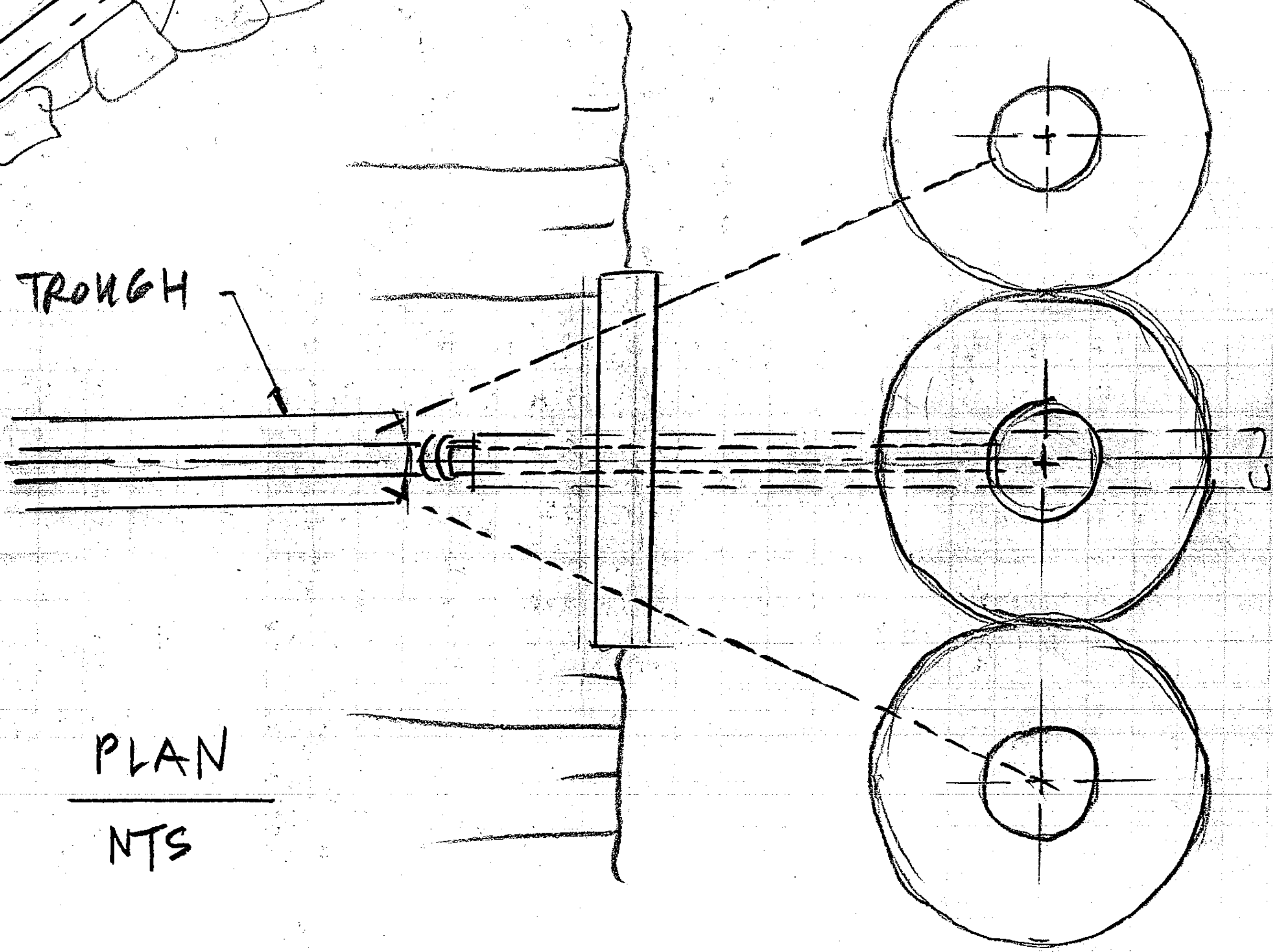
CALCULATION SHEET

SHEET NO. 4 OF ____

DESCRIPTION	PROJECT NO.	MADE BY	CHECKED BY
UPPER ANCHOR G.A.	331759	MP DATE DEC 16	DATE



SECTION
NTS

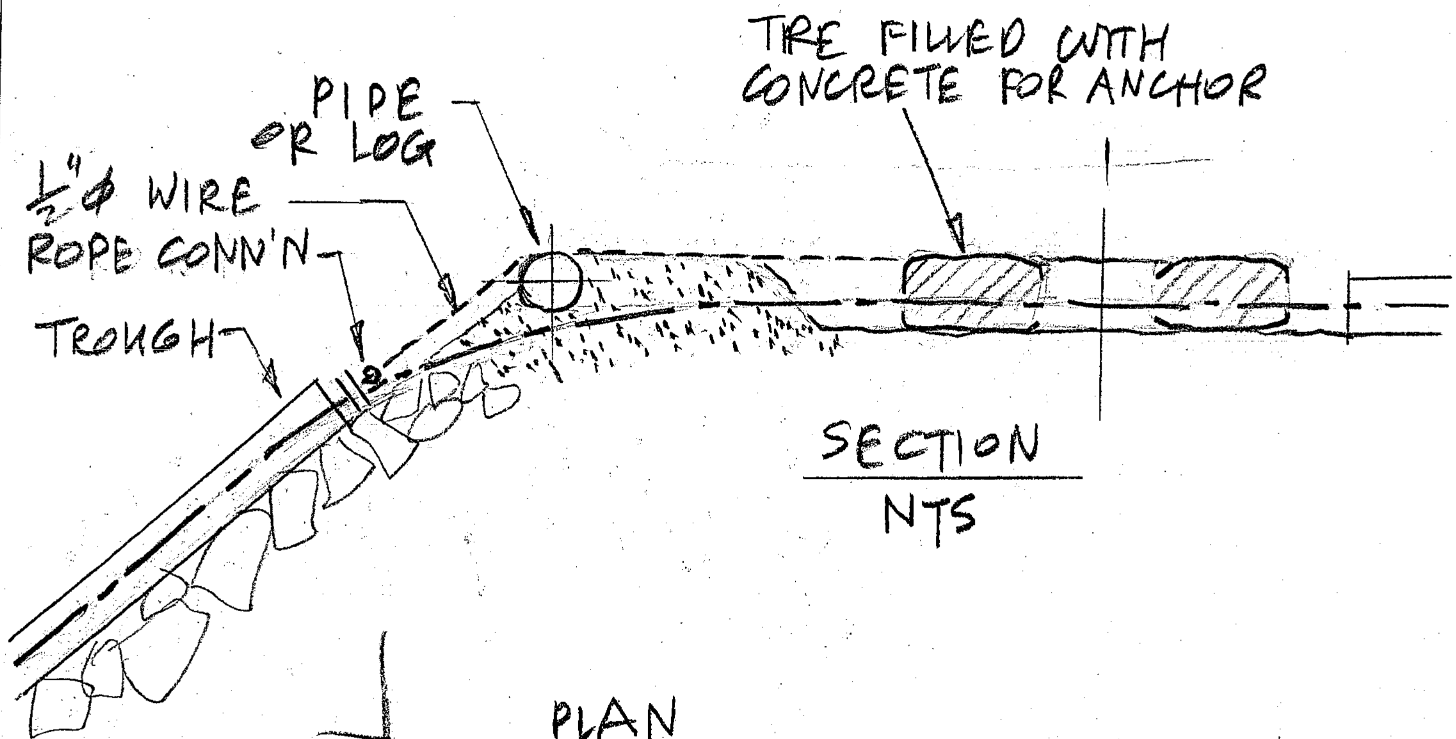


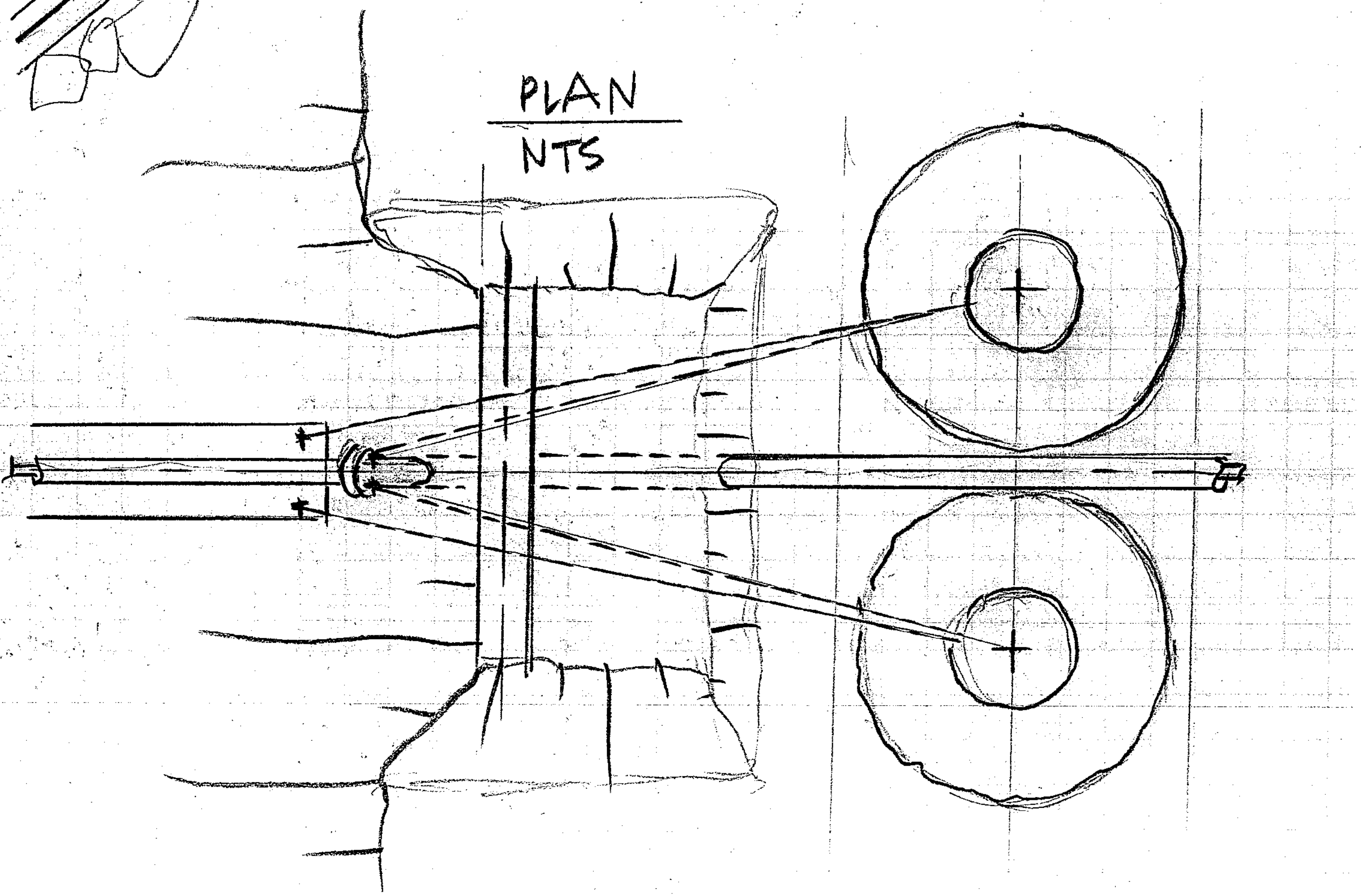
PLAN
NTS

HATCH	CALCULATION SHEET	SHEET NO. 5 OF

DESCRIPTION	PROJECT NO.	MADE BY	CHECKED BY
UPPER ANCHOR G.A.	331759	MP DATE DEC 16	DATE

OPTION WITH "NO ELBOW"



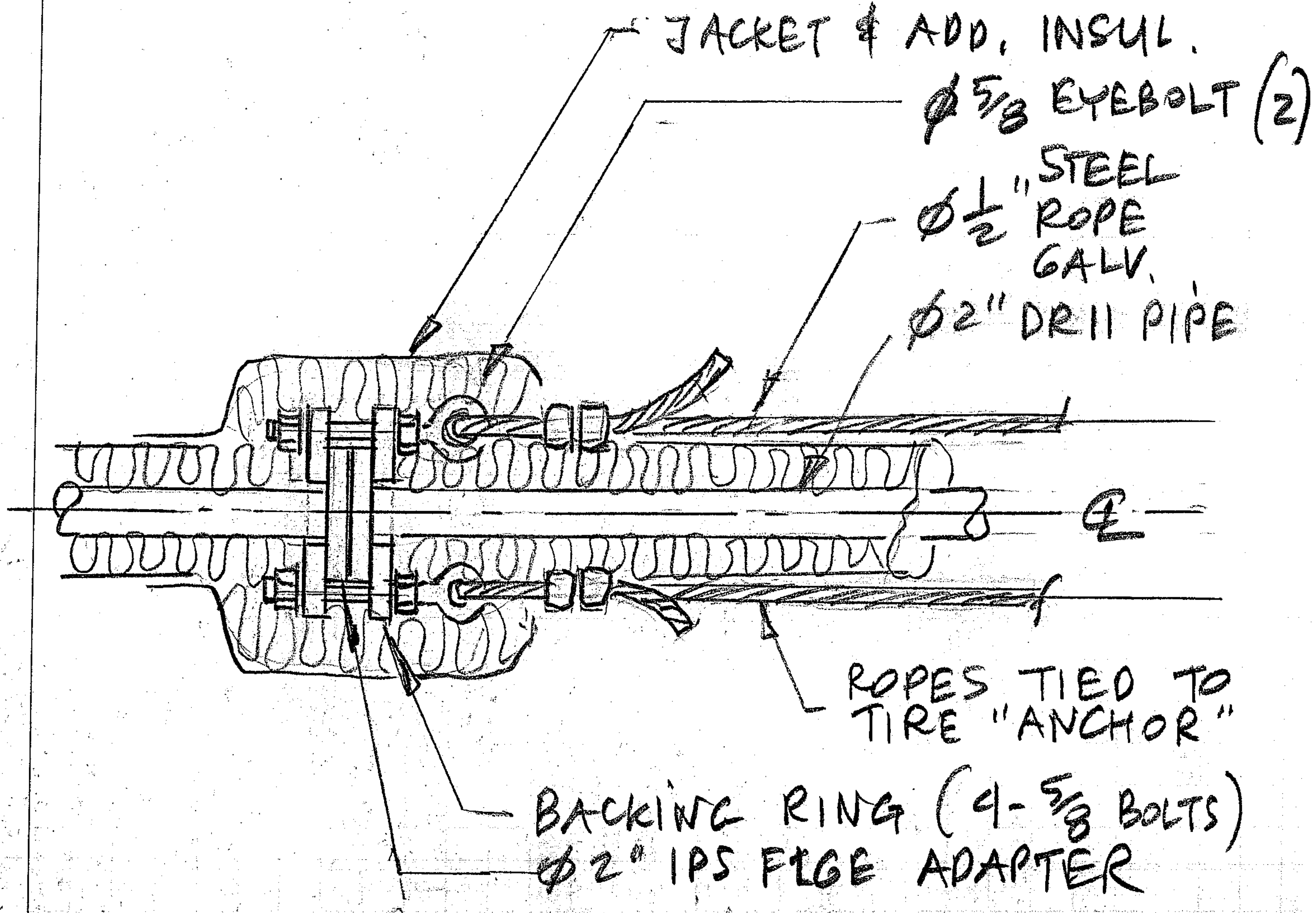


HATCH™

CALCULATION SHEET

SHEET NO. 6 OF

DESCRIPTION	PROJECT NO.	MADE BY	CHECKED BY
UPPER ANCHOR DETAILS	331759	MP DATE DEC 16	DATE



ROPE CONN'N DETAIL

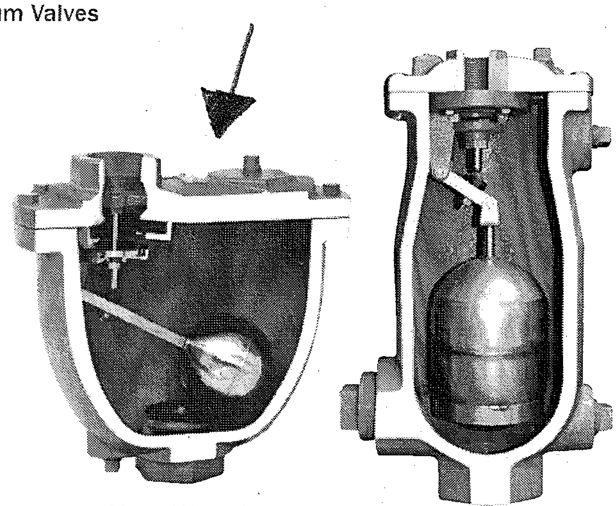
Combination Air Valves

Operational Highlights:

- Provides the functions of both Air Release and Air/Vacuum Valves
- Exhausts large quantities of air at system start-up
- Releases air pockets during system operation
- Provides pipeline vacuum protection

Product Features:

- Single body incorporates both features within one valve
  - More compact and economical
- Dual body consists of two independent valves
  - Allows individual maintenance while still protecting the pipeline
  - Wider range of sizing options
- Inlets and outlets are equal to full nominal size
- Unconditionally guaranteed stainless steel floats
- Stainless steel 316 internal trim
- Non-clog design eliminates backwashing
- Exclusive high/low pressure resilient seating



Clean Water*

Wastewater

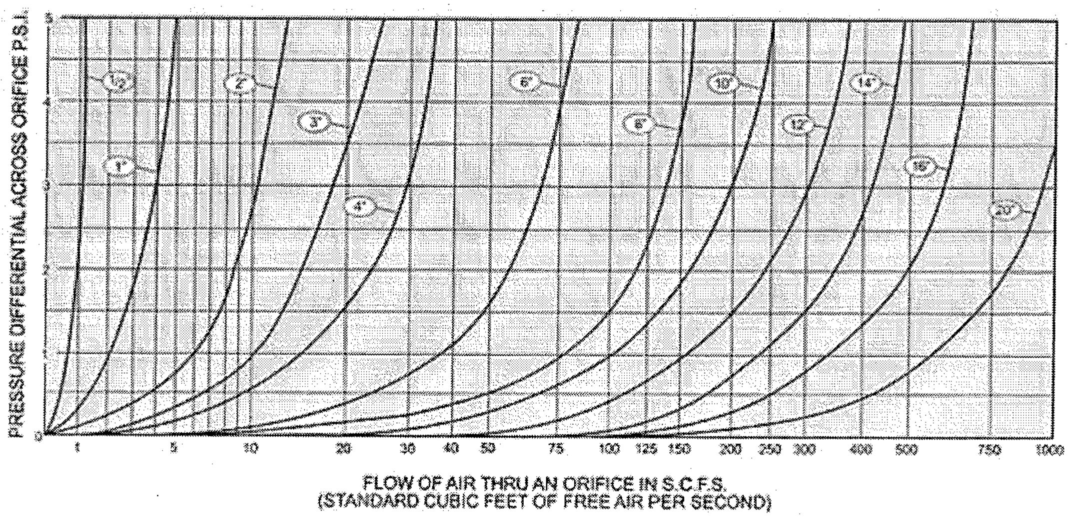
Optional Accessories:

- Outlet hood with screen (prevents debris from entering valves)
- Ball, plug and butterfly isolation valves (allows valve maintenance)
- Inflow Preventer on outlet (stops flood water and resulting contamination from entering pipeline)
- Backwash kit (for severe wastewater applications)

CLASSIFIED UL *WATER QUALITY

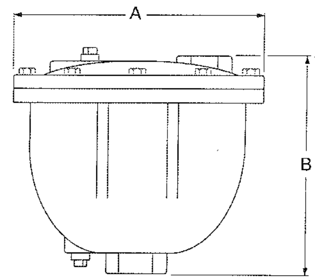
MATERIALS OF CONSTRUCTION		
COMPONENT	STANDARD	OPTIONAL
Body and Cover	Cast Iron ASTM A126 Class B Class 125 and 250	Ductile Iron ASTM A536 Grade 65-45-12 Stainless Steel ASTM A351 Grade CF8M
Trim	Type 316 Stainless Steel	
Coating	Universal Alkyd Primer (external)	Non-Stick Fusion Bonded Epoxy (internal & external)

FLOW CAPACITY OF COMBINATION AIR VALVES

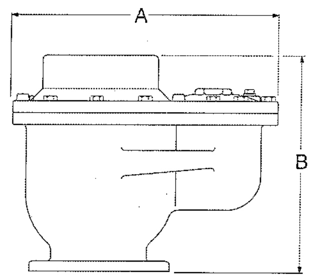


Combination Air Valves
Installation Dimensions

WATER COMBINATION AIR VALVES (SINGLE BODY)						
Inlet Size	Outlet Size	Model Number	CWP PSI	Orifice Size	Dimensions	
					A	B
1" NPT	1" NPT	201C.2	300	5/64"	11 3/8"	10 1/2"
2" NPT	2" NPT	202C.2	300	3/32"	14"	13"
3" NPT	3" NPT	203C.2	300	3/32"	16"	15"
3" 125lb Flg	3" NPT	203C.14	150	3/32"	16"	16 3/4"
3" 250lb Flg	3" NPT	203C.15	300	3/32"	16"	17 1/4"
4" NPT	4" NPT	204C.2	300	3/32"	18 1/2"	17"
4" 125lb Flg	4" NPT	204C.14	150	3/32"	18 1/2"	19 3/4"
4" 250lb Flg	4" NPT	204C.15	300	3/32"	18 1/2"	20 1/4"
6" 125lb Flg	6" NPT	206C	150	3/8"	21"	20 1/4"
6" 250lb Flg	6" NPT	256C	300	7/32"	21"	20 1/4"
8" 125lb Flg	8" NPT	208C	150	3/8"	25"	23 1/2"
8" 250lb Flg	8" NPT	258C	300	7/32"	25"	23 1/2"

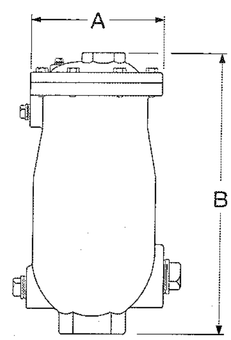


201C.2 - 204C.15
Single Body Combination
Air Valves

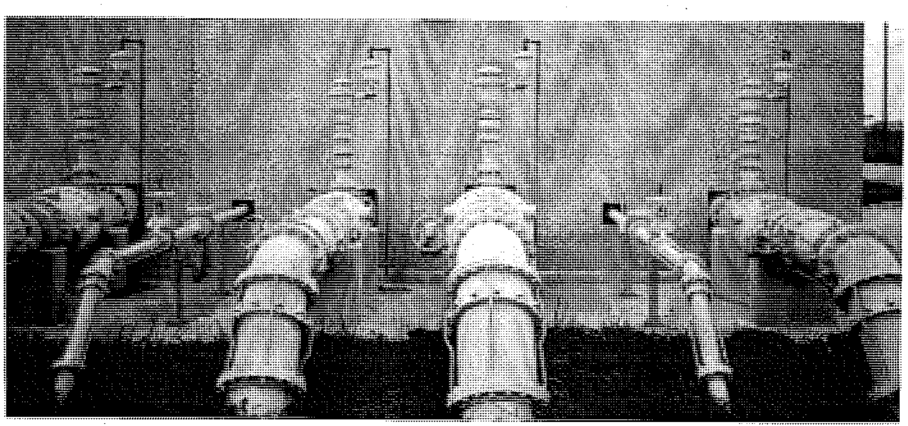


206C - 258C
Single Body
Combination Air Valves

WASTEWATER COMBINATION AIR VALVES (SINGLE BODY)						
Inlet Size	Outlet Size	Model Number	CWP PSI	Orifice Size	Dimensions	
					A	B
2" NPT	1" NPT	801A	150	1/8"	7"	14 15/16"
2" NPT	2" NPT	802A	150	9/64"	9 1/2"	18 1/16"
3" NPT	3" NPT	803A	150	11/64"	11"	23 1/2"
4" NPT	4" NPT	804	150	11/64"	11"	23 1/2"



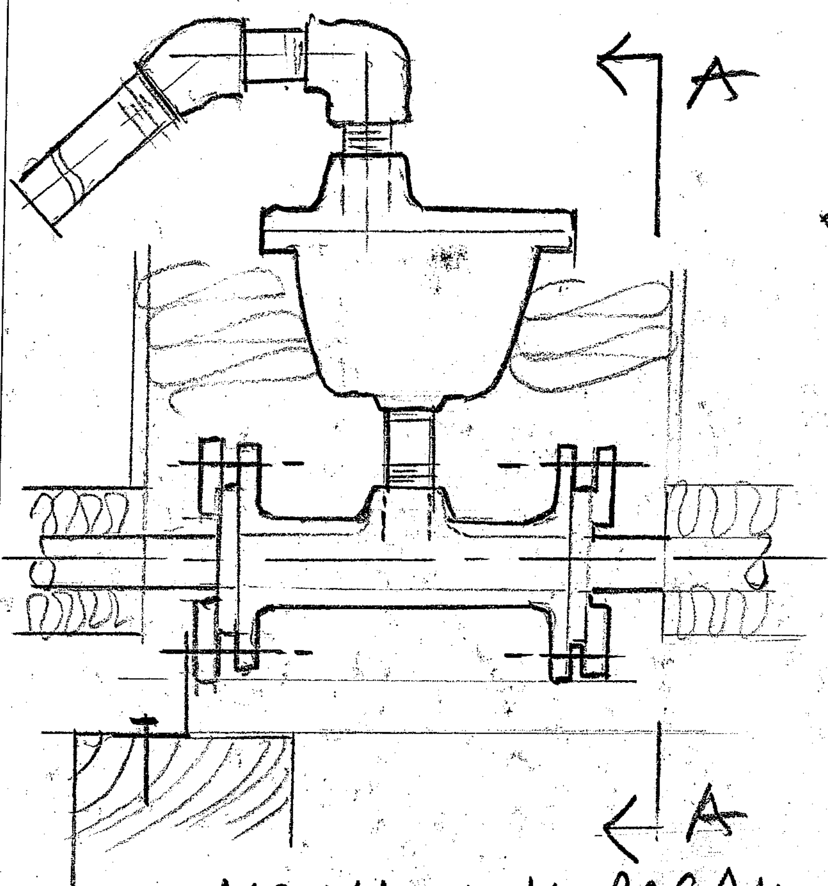
801A - 804
Wastewater
Single Body Combination
Air Valves



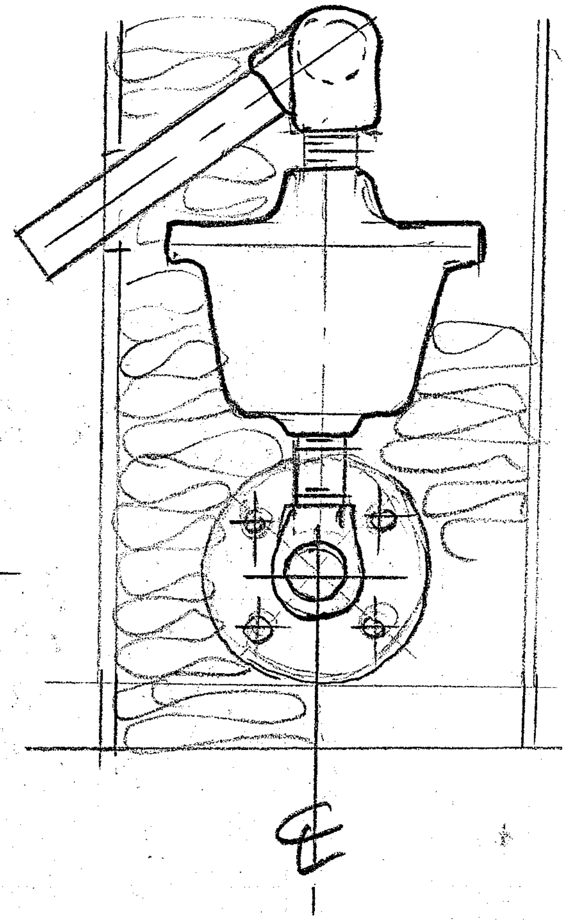
Surge-Suppression Air Valves and Isolation Valves in a pump discharge application.

HATCH	CALCULATION SHEET	SHEET NO. 7 OF

DESCRIPTION	PROJECT NO.	MADE BY	CHECKED BY
AIR/VACUUM BREAK GA	331759	MP DATE DEC 7	DATE



AIR VACUUM BREAK GA



A - A

PRECISION SERVICE & PUMPS INC.
EST. 1992

1334 Riverside Road
Abbotsford, B.C.
V2S 8J2
P604-850-7010 F604-850-9666
www.precision-pumps.com

Estimate

Date	Estimate #
12/18/2008	1890

Name / Address
ANVIL RANGE MINING CORPORATION P.O. BAG 1,000 FARO, YT Y0B 1K0

P.O. No.	Terms	Rep	Work Order No.
	DUE UPON RECEIPT	ML	6982

Qty	Description	Rate	Total
1	1" Apsco Air/Vacuum valve 210C.2	571.20	571.20T
1	2" Singer electric valve, Normally open , 106-PGX-SC-NO, 120 VAC solenoid, energized to close, 250psi rated	1,873.60	1,873.60T
	Business Number: 893380634		

Subtotal	$2,444.80
GST	$122.24
PST	$171.14
Total	$2,738.18

** This is an estimate only, not a contract. This estimate is for completing the works described above, based upon our evaluation of the work requirements. It does not include allowance for wholesale price increases or for additional labour and materials which may be required due to unforeseen conditions. Quotation valid for 15 days.

NOTE: All of Precision's Certified Pump Installers are Class 1 and 2, as certified by the Canadian Groundwater Association, as well as, Registered under the Water Act as Qualified Well Pump Installers in the Province of British Columbia.

Signature ________________________

12850-87th Avenue
Surrey, BC. Canada. V3W 3H9
Ph: 604-594-5404
Fx: 604-594-8845
www.singervalve.com

SINGER MODEL 106-PGX-SC-NO
Normally Open Solenoid Control Valve
Schematic A-8303A

DESCRIPTION:

Model 106-PGX-SC-NO is a globe pattern valve designed for two position (open or closed) operation.

The position of the Main Valve is selected electrically by energizing or de-energizing the Solenoid Valve.

An external spring lift assists in opening the Main Valve at low operating pressures.

A fairly high flow is required to close the valve if Remote Pressure (10 psi or more higher than valve inlet pressure) is not used.

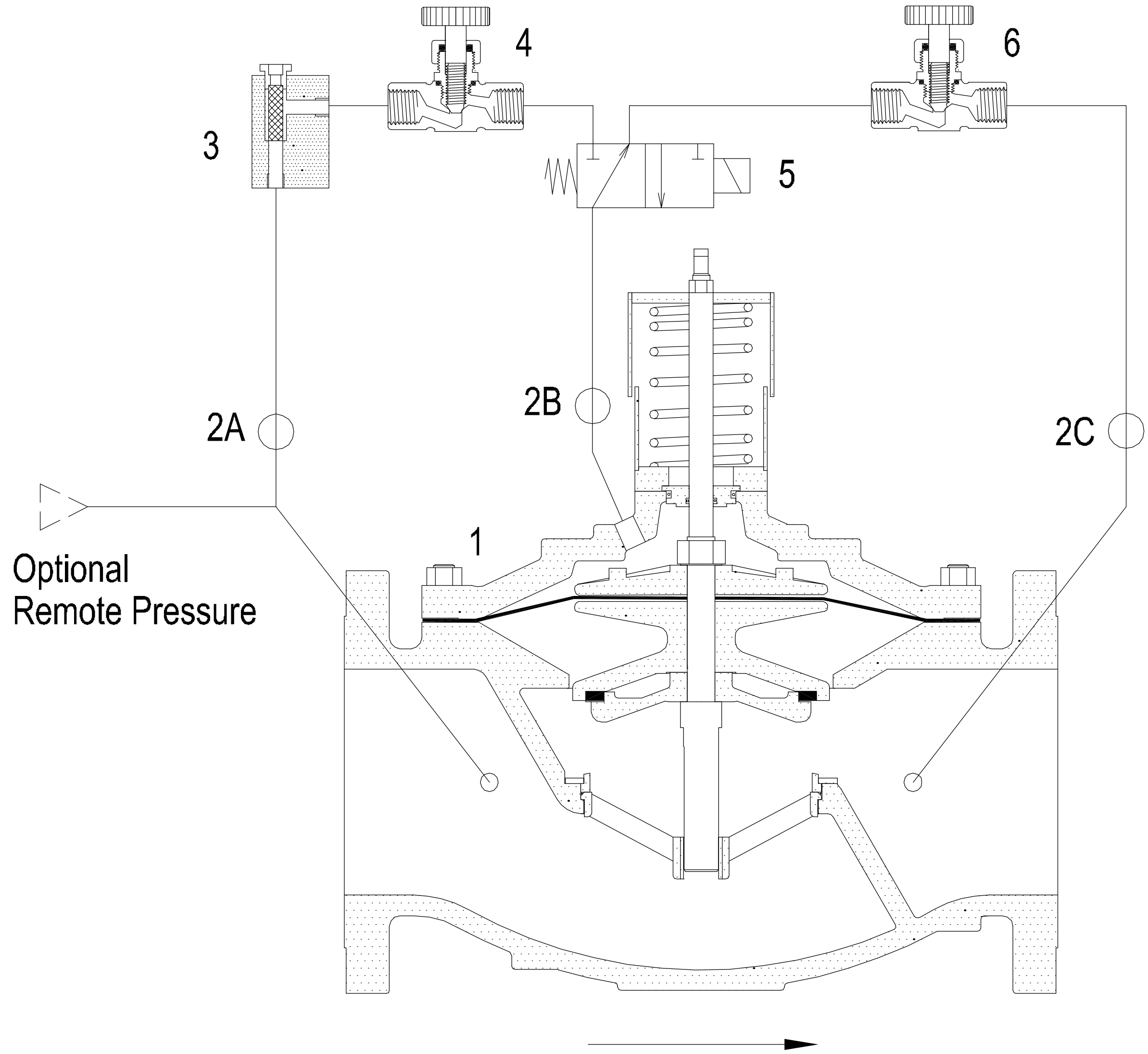
DESCRIPTION OF OPERATION:

Main Valve (1) closes when the inlet pressure or Remote Pressure is directed to the bonnet and opens when the bonnet is vented to downstream. Refer to 106-PGX "Description of Operation". Solenoid Valve (5) connects the bonnet to upstream or downstream, as required.

Opening Speed Control (6) limits the rate of flow from the bonnet to downstream thereby controlling the rate of opening of the Main Valve. Closing Speed Control (4) limits the rate of flow to the bonnet from upstream thereby controlling the rate of closing of the Main Valve.

INSTALLATION:

1. Refer to 106/206-PGX "Installation".
2. If Optional Remote Pressure is to be used, disconnect Strainer (3) and Isolating Valve (2A) from Main Valve inlet and connect to Remote Pressure. Remote Pressure must be 10 psi or more higher than the inlet pressure of Main Valve (1).
3. Check Solenoid Valve name plate for correct pressure. Check voltage at the side of the coil (not the name plate).
4. Connect a suitable power source to the solenoid. Refer to solenoid valve instructions. **Never energize an A.C. coil when the coil is removed from the solenoid valve; the coil will be destroyed in seconds.**



1. Main Valve - Model 106-PGX or 206-PGX.
2. Isolating Valve.
3. Strainer - Model J0098A.
4. Closing Speed Control - Model 852-B.
5. Solenoid Valve.
6. Opening Speed Control - Model 852-B.

SINGER MODEL 106/206-PGX-SC

Solenoid Control Valve (Normally Open Shown)

SINGER VALVE INC. 12850-87th avenue surrey, bc canada. v3w-3h9	
Date: July 16, 1998	Appd. By:
Drawn By: Scott Grover	A-8303A
106/206-PGX-SC	

12850-87th Avenue
Surrey, BC. Canada. V3W 3H9
Ph: 604-594-5404
Fx: 604-594-8845
www.singervalve.com

SINGER MODEL 106-PGX-SC-NO
Normally Open Solenoid Control Valve
Schematic A-8303A

DESCRIPTION:

Model 106-PGX-SC-NO is a globe pattern valve designed for two position (open or closed) operation.

The position of the Main Valve is selected electrically by energizing or de-energizing the Solenoid Valve.

An external spring lift assists in opening the Main Valve at low operating pressures.

A fairly high flow is required to close the valve if Remote Pressure (10 psi or more higher than valve inlet pressure) is not used.

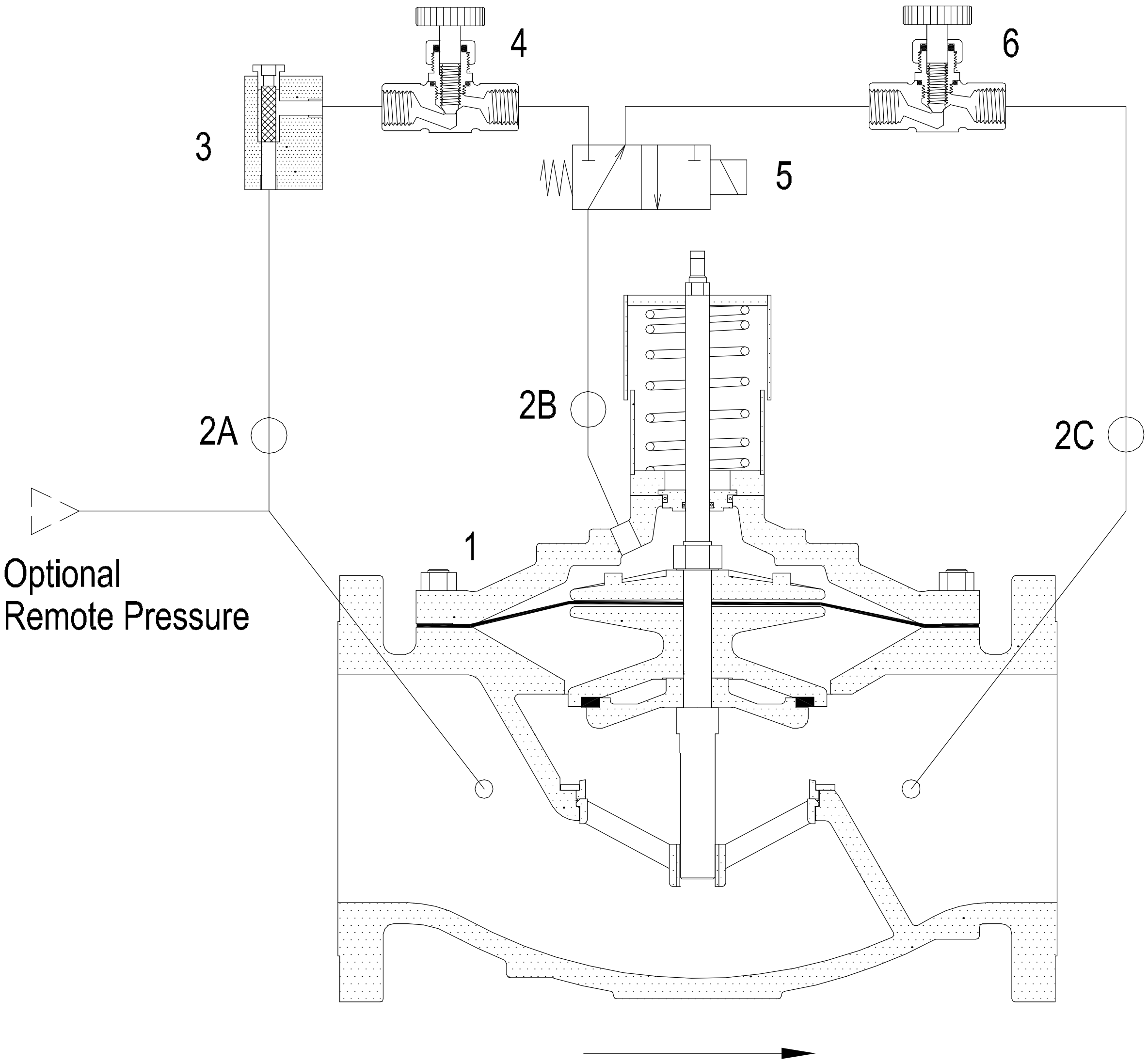
DESCRIPTION OF OPERATION:

Main Valve (1) closes when the inlet pressure or Remote Pressure is directed to the bonnet and opens when the bonnet is vented to downstream. Refer to 106-PGX "Description of Operation". Solenoid Valve (5) connects the bonnet to upstream or downstream, as required.

Opening Speed Control (6) limits the rate of flow from the bonnet to downstream thereby controlling the rate of opening of the Main Valve. Closing Speed Control (4) limits the rate of flow to the bonnet from upstream thereby controlling the rate of closing of the Main Valve.

INSTALLATION:

1. Refer to 106/206-PGX "Installation".
2. If Optional Remote Pressure is to be used, disconnect Strainer (3) and Isolating Valve (2A) from Main Valve inlet and connect to Remote Pressure. Remote Pressure must be 10 psi or more higher than the inlet pressure of Main Valve (1).
3. Check Solenoid Valve name plate for correct pressure. Check voltage at the side of the coil (not the name plate).
4. Connect a suitable power source to the solenoid. Refer to solenoid valve instructions. **Never energize an A.C. coil when the coil is removed from the solenoid valve; the coil will be destroyed in seconds.**

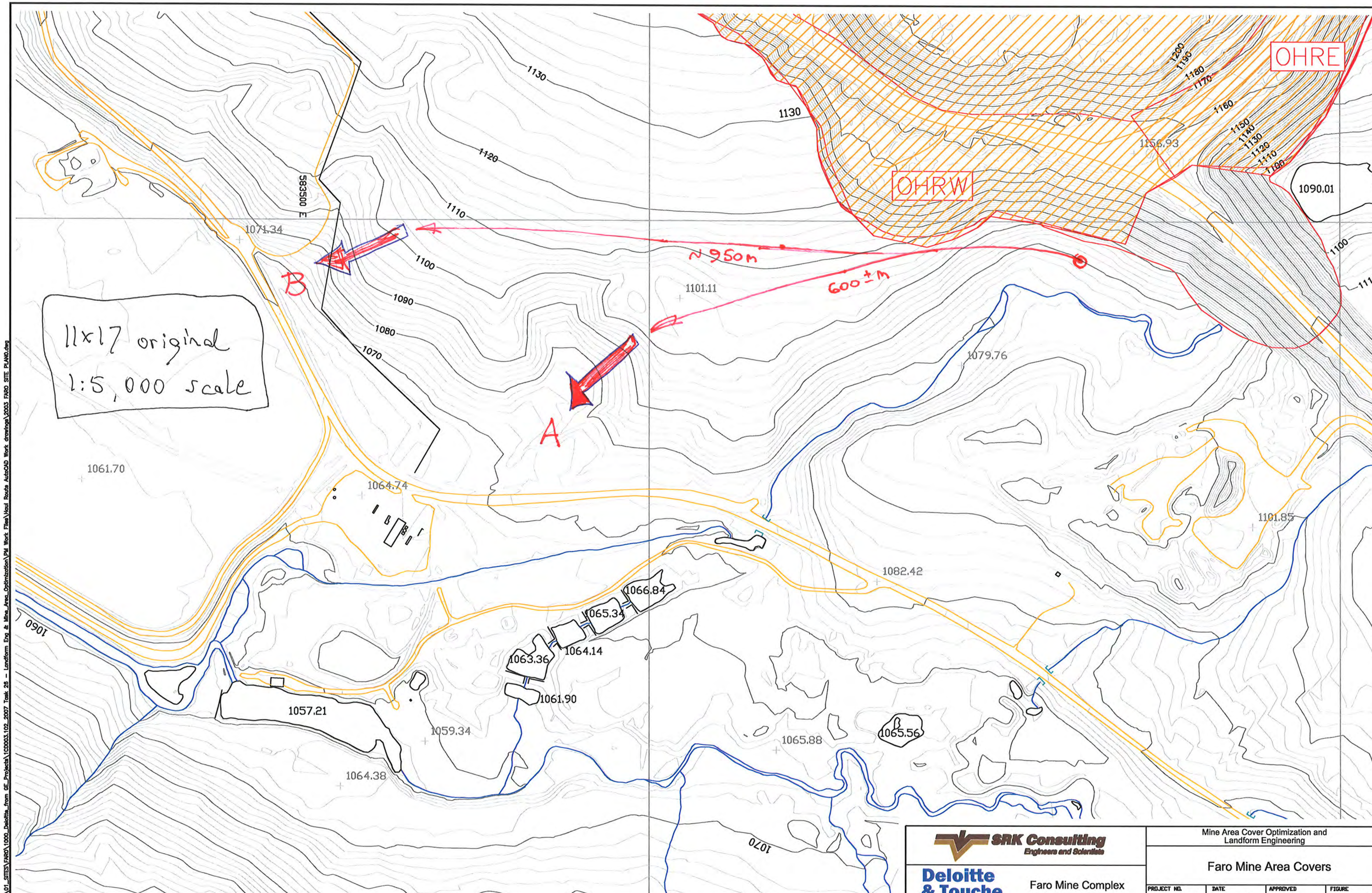


1. Main Valve - Model 106-PGX or 206-PGX.
2. Isolating Valve.
3. Strainer - Model J0098A.
4. Closing Speed Control - Model 852-B.
5. Solenoid Valve.
6. Opening Speed Control - Model 852-B.

SINGER MODEL 106/206-PGX-SC

Solenoid Control Valve (Normally Open Shown)

SINGER VALVE INC. 12850-87th avenue surrey, bc canada. v3w-3h9	
Date: July 16, 1998	Appd. By:
Drawn By: Scott Grover	A-8303A
106/206-PGX-SC	



SRK Consulting Engineers and Scientists

Deloitte & Touche

Faro Mine Complex

Mine Area Cover Optimization and Landform Engineering

Faro Mine Area Covers

PROJECT NO.	DATE	APPROVED	FIGURE
1CD003.102	June 2008		1

Appendix G
Daily Reports for Construction/Implementation

Appendix G.1

Pelly Force Accounting Sheets

Pelly Construction Ltd.
111 Industrial Road, Whitehorse, Yukon Y1A 2T7
Phone: (867) 667-6161 • Fax: (867) 667-4194

DAILY FORCE ACCOUNT SHEET

Date: Jan 15-09

Shift: -11 morning
-0 - Afternoon

Equipment - Type Labour - Name	Unit No.	Hours	Rate	Total	Remarks
200 excavator		10			build road way to 5 wells site
D-5 cat operator	only	10			
1-Dump Truck		10			
1-Dump Truck		10			
1- D-9 Cat	operator only	10			
1-Fusing Tech		10			Fusing pipe
2 Fusing laborers		10			
1-Foreman		10			
2- service Trucks		daily			Generator used to plug in machines
1-light plant Generator		daily			at night
1-Generator For Fusing		daily			

Total for Sheet: ____________

Authorization: ____________

Pelly Construction ____________

Pelly Construction Ltd.
111 Industrial Road, Whitehorse, Yukon Y1A 2T7
Phone: (867) 667-6161 • Fax: (867) 667-4194

DAILY FORCE ACCOUNT SHEET

Date: Jan 16 - 09

Shift: -5 °C morning, 0 - Afternoon

Equipment - Type / Labour - Name	Unit No.	Hours	Rate	Total	Remarks
200 excavator		10			build rd to 5 wells
D-5 cat operater only		10			haul drain rock to 5 well site
1- Dump truck		10			
1- Dump Truck		10			
D-9 cat operater only		10			
1-Fusing Tech		10			Fusing pipe
2 Fusing laborers		10			
1- Foreman		10			
2-service trucks		daily			
1- light plant Generator		daily			Generator used For machine plug ins
1-Generator for Fusing		daily			

Total for Sheet: ______

Authorization: [signature]

Pelly Construction [signature: W Dean]

WILLOW PRINTERS LTD

Pelly
Construction Ltd.

111 Industrial Road, Whitehorse, Yukon Y1A 2T7
Phone: (867) 667-6161 • Fax: (867) 667-4194

DAILY FORCE ACCOUNT SHEET

Date: Jan 17-09

Shift: -3 Morning +4 afternoon

Equipment - Type Labour - Name	Unit No.	Hours	Rate	Total	Remarks
200 Excavator		10			load drain rock dig out embankment ontop of haul rd
D-5 Cat operator only		10			
1- Dumptruck		10			haul drain rock 13 loads
1- Dump truck		10			haul drain rock 15 loads
D-9 cat operator only		5			help rip embankment push dirt out of way of pipe line access
1-Fusing Tech		10			Fusing pipe + get pipeline chute ready For laying over bank
2- Laborers		10			
1- Foreman		10			
1- Generator		daily			used power For power tools working on chute

Total for Sheet: ______

Authorization: [signature]

Pelly Construction W Dear

Pelly Construction Ltd.

111 Industrial Road, Whitehorse, Yukon Y1A 2T7
Phone: (867) 667-6161 • Fax: (867) 667-4194

DAILY FORCE ACCOUNT SHEET

Date: Jan 18-09

Shift: +3 morning +8 - afternoon

Equipment - Type Labour - Name	Unit No.	Hours	Rate	Total	Remarks
200 Hoe		10			dig out roadcrossing load drain rock,
D-9 cat operater	only	5			Rip roadcrossing
1- Dump Truck		10			haul drain rock 10 load
1- Dump Truck		10			haul drain rock 10 loads
D-5 cat		5			Clear snow + drain rock
325 cat Hoe		10			dig out behind deep well for pipeline
1- Foreman		10			by pit roadcrossing
2 service trucks		daily			

Total for Sheet: ____________

Authorization: [signature]

Pelly Construction [signature]

Pelly
Construction Ltd.
111 Industrial Road, Whitehorse, Yukon Y1A 2T7
Phone: (867) 667-6161 • Fax: (867) 667-4194

DAILY FORCE ACCOUNT SHEET

Date: Jan 19-09

Shift: 0°C morning / +4 - afternoon

Equipment - Type / Labour - Name	Unit No.	Hours	Rate	Total	Remarks
200 Hoe			10		load drain rock finish digging for road crossing
1- Dump Truck			10		haul drain rock to
1- Dump Truck			10		5 wells
1-Foreman			10		finish road crossing at top of bank, extend 1/2 chi[illegible]
3 laberers			10		for embankment distance put guide rope down bank with boat
325 Hoe			10	stockpile drainrock	predig at 5 wells Frozen ground
D-5 cat operator only			5		clear more snow + push back extra dirt to make dike
2 service Trucks			daily		

Total for Sheet: __________

Authorization:

Pelly Construction W Dear

Pelly Construction Ltd.
111 Industrial Road, Whitehorse, Yukon Y1A 2T7
Phone: (867) 667-6161 • Fax: (867) 667-4194

DAILY FORCE ACCOUNT SHEET

Date: Jan 20 - 09

Shift: 0° morning +4 afternoon

Equipment - Type Labour - Name	Unit No.	Hours	Rate	Total	Remarks
200 Hoe		10			load drain rock help guide 1/2 chute down bank
1-Dump Truck		6			haul drain rock
1-Dump Truck		6			
D-9 cat operator only		5			anchor onto 1/2 chute to push over bank
1-Foreman		10			
3 labourers		10			Prepare 1/2 chute & help guide 1/2 chute over bank c/w radios etc men at top & bottom
2 labourers		5			at bottom with guide Rope & help guide 1/2 ch
325 Hoe		10			stockpile drain rock predig at 5 wells
D-5 cat operator only		5			push extra frozen grou away from 5 well site

Total for Sheet: -

Authorization: [signature]

Pelly Construction W Dear

Pelly Construction Ltd.
111 Industrial Road, Whitehorse, Yukon Y1A 2T7
Phone: (867) 667-6161 • Fax: (867) 667-4194

DAILY FORCE ACCOUNT SHEET

Date: Jan 21-09

Shift: -6 morning -10-14- afternoon

Equipment - Type Labour - Name	Unit No.	Hours	Rate	Total	Remarks
325 Hoe		10			pre dig Frozen ground at 5-wells to grade
D-9 cat operator only		10			Rip roadcrossing at deep well
200 Hoe		10			dig out trench for road crossing at deep well + backfill also haul pipe to deepwell etc lay pipe in
3 laborers		10			install cables on anchors adjust pipe + cut off at bottom also help at deepwell roadcrossing + culvert at bottom of hill installed
D-5 cat		5			push Frozen dirt away at 5 wells for site prep
1-Dump Truck		2			load + haul sand down to culvert at 5 well road crossing
Foreman		10			
2 service trucks		daily			
1-light plant		daily			plug in machines at 5 wells
1-Generator		daily			use for hand tools power + machine plug in
1-Dump Truck					Demob back to Whse

Total for Sheet: ________

Authorization: ________

Pelly Construction W Dear

Pelly Construction Ltd.

111 Industrial Road, Whitehorse, Yukon Y1A 2T7
Phone: (867) 667-6161 • Fax: (867) 667-4194

DAILY FORCE ACCOUNT SHEET

Date: Jan 22- 09

Shift: -21°C morning -25 afternoon

Equipment - Type Labour - Name	Unit No.	Hours	Rate	Total	Remarks
200 Hoe		10			~~Mob Hoe down to Swells~~ use 2 Hoe's to dig sump
325 Hoe		10			Start to dig sump Trench 2 Hoe's to move muck away
D-5 Cat operator only		10			use D-5 to push muck away from Trench area
D-9 cat operator only		1			mob back to Gatehouse line up
1- Foreman		10			
3 laborers		10			haul bentonite mat to sump, help put matting in along wall of sump Trench also fusing more pipe for embankment length
2 service Trucks		daily			
1- Generator		daily			Fusing pipe
					Sump Trench digging bank holding up not to much water put in 45 ft of Trench, cloth + drain rock

Total for Sheet: ______

Authorization: ______ [signature]

Pelly Construction W Deer

Pelly Construction Ltd.
111 Industrial Road, Whitehorse, Yukon Y1A 2T7
Phone: (867) 667-6161 • Fax: (867) 667-4194

DAILY FORCE ACCOUNT SHEET

Date: Jan 23 -09

Shift: -31°c Morning -32 Afternoon

Equipment - Type Labour - Name	Unit No.	Hours	Rate	Total	Remarks
200 Hoe		10			dig out trench for Scoria install cloth + drain rock
325 Hoe		10			+ culvert
Volvo loader operator only		10			
2 labourers		10			Install bentonite cloth at sump
1 - Foreman		10			
2 labourers		10			help at sump also get material together for Generator shed
1 - Generator		daily			plug in machines D-5
325 - 200 Hoe		stand by			machines running at night to keep warm
2 Service trucks		daily			

Total for Sheet:

Authorization:

Pelly Construction W. Dear

Pelly Construction Ltd.
111 Industrial Road, Whitehorse, Yukon Y1A 2T7
Phone: (867) 667-6161 • Fax: (867) 667-4194

DAILY FORCE ACCOUNT SHEET

Date: Jan 24-09

Shift: -30° morning -20° Afternoon

Equipment - Type Labour - Name	Unit No.	Hours	Rate	Total	Remarks
200 Hoe			8		dig trench for sump finish install of
325 Hoe			8		trench, cloth, drain rock etc
Volvo Loader operator only			8		dike holding water well
2 labourers			8		installing cloth
1-Foreman					
2 Service Trucks					
325-200 Hoe		stand by			machines running at night
1-Generator		daily			plug into for D-5
mob 2 Truck drivers			4		
back to Whse with					
pickup					

Total for Sheet: ______

Pelly Construction W Dear

Authorization: [signature]

WILLOW PRINTERS LTD

Pelly Construction Ltd.
111 Industrial Road, Whitehorse, Yukon Y1A 2T7
Phone: (867) 667-6161 • Fax: (867) 667-4194

DAILY FORCE ACCOUNT SHEET

Date: Jan 25 - 09 Day oFF Shift: -39°C day + night

Equipment - Type Labour - Name	Unit No.	Hours	Rate	Total	Remarks
325 + 200 Hoe		standby			machines running due to cold weather
+ [illegible]					
maintance man		4			check + Fuel machines

Total for Sheet: ____________

Authorized: ____________

Pelly Construction W. Dear

Pelly Construction Ltd.
111 Industrial Road, Whitehorse, Yukon Y1A 2T7
Phone: (867) 667-6161 • Fax: (867) 667-4194

DAILY FORCE ACCOUNT SHEET

Date: Jan 26 - 09 Shift:

Equipment - Type Labour - Name	Unit No.	Hours	Rate	Total	Remarks
3 laborers		10			build generator shed inside warehouse
1- Foreman		10			help at Generator shed + trailer 325 up hill to main yard
325- Hoe		4			move Hoe back to main yard

Total for Sheet: Pelly Construction W Dear

Authorization

Pelly Construction Ltd.
111 Industrial Road, Whitehorse, Yukon Y1A 2T7
Phone: (867) 667-6161 • Fax: (867) 667-4194

DAILY FORCE ACCOUNT SHEET

Date: Jan 27-09

Shift: -20° morning -28-afternoon

Equipment - Type Labour - Name	Unit No.	Hours	Rate	Total	Remarks
3 labours		10			build generator shed & get material ready on trailer For Heat trace job
1- Foreman		10			
325-200 Hoe	at night	stand by 4			machines running at night, due to cold weather ~~Walk 325 back~~ up From Sump to Top of embankment

Total for Sheet:

Authorization: [signature]

Pelly Construction W Dear

Pelly
Construction Ltd.
111 Industrial Road, Whitehorse, Yukon Y1A 2T7
Phone: (867) 667-6161 • Fax: (867) 667-4194

DAILY FORCE ACCOUNT SHEET

Date: FEBRUARY 2/09 Shift: -16 °C.

Equipment - Type Labour - Name	Unit No.	Hours	Rate	Total	Remarks
1 CARPENTER		10			BUILDING GENERATOR SHED
1 LABORER		10			AND SNOW REMOVAL
					AROUND PIPE CONNECTIONS
SERVICE TRUCK					

Total for Sheet: ____________

Authorization: ____________

Pelly Construction [signature]

Pelly Construction Ltd.

111 Industrial Road, Whitehorse, Yukon Y1A 2T7
Phone: (867) 667-6161 • Fax: (867) 667-4194

DAILY FORCE ACCOUNT SHEET

Date: FEBRUARY 3/09 Shift: -6°C

Equipment - Type Labour - Name	Unit No.	Hours	Rate	Total	Remarks
325 HOE		7			HOLDING PIPE OVER BANK
					FOR ANCHOR INSTALL
FUSING TECH		10			INSTALL ANCHOR +
LABORER		10			FUSE FLANGES
1 LIGHT PLANT		DAILY			SUPPLY POWER FOR FUSING.
1 SERVICE TRUCK					
1 FOREMAN		10			

Total for Sheet:

Authorization:

Pelly Construction [signature]

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Pelly
Construction Ltd.
111 Industrial Road, Whitehorse, Yukon Y1A 2T7
Phone: (867) 667-6161 • Fax: (867) 667-4194

DAILY FORCE ACCOUNT SHEET

Date: FEBRUARY 4/09 Shift: -25°C.

Equipment - Type Labour - Name	Unit No.	Hours	Rate	Total	Remarks
325 HOE		8			PULLING PIPELINE OUT
					OF SNOW, PULLING INTO
					PLACE - INTO FARO PIT.
FUSING TECH		10			FUSE PIPE + RUN
LABORER		10			HEAT TRACE
LIGHT PLANT		DAILY			POWER FOR FUSING +
1 SERVICE TRUCK					
FOREMAN		10			

Total for Sheet:

Authorization:

Pelly Construction:

WILLOW PRINTERS LTD

Pelly
Construction Ltd.

111 Industrial Road, Whitehorse, Yukon Y1A 2T7
Phone: (867) 667-6161 • Fax: (867) 667-4194

DAILY FORCE ACCOUNT SHEET

Date: FEBRUARY 5/09 Shift: -25°C

Equipment - Type Labour - Name	Unit No.	Hours	Rate	Total	Remarks
325 HOE		4			PULLING PIPELINE INTO PLACE, IDLE AT NIGHT DUE TO COLD
1 LABORER		10			INSULATING & HEAT SHRINKING JOINS IN PIPELINE
1 SERVICE TRUCK					
1 FOREMAN		10			

Total for Sheet: ______

Authorization: [signature]

Pelly Construction [signature]

WILLOW PRINTERS LTD

Pelly Construction Ltd.
111 Industrial Road, Whitehorse, Yukon Y1A 2T7
Phone: (867) 667-6161 • Fax: (867) 667-4194

DAILY FORCE ACCOUNT SHEET

Date: FEBRUARY 6/09 Shift: -24°C

Equipment - Type Labour - Name	Unit No.	Hours	Rate	Total	Remarks
1 LABORER		10			INSULATING & HEAT
					SHRINKING JOINS
1 SERVICE TRUCK					
1 FOREMAN		10			

Total for Sheet:

Authorization: [signature]

Pelly Construction [signature]

WILLOW PRINTERS LTD

FEB-09-2009(MON) 10:01

Pelly Construction Ltd.
111 Industrial Road, Whitehorse, Yukon Y1A 2T7
Phone: (867) 667-6161 • Fax: (867) 667-4194

DAILY FORCE ACCOUNT SHEET

Date: FEBRUARY 7/09 Shift: -20°C

Equipment - Type Labour - Name	Unit No.	Hours	Rate	Total	Remarks
1 LABORER		10			INSULATING +
					HEAT SHRINKING
					JOINS ON
					PIPELINE.
					INSTALLING HEAT
					TRACE
SERVICE TRUCK					
FOREMAN		10			

Total for Sheet:

Authorization:

Pelly Construction

WILLOW PRINTERS LTD

Pelly Construction Ltd.

111 Industrial Road, Whitehorse, Yukon Y1A 2T7
Phone: (867) 667-6161 • Fax: (867) 667-4194

DAILY FORCE ACCOUNT SHEET

Date: FEBRUARY 8/09 Shift: -16°C

Equipment - Type Labour - Name	Unit No.	Hours	Rate	Total	Remarks
1 LABORER		10			INSULATING + HEAT
					SHRINKING JOINS W
					PIPELINE + SOME
					CLEAN-UP.
1 SERVICE TRUCK					
1 FOREMAN		10			

Total for Sheet:

Authorization:

Pelly Construction

WILLOW PRINTERS LTD

P. 010/010

FEB-09-2009(MON) 10:01

Pelly
Construction Ltd.
111 Industrial Road, Whitehorse, Yukon Y1A 2T7
Phone: (867) 667-6161 • Fax: (867) 667-4194

DAILY FORCE ACCOUNT SHEET

Date: Jan 25 - 09 Day off Shift: -30°C day + night

Equipment - Type Labour - Name	Unit No.	Hours	Rate	Total	Remarks
325 + 200 Hoe		standby			machines running due to cold weather
4 [illegible]					
maintance man		4			check + Fuel machines
Service Truck		[signature]	✓		
		[redacted]			

Total for Sheet: [signature]

Authorization: [signature]

Pelly Construction W. Dear

WILLOW PRINTERS LTD

P. 002/010

FEB-09-2009(MON) 10:00

Pelly Construction Ltd.
111 Industrial Road, Whitehorse, Yukon Y1A 2T7
Phone: (867) 667-6161 • Fax: (867) 667-4194

DAILY FORCE ACCOUNT SHEET

Date: Jan 26 - 09 Shift: ________

Equipment - Type Labour - Name	Unit No.	Hours	Rate	Total	Remarks
3 labrers		10			build generator shed inside warehouse
1 - Foreman		10			help at Generator shed + mob 325 up hill to main yard
325 - Hoe		4			move Hoe back to main yard
Service trucks		[illegible]	✓		

[redacted]

Total for Sheet: ________

Pelly Construction W Dear

Authorization: [signature]

FEB-09-2009(MON) 10:00

Pelly Construction Ltd.

111 Industrial Road, Whitehorse, Yukon Y1A 2T7
Phone: (867) 667-6161 • Fax: (867) 667-4194

DAILY FORCE ACCOUNT SHEET

Date: Jan 27- 09

Shift: -20° morning -28 - afternoon

Equipment - Type Labour - Name	Unit No.	Hours	Rate	Total	Remarks
3 laborers		10	✓		build generator shed + get material ready on trailer For Heat trace job
1- Foreman		10	✓		
325-200 Hoe	at night	stand by			machines running at night, due to cold weather
walk Hoe up to bank		4	✓		walk 325 back up From Sump to Top of embankment
1 Service truck			✓		

Total for Sheet: ______

Authorization: [signature]

Pelly Construction W Dear

WILLOW PRINTERS LTD

(7)

Pelly Construction Ltd.

111 Industrial Road, Whitehorse, Yukon Y1A 2T7
Phone: (867) 667-6161 • Fax: (867) 667-4194

DAILY FORCE ACCOUNT SHEET

Date: Jan 30 - 09

Shift: -11°C morning / -6 - afternoon

Equipment - Type / Labour - Name	Unit No.	Hours	Rate	Total	Remarks
1- Carpenter		8	✓		building Generator Shed inside
2 laborers		8	✓✓		Warehouse due to
					snow storm
1- Foreman		8	✓		
2 Service Trucks			✓✓		
Denos Dump Trk			✓		
1- Electrician		10	✓		Site Visit to prepare
1-Electrician Helper		10	✓		For C-Can arrival

Total for Sheet: ______

Authorization: [signature]

Pelly Construction W Dear

Pelly Construction Ltd.

111 Industrial Road, Whitehorse, Yukon Y1A 2T7
Phone: (867) 667-6161 • Fax: (867) 667-4194

DAILY FORCE ACCOUNT SHEET

Date: Jan 28 - 09

Shift: -13°C Morning -10 afternoon

Equipment - Type Labour - Name	Unit No.	Hours	Rate	Total	Remarks
325 Hoe		10 ✓			hold pipeline For over bank
200 Hoe		10 ✓			Guiding pipeline over bank at bottom
3 Laborers		10			help put pipeline over bank
					Fusing some pipe
1-Foreman		10 ✓			
2 Service trucks		✓			
1-Generater		daily ✓			plug in For machine 200 Hoe
1-light Plant		daily ✓			plug in For 325. Fusing machine

Total for Sheet:

Pelly Construction W Dear

Authorization: [signature]

WILLOW PRINTERS LTD

Pelly Construction Ltd.

111 Industrial Road, Whitehorse, Yukon Y1A 2T7
Phone: (867) 667-6161 • Fax: (867) 667-4194

DAILY FORCE ACCOUNT SHEET

Date: Jan 29

Shift: -11° Morning
-8 Afternoon

Equipment - Type Labour - Name	Unit No.	Hours	Rate	Total	Remarks
200 Hoe		8	✓		dig out around sump Install Filter cloth backfill
325 Hoe		10	✓		holding pipe wire for over bank
Fusing Tech		10	✓		Fusing pipe
2 laborers		10	✓		Install Heat Trace help Fuse pipe help lay Filter cloth
2 Service Trucks			✓		
1-Generator			✓		plug in For 200 Hoe
1-light plant			✓		Fusing pipe plug in For 325 Hoe

Total for Sheet:

Authorization: [signature]

Pelly Construction W Dear

Pelly Construction Ltd.
111 Industrial Road, Whitehorse, Yukon Y1A 2T7
Phone: (867) 667-6161 • Fax: (867) 667-4194

DAILY FORCE ACCOUNT SHEET

Date: Jan. 30/09

Shift: -11°C morn / -6 Afternoon

Equipment - Type / Labour - Name	Unit No.	Hours	Rate	Total	Remarks
1 Carpenter		8	✓		Build Generator shed
2 Labourers		8	✓		inside warehouse due
1 Foreman		8	✓		to snow storm
2 Service Trucks		8	✓		
Demob. Dump Truck			✓		
1- Electrician		4			} Site Visit to Prepare
1- Electrician Apprentice		4			for C-Can arrival
1- Electrician Truck		4			

Total for Sheet: ______

Authorization: [signature]

Pelly Construction [signature]

Pelly Construction Ltd.
111 Industrial Road, Whitehorse, Yukon Y1A 2T7
Phone: (867) 667-6161 • Fax: (867) 667-4194

ENTERED

DAILY FORCE ACCOUNT SHEET

Date: Feb 09/09

Shift: -23°C Morn / -18°C Afternoon

Equipment - Type Labour - Name	Unit No.	Hours	Rate	Total	Remarks
325 Hoe		5 hrs ✓ Run through night			Offload Rails & Place
Light Plant		5 hrs ✓			Power for Carpenters
Generator		Run overnight for 200 block water			
Carpenter		10 ✓			Build generator shack, insulate & Board
Carpenter Helper		10 ✓			
Electrician		10 ✓			Prep for Wire pull
Electrician Helper		10 ✓			Place Rails, Remove old
Foreman		10 ✓			transformer from generator
3 Service trucks					

Total for Sheet:

Authorization: [signature]

Pelly Construction [signature]

WILLOW PRINTERS LTD

Pelly Construction Ltd.
111 Industrial Road, Whitehorse, Yukon Y1A 2T7
Phone: (867) 667-6161 • Fax: (867) 667-4194

ENTERED

DAILY FORCE ACCOUNT SHEET

ate: Feb. 10/09

Shift: -25 morn / -22 aft.

quipment - Type / ıbour - Name	Unit No.	Hours	Rate	Total	Remarks
325 HOE		Cold Standby	Standby		Used for loading reels onto reel stand & used as reel stand
Light Plant		10			Power for Carpenters
Generator		24 HRS Plug in 200	St Daily		
Carpenter		10			Continue to build
Carpenters Helper		10			generator shack
Electrician		10			Pull distribution to
Electrical apprentice		10			required locations
Foreman		10			
3 Service Trucks					

al for Sheet: ____________

thorization: ____________

Pelly Construction ____________

Pelly Construction Ltd.
111 Industrial Road, Whitehorse, Yukon Y1A 2T7
Phone: (867) 667-6161 • Fax: (867) 667-4194

DAILY FORCE ACCOUNT SHEET

Date: Feb. 11/09

Shift: -30 Morn -32 Aft.

Equipment - Type Labour - Name	Unit No.	Hours	Rate	Total	Remarks
325 Hoe		4 hrs +	Standby		Placing reels, used as a reel stand
Light Plant		10 hrs			Power for Carpenters
Generator		Daily			Plug-in for 200
Carpenter		10			} Generator shack
Carpenter's Helper		10			creation
Electrician		10			} Tie in @ Controller
Electrical Apprentice		10			} Points - Pull distribution to
Foreman		10			allocated points
3 Service Trucks					

Total for Sheet: ______________

Authorization: [signature]

Pelly Construction ______________

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Pelly Construction Ltd.

111 Industrial Road, Whitehorse, Yukon Y1A 2T7
Phone: (867) 667-6161 • Fax: (867) 667-4194

DAILY FORCE ACCOUNT SHEET

Date: Feb. 12/09

Shift: - 32 morn - 19 aft.

Equipment - Type Labour - Name	Unit No.	Hours	Rate	Total	Remarks
325 Hoe		6 hrs +	Standby		Placing & loading Rocks
Light Plant		10 hrs			Power for Carpenters
Generator		Daily			Plug in 200
Carpenter		10			Generator Shack
Carpenter's Helper		10			Creation
Electrician		10			Splicing @ Controller sites
Electrician Apprentice		10			Pull Remaining distribution
Foreman		10			
3 Service Trucks					

Total for Sheet: 13/02/09.

Authorization:

Pelly Construction ____________

Pelly Construction Ltd.
111 Industrial Road, Whitehorse, Yukon Y1A 2T7
Phone: (867) 667-6161 • Fax: (867) 667-4194

DAILY FORCE ACCOUNT SHEET

Date: Feb. 13/09

Shift: -31 Morn -20 Afternoon

Equipment - Type Labour - Name	Unit No.	Hours	Rate	Total	Remarks
325 Hoe		4 hrs	Standby		Clean-up Roads
Light Plant		10 hrs			Power for Carpenters
Generator			Daily		Plug in for 200
Carpenter		10			Complete Work on generator Shack
Carpenter's Helper		10			
Electrician		10			Tie in remaining Sensors @ Control points
Electrical Apprentice		10			
Foreman		10			
3 Service Trucks					

Total for Sheet:

Authorization:

Pelly Construction

WILLOW PRINTERS LTD

Pelly Construction Ltd.
111 Industrial Road, Whitehorse, Yukon Y1A 2T7
Phone: (867) 667-6161 • Fax: (867) 667-4194

DAILY FORCE ACCOUNT SHEET

Date: Feb 14/09

Shift: - 33 Morn - 15 Aft.

Equipment - Type Labour - Name	Unit No.	Hours	Rate	Total	Remarks
325 Hoe		6hrs •	Standby		Dug 2 holes for generator shack grounding
Light Plant		10			Power for Electrician
Generator			Stand by		Plug in for 200 Hoe
Electrician		10			- Put panels & Pipework in shack
Electrical Apprentice		10			- Splice heat-tape
Foreman		10			
2 Service Trucks					

Total for Sheet:

Authorization:

Pelly Construction ______

Pelly Construction Ltd.
111 Industrial Road, Whitehorse, Yukon Y1A 2T7
Phone: (867) 667-6161 • Fax: (867) 667-4194

DAILY FORCE ACCOUNT SHEET

Date: Feb. 15/09

Shift: -28 Morn. -16 Aft.

Equipment - Type Labour - Name	Unit No.	Hours	Rate	Total	Remarks
325 Hoe		2hrs	Standby		Backfill grounding system for Generator Shack
Light Plant		10hrs			Power for Electricians within generator Shack.
Generator			Daily		Plug in for 200 Hoe
Electrician		10hrs			Continue building
Electrical Apprentice		10hrs			distribution with generator shack
Foreman		10hrs			
2 Service Trucks					

Total for Sheet:

Authorization:

Pelly Construction

WILLOW PRINTERS LTD

Pelly Construction Ltd.
111 Industrial Road, Whitehorse, Yukon Y1A 2T7
Phone: (867) 667-6161 • Fax: (867) 667-4194

DAILY FORCE ACCOUNT SHEET

Date: Feb. 16/09

Shift: - 24 men / - 15 off

Equipment - Type Labour - Name	Unit No.	Hours	Rate	Total	Remarks
325 hoe		4			Clean-up
Light Plant		10			Power for Electrician & Carpenter
Generator			Daily		Plug in for 200 hoe
Carpenter		10			Complete outside of Generator shack
Carpenter's Helper		10			
Electrician		7hrs + 4hrs	Drive Home To WH SE		Terminate & Test Generator Shack
Electrical apprentice		7hrs + 4hrs			
Foreman		7hrs + 4hrs			
3 Service Trucks					

Total for Sheet: ____________

Authorization: [signature]

Pelly Construction ____________

Pelly Construction Ltd.
111 Industrial Road, Whitehorse, Yukon Y1A 2T7
Phone: (867) 667-6161 • Fax: (867) 667-4194

DAILY FORCE ACCOUNT SHEET

Date: Feb. 17/09 Shift: ______

Equipment - Type / Labour - Name	Unit No.	Hours	Rate	Total	Remarks
Light Plant		5			Power for Carpenters
Generator			Daily		Plug in for 200
Carpenter / Pipefitter		10			Fuse pipe, Compact generator shack
Carpenters helper		10			Build Box's to insulate Phlanges
1 Service Truck					

Total for Sheet: ______

Pelly Construction ______

Authorization: [signature]

Pelly Construction Ltd.
111 Industrial Road, Whitehorse, Yukon Y1A 2T7
Phone: (867) 667-6161 • Fax: (867) 667-4194

DAILY FORCE ACCOUNT SHEET

Date: Feb 18/09 Shift:

Equipment - Type Labour - Name	Unit No.	Hours	Rate	Total	Remarks
Light Plant		5			Power for Carpenters
Generator			Daily		Plug in for 200 Hoe
Carpenter					Fuse Joints, insulate Joints, continue completion
Carpenters helper		10			of [illegible] shack Build [illegible] boxes
1 Service truck		10			for insulating flanges

Total for Sheet:

Authorization: [signature]

Pelly Construction

WILLOW PRINTERS LTD

Pelly Construction Ltd.
111 Industrial Road, Whitehorse, Yukon Y1A 2T7
Phone: (867) 667-6161 • Fax: (867) 667-4194

DAILY FORCE ACCOUNT SHEET

Date: Feb. 19/08

Shift: =14 Morn. =1 Aft.

Equipment - Type Labour - Name	Unit No.	Hours	Rate	Total	Remarks
Generator			Daily		Plug in for temp. Power for C-Can
Light Plant		Plug in for 200 Hoe	Overnight		
200 Hoe		2½	For Discussion		Pipe Elevation Repair
Pipe fuser		10			Tie in C-Can outlet p. (fuse) & Vent T° etc...
Pipe fuser's Helper		10			
Electrician		3			Terminate 600v main into C-Can + Generator shack
Electrical Apprentice		10			Site Prep, C-Can placem
Foreman		10			
3 Service Trucks					

Total for Sheet: ______

Authorization: [signature]

Pelly Construction ______

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Pelly Construction Ltd.
111 Industrial Road, Whitehorse, Yukon Y1A 2T7
Phone: (867) 667-6161 • Fax: (867) 667-4194

DAILY FORCE ACCOUNT SHEET

Date: Feb. 20/09

Shift: -12 morn. -3 aft.

Equipment - Type Labour - Name	Unit No.	Hours	Rate	Total	Remarks
Generator			Daily		Temp C-Can Power & heat
Light Plant			Nightly		Plug in for 200
200 Hoe		4 hrs	For Dismantling Off		Pipe elevation repair
Pipe Tech		10			Fuse pipe between
Pipe Tech's Helper		10			C-Can [illegible] Wells
Electrician		10			Terminate Connections
Electrical Apprentice		10			@ C-Can
Foreman		10			
3 Service Trucks					

Total for Sheet: ________

Pelly Construction ________

Authorization: [illegible]

WILLOW PRINTING LTD

Pelly Construction Ltd.
111 Industrial Road, Whitehorse, Yukon Y1A 2T7
Phone: (867) 667-6161 • Fax: (867) 667-4194

DAILY FORCE ACCOUNT SHEET

ate: Feb. 21/09

Shift: -12 °c Morn -8 °c Aft

quipment - Type abour - Name	Unit No.	Hours	Rate	Total	Remarks
Generator			Daily		
200 Hoe		3 hrs			Strategic Rock placement
Pipe technician		10			Fuse & insulate pipe Grade Well Pipe
Electrician		10			Terminate connections @ C-Can / Run Tec. to wellheads
Electrical apprentice		10			
Foreman		10			
Service Trucks					

al for Sheet:

thorization: [signature]

Pelly Construction

WILLOW PRINTERS LTD

Pelly Construction Ltd.
111 Industrial Road, Whitehorse, Yukon Y1A 2T7
Phone: (867) 667-6161 • Fax: (867) 667-4194

DAILY FORCE ACCOUNT SHEET

Morn -27°C
Aft -15°C

Date: Feb 22/09

Shift: [illegible]

Equipment - Type Labour - Name	Unit No.	Hours	Rate	Total	Remarks
Generator		10 hrs			Plug in for 200 / Temp Power for the
200 Vac		1 hrs			Clear well area / Dig electrically challenged pipe
Electrician		10 hrs			Help tie in well heads - Complete Gr Can Termination
Electrical Apprentice		10 hrs			- Plan in a Place Temp. fuel source for generator
Foreman		10 hrs			- Solidify well line electrical - Clean-up work areas
2 Service Trucks					

Total for Sheet: ______________

Authorization: [signature]

Pelly Construction ______________

WILLOW PRINTERS LTD

Pelly Construction Ltd.
111 Industrial Road, Whitehorse, Yukon Y1A 2T7
Phone: (867) 667-6161 • Fax: (867) 667-4194

DAILY FORCE ACCOUNT SHEET

Date: Feb. 23/09

Shift: -26 Morn -14 Aft.

Equipment - Type Labour - Name	Unit No.	Hours	Rate	Total	Remarks
Light Plant		4			Power for Electrician @ Controller #1
Electrician		10			Terminate Controller Complete Co-Can Tie-In
Electrical Apprentice		10			Modify & Place Controllers in place
Foreman		10			Add 100' of Pipe onto outlet end
3 Service Trucks					Insulate Connections Build Supports for pipeline
Pipe technician		10			Place sand bags on controllers etc.

Total for Sheet: ____________

Authorization: [signature]

Pelly Construction ____________

WILLOW PRINTERS LTD

Pelly Construction Ltd.
111 Industrial Road, Whitehorse, Yukon Y1A 2T7
Phone: (867) 667-6161 • Fax: (867) 667-4194

DAILY FORCE ACCOUNT SHEET

Date: Feb. 24/09

Shift: – 2 4 morn
– 10 aft.

Equipment - Type Labour - Name	Unit No.	Hours	Rate	Total	Remarks
Lightplant		6			Power for Electrician
Carpenter		10			Build assorted boxes That Require insulation
Electrician		10			Terminate controllers
Electrical Apprentice		10			Adjust outlet Elevation Secure Controllers
Foreman		10			Position Power + tarp in Controller Sites for Electrician
3 Service Trucks					Test + Troubleshoot Electrical System

Total for Sheet: ____________

Authorization: [signature]

Pelly Construction ____________

Pelly Construction Ltd.
111 Industrial Road, Whitehorse, Yukon Y1A 2T7
Phone: (867) 667-6161 • Fax: (867) 667-4194

DAILY FORCE ACCOUNT SHEET

Date: Feb 25/09 Shift: -27 [illegible] -16 [illegible]

Equipment - Type Labour - Name	Unit No.	Hours	Rate	Total	Remarks
Lightplant		1			Charge & boost generator Battery
Carpenter		10			Wellhead Box Fabrication
Electrician		10			Place [illegible] Sensor @ C-Can
Electrical Apprentice		10			Run a new [illegible] from Controller to Pipeline [illegible]
Foreman		10			Splice power to 600V heat tape for [illegible] box
3 Service Trucks					Sand bag & Tyrap pipeline

Total for Sheet: ______ Pelly Construction ______

Authorization: [signature]

WILLOW PRINTERS LTD

SCHEDULE OF PRICES
SCHEDULE "A"

S-wells seepage interception and pipeline system

	units	quantity	Unit Rate	Provisional Total
1. Mobilize & demobilize				
all equipment (assuming sheet piles not included)	each	1	30,000.-	30,000.-
project foreman	man-days	25	900	22,500.-
2. Assemble and install pipeline including:				
laborers	man-days	50	600.-	30,000.-
techncian for pipe,- heat trace - insulation assembly	man-days	25	1,200.-	30000.-
truck with crane	hrs	50	230.-	11,500.-
excavator for buried sections under road	hrs	10	260.-	2,600.-
3. Install seepage interception system including:				
laborers	man-days	15	600.-	9,000.-
technician for pump, pipe, heat trace - insulation assembly	man-days	5	1200.-	6,000.-
excavator	hrs	10	260.-	2,600.-
haul truck	hrs	150	135.-	20,250.-
4. Install the energy system, control system and commission				
laborers	man-days	15	600.-	9,000.-
electrician	man-days	3	1,200.-	3,600.-
technician for commissioning system	man-days	5	1,200.-	6,000.-
5 General				
Mark-up percentage on disbursements			20%	
pick up truck	day	50	300.-	15,000.-

TOTAL $ 198,050.-

PELLY CONSTRUCTION LTD

Pelly Construction Ltd
111 Industrial Road
Whitehorse, YT Y1A 2T7

S-Wells Seepage Collection and Pump/Pipeline System

Equipment Rental Rates

EQUIPMENT RATES

	Hourly $ Charge (includes fuel)	Daily $ Charge (includes fuel)	Per Loaded Mile
325 CATERPILLAR EXCAVATOR	$ 260.00		
200 KOMATSU EXCAVATOR	$ 260.00		
TANDEM AXEL DUMP TRUCK	$ 135.00		
250 KOMATSU LOADER	$ 150.00		
TRUCK WITH CRANE	$ 230.00		
CREW TRUCK C/W TOOLS & TIDY TANK		$ 300.00	
WELDER C/W OPERATOR	$ 145.00		
LIGHT TOWER		$ 135.00	
GENSET		$ 180.00	
AMBULANCE C/W ATTENDANT		$ 650.00	
PILOT CAR			$ 3.60
TRACTOR/BTRAIN			$ 8.40
FUEL TRUCK		$ 100.00	

LABOUR RATES

	Hourly $ Charge
SUPERINTENDENT	$ 85.00
FOREMAN	$ 75.00
LABOUR	$ 65.00
ELECTRICIAN	$ 120.00
TECHNICIAN	$ 100.00
SAFETY REPRESENTATIVE	$ 75.00

D4/D5 Supplied by Deloitte & Touche

December 10, 2008

NR

Appendix G.2
Daily Reports

January 14, 2009

Deloitte & Touche – Anvil Range Mine S-wells Pump and Pipeline System

DISTRIBUTION

Marius Pytlewski - Hatch
Cam Scott, Dan Mackie – SRK
Wes Treleaven, Doug Sedgwick and Dan Haggar – D&T

Trip Report

DATE: January 12 and 13, 2009

LOCATION: Anvil Range Mine Complex – Faro, Yukon

PRESENT: Greg Stevens – Deloitte & Touche
Dana Hagar - Deloitte & Touche
Mike Bryson - Deloitte & Touche
Andreas Delbruck - Hatch

PURPOSE: Trip and Initial Alignment Meeting

1. Trip Information

I left Vancouver on Monday, January 12, 2009 on the Air Canada flight to Whitehorse, Yukon scheduled to leave at 10:10 pm and arrive 12:50 am. The truck pick-up from National Car Rental in Whitehorse took an hour and got to the hotel, Best Western at 2:00 am. Next day, January 13, I left Whitehorse at 9:30 am, stopped by Carmacks to fuel-up at 12:30 pm and arrived on site at 3:30 pm. I contacted Mike Bryson at the mine site before leaving Whitehorse and on the way from Carmacks. The weather was fair, cloudy most of the day and no snowfall but the temperature varied significantly by location and elevation. In Whitehorse the temperature was -14 C, in Carmacks -26 C, in Faro -16 C and at the mine site -12 C. Along the way, there were very mild spots with temperatures as high as -8 C and as low as -28 C.

Note for Hatch personnel: the road (and snow) condition can change significantly with the temperature. Allocate sufficient time (in my case 4.5 hours) to complete the 360 km drive between Whitehorse and Faro. On some stretches of the highway, I needed to reduce the speed to 50 to 60 km/hr from the posted 90 km/hr to avoid sliding. Also, the daylight is short, from roughly 10:00 am to 3:30 pm, which can affect the driving speed.

2. Initial Alignment Meeting

At the mine site, I met Greg Stevens, Dana Haggar and Mike Bryson from Deloitte & Touche (at around 3:45) and discussed the project in general and the progress of the contractor.

The main contractor is Pelly with several subcontractors to help out in various stages of the project, such as Arctic Backhoe with the civil work, fusing and pipe laying. Currently there are 6 people on site from the contractor, which is expected to increase to 7 by the end of this week. The hours of operation are 8:00 am to 6:00 pm, seven days a week.

Here is the summary of activities for last couple of days:

- January 12, 2009 – Mobilized to site (by 5:00 pm due to delays caused by a snowstorm). No other activity was completed.
- January 13, 2009 – Started the snow clearing at the top of the bench and in the existing quarry to get haul truck access to the well area. The progress was reasonable for the day with no snowfall and relatively mild temperatures (-12 C).

Dana (Deloitte & Touche) requested a pipeline alignment modification at the planned road crossing to the tailings pond. There is an existing pump (Zone 2) located at this spot to collect the waste dump run-off water with a pipe running across the road already. As proposed, the pipeline should run behind the Zone 2 pump, between the toe of the waste pile and the pump rather than in front of it to avoid crossing the two pipelines. The site will be visited tomorrow with the Contractor to evaluate the issues with this proposed change.

The Contractor has been given full access to a D5 and a D9 Cat to clear snow and rip the pipeline route as necessary. The Contractor is providing the certified operators for the Cats for the duration of the project.

The meeting was completed at around 6:00 pm.

END OF REPORT

Andreas Delbruck

AAD:AAD
Attachment(s)/Enclosure: N/A

January 14, 2009

Deloitte & Touche – Anvil Range Mine S-wells Pump and Pipeline System

DISTRIBUTION

Marius Pytlewski - Hatch
Cam Scott, Dan Mackie – SRK
Wes Treleaven, Doug Sedgwick and Dan Haggar – D&T

Trip Report

DATE: January 14, 2009

LOCATION: Anvil Range Complex – Faro, Yukon

PRESENT:
Greg Stevens – Deloitte & Touche
Dana Haggar - Deloitte & Touche
Mike Bryson - Deloitte & Touche
Andreas Delbruck - Hatch
Wayne Dear – Arctic Backhoe
Dan Russell - Pelly

PURPOSE: Daily Progress (complete)

1. Site Safety

The plant's access road has sections that may be a concern if drivers are not paying enough attention to speed. One particular section (500 meters from the gatehouse) has a steep slope and a sudden curve that can cause trucks to spin out of control.

2. Site Conditions

The weather in the morning was cloudy and calm with temperatures in the range of -12 to -14 C. No new snow.

3. Contractor Alignment Meeting

The alignment meeting started at 8:00 am with Greg, Dana and Mike from Deloitte & Touche, Wayne and Dan from Pelly and me from Hatch present. The scope of the work was well understood by all present in the meeting.

The following specific items were discussed in the meeting:

1. Vacuum breaker – the location of the vacuum breaker will have to be determined on site after reviewing the slopes in the proposed area. The vacuum breaker will have to be insulated for proper operation. Contractor will provide cover and insulation.

2. Heat trace – the location of the control panels will have to be provided to the Pelly as soon as possible.
3. Culvert – two culverts (12" dia. Schedule 40 pipes) will be provided by the contractor for road crossing. Clamping of culvert section will be required at the road crossing on top of the embankment.
4. Pipe fusing – a pipe will be fused and tested by the Contractor in the morning. The results will be checked before the fusing work can start.
5. Localized fill – the pipe route may require fill material in some areas to eliminate local low spots . The location of these fills will need to be identified as the snow clearing proceeds.
6. Pipe specification – the DR11 and DR17 pipes will need to be laid down on site according to the pressure rating requirements of the design. The section from the sump pump up to the embankment will be the DR11 spec. The design will need to be checked for the minimum length of DR11 along the route. The remaining pipes will be the DR17 type.
7. Schedule – the amount of time needed to be spent on fusing the pipe sections is weather and temperature dependent. Normally it would take 10 minutes for each fusing but this can lengthen significantly if the temperature is low (-30 C). As estimated currently, the fusing portion of the work will take 4 to 5 days.

The Contractor will be performing the following activities today:

1. Clear additional section of the access road along the toe of the waste pile.
2. Start the fusing of the pipe sections
3. Complete the road clearing from the quarry to the wells.

The meeting was completed at 10:00 am. (Note: the power went out at 9:10 am and the plant generators started up at 9:45 am.)

4. Contractor Site Walk (10:00 am to 12:30 pm)

The following notes were taken during the morning site walk (from 10:00 am to 12:30 pm):

- The Contractor has two haul trucks, a backhoe and two pick-up trucks on site.
- Both, the D9 and D5 are being used and operated by the Contractor in the quarry.
- The access road from the quarry to the wells will require some repair. Some sections of the road bank are at a steep angle and will require some fill material before the large haul trucks can use it. This work will start today.
- The wells will be accessible from the quarry only. This will require that the pipeline crosses this road (at the bottom of the embankment) to get to the sump. The contractor was instructed that a culvert (this will be the third one) will be necessary in this location.
- The pipeline route is partially cleared from the snow. It is difficult to determine if there is a local low point in the pipeline until the snow is cleared up to the high point of the route. Further review of this will be required as the work progresses.

- The road crossing at the Zone 2 pump will not be a problem coming from behind the installation (between the toe of the pile and the pump). This modification will eliminate the need for crossing pipelines and the elbows in the area. Some ripping of the waste pile may be required to even the ground once the snow is removed.
- The pipe route after the road crossing (at around No. 3 heat trace control panel location) is not currently accessible. Snow removal will be required at a later date.
- The contractor is COR certified in the Yukon and appropriate safety measures and documentation is being followed.
- The pipe fusing test has been completed. The test showed that the pipe itself sustained damage during the test while the fused portion retained its integrity. The fusing activities will start later today.

5. Contractor Site Walk (2:00 pm to 4:00 pm)

The following notes were taken during the afternoon site walk (from 2:00 pm to 4:00 pm):

- The quarry road repair is well underway. It is expected that the work will be completed tomorrow.
- The embankment portion of the pipeline will be installed in an open “trough” using a 10” dia HDPE pipe. The concern is that the “half-pipe” have too much lateral flexibility that may cause the pipe to “turn over” into an upside down position. To prevent this, couple of flat bars will need to be added to the open side of the trough for added rigidity.
- The embankment has a ledge, roughly 30 meters below the top, that reduces the visibility of the well area. The trough will be lowered down from the top of the embankment but need to be guided from below using a guy wire system.
- The fusing activities are under way and by 4:00 pm 10 – 50 ft sections of the 2” dia. pipeline were connected. It is expected that for the next 2-3 days the focus will be on fusing the majority of the pipe sections, except the embankment portion.

6. Activity Summary

- Quarry / Well Access- snow clearing to the well site, road repair underway
- Well Site - no activity
- Embankment Area - no activity
- Fusing Station - fuse test completed, 10 sections of the 2” pipe fused
- Pipe Route - snow clearing completed up to the high point of the route
- Zone 2 Pump Area - no activity
- Faro Pit Discharge - no activity

7. Site personnel

- Contractor - Wayne Dear plus 6 workers from Pelly and the subcontractors
- SRK - N/A
- Hatch - Andreas Delbruck

8. Materials

- Quarry / Well Access- N/A
- Well Site - N/A
- Embankment Area - N/A
- Fusing Station - fusing station tent and plywood flooring
- Pipe Route - N/A
- Zone 2 Pump Area - N/A
- Faro Pit Discharge - N/A

9. Equipment

- D5, D9, 2 haul trucks, 200 Excavator and light plant with generator in the Quarry
- Fusing equipment including generator and a crew truck at the Fusing Station
- Foreman truck on site

END OF REPORT

Andreas Delbruck

AAD:AAD
Attachment(s)/Enclosure: N/A

SRK Consulting (Canada) Inc.
Suite 2200 – 1066 West Hastings Street
Vancouver, B.C. V6E 3X2, Canada
Tel: **604.681.4196**
Fax: **604.687.5532**

DAILY REPORT – Anvil Range Mine Complex S-Wells Pump and Pipeline System

Prepared by:	Alvin Tong (SRK)	**Date:**	2009.01.15
Site Source:	Wayne (Pelly)	**Project #:**	1CD003.120
Distribution List:	D&T: Wes Treleaven, Doug Sedgwick, Dana Haggar, Greg Stevens, Mike Bryson Hatch: Marius Pytlewski, Rui Adanjo SRK: Cam Scott, Dan Mackie Pelly: Jess Jewell, Dan Russell and Jennifer DeHart		

WEATHER (from site data of theweathernetwork.com for Faro, YT)

Temperature (°C)	7 AM: -11°C	2 PM:	6 PM: 0°C
Precipitation (mm)	Rain: none	Snow: none	
Conditions			

KEY SITE PERSONNEL

Pelly	• Wayne
D&T	• N/A
Hatch	• N/A
SRK	• N/A
Urecon	• N/A
Precision	• N/A

ACTIVITY

Area	Description
Quarry/Well Access	• Build access road way to S-well Site.
Well Site	• N/A
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• Fusing pipes
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A

MATERIALS CONSUMED

Quarry/Well Access	• N/A
Well Site	• N/A
Embankment Area	• N/A
Fusing Station	• Light plant use to plug in machines at night
Pipe Route	• N/A
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A

EQUIPMENT

Equipment	Notes
• D5 Dozer	– Building access road
• 200 Excavator	– Building access road
• 325 Excavator	– N/A
• Light plant with generator	– Power equipment at night
• Fusing equipment, incl. Generator	– Fusing pipes
• Crew truck	– Transport crew
• Foreman truck	– Transport
• Haul Trucks	– Building access road

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- N/A

SCHEDULE ISSUES/OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- N/A

COMMENTS, CONCERNS AND CORRESPONDENCE

•

PHOTOS

SRK Consulting
Engineers and Scientists

SRK Consulting (Canada) Inc.
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Vancouver, B.C. V6E 3X2, Canada
Tel: 604.681.4196
Fax: 604.687.5532

DAILY REPORT – Anvil Range Mine Complex
S-Wells Pump and Pipeline System

Prepared by:	Alvin Tong (SRK)	**Date:**	2009.01.16
Site Source:	Wayne (Pelly)	**Project #:**	1CD003.120
Distribution List:	D&T: Wes Treleaven, Doug Sedgwick, Dana Haggar, Greg Stevens, Mike Bryson Hatch: Marius Pytlewski, Rui Adanjo SRK: Cam Scott, Dan Mackie Pelly: Jess Jewell, Dan Russell and Jennifer DeHart		

WEATHER (from site data of theweathernetwork.com for Faro, YT)

Temperature (°C)	7 AM: -5°C	2 PM:	6 PM: 0°C
Precipitation (mm)	Rain: none	Snow: none	
Conditions			

KEY SITE PERSONNEL

Pelly	• Wayne Dear
D&T	• N/A
Hatch	• N/A
SRK	• N/A
Urecon	• N/A
Precision	• N/A

ACTIVITY

Area	Description
Quarry/Well Access	• Build access road way to S-well Site.
Well Site	• N/A
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• Fusing pipes
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A

MATERIALS CONSUMED

Quarry/Well Access	• N/A
Well Site	• N/A
Embankment Area	• N/A
Fusing Station	• Light plant use to plug in machines
Pipe Route	• N/A
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A

EQUIPMENT

Equipment	Notes
• D5 Dozer	– Building access road
• D9 Dozer	– Building access road
• 200 Excavator	– Building access road
• 325 Excavator	– N/A
• Light plant with generator	– Power equipment
• Fusing equipment, incl. Generator	– Fusing pipes
• Crew truck	– Transport crew
• Foreman truck	– Transport
• Haul Trucks	– Building access road

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- N/A

SCHEDULE ISSUES/OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- N/A

COMMENTS, CONCERNS AND CORRESPONDENCE

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DAILY REPORT – Anvil Range Mine Complex
S-Wells Pump and Pipeline System

Prepared by:	Alvin Tong (SRK)	**Date:**	2009.01.17
Site Source:	Wayne (Pelly)	**Project #:**	1CD003.120
Distribution List:	D&T: Wes Treleaven, Doug Sedgwick, Dana Haggar, Greg Stevens, Mike Bryson Hatch: Marius Pytlewski, Rui Adanjo SRK: Cam Scott, Dan Mackie Pelly: Jess Jewell, Dan Russell and Jennifer DeHart		

WEATHER (from site data of theweathernetwork.com for Faro, YT)

Temperature (°C)	7 AM: 0°C	2 PM:	6 PM: 4°C
Precipitation (mm)	Rain: none	Snow: none	
Conditions			

KEY SITE PERSONNEL

Pelly	• Wayne Dear
D&T	• N/A
Hatch	• N/A
SRK	• N/A
Urecon	• N/A
Precision	• N/A

ACTIVITY

Area	Description
Quarry/Well Access	• Load and haul drain rock to well site.
Well Site	• N/A
Embankment Area	• Load drain rock and dig out embankment on top of haul road
Fusing Station	• Fusing pipe and get pipeline chute ready for laying over bank
Pipe Route	• N/A
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A

MATERIALS CONSUMED

Quarry/Well Access	• N/A
Well Site	• N/A
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• N/A
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A

EQUIPMENT

Equipment	Notes
• D5 Dozer	– N/A
• D9 Dozer	– Push dirt out of way of pipeline access
• 200 Excavator	– Load drain rock
• 325 Excavator	– N/A
• Light plant with generator	– Power equipment
• Fusing equipment, incl. Generator	– Fusing pipes
• Crew truck	– Transport crew
• Foreman truck	– Transport
• Haul Trucks	– Haul drain rock

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- N/A

SCHEDULE ISSUES/OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- N/A

COMMENTS, CONCERNS AND CORRESPONDENCE

-

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DAILY REPORT – Anvil Range Mine Complex S-Wells Pump and Pipeline System

Prepared by:	Alvin Tong (SRK)	**Date:**	2009.01.18
Site Source:	Wayne (Pelly)	**Project #:**	1CD003.120
Distribution List:	D&T: Wes Treleaven, Doug Sedgwick, Dana Haggar, Greg Stevens, Mike Bryson Hatch: Marius Pytlewski, Rui Adanjo SRK: Cam Scott, Dan Mackie Pelly: Jess Jewell, Dan Russell and Jennifer DeHart		

WEATHER (from site data of theweathernetwork.com for Faro, YT)

Temperature (°C)	7 AM: 0°C	2 PM:	6 PM: 4°C
Precipitation (mm)	Rain: none	Snow: none	
Conditions			

KEY SITE PERSONNEL

Pelly	• Wayne Dear
D&T	• N/A
Hatch	• N/A
SRK	• N/A
Urecon	• N/A
Precision	• N/A

ACTIVITY

Area	Description
Quarry/Well Access	• Load and haul drain rock to well site.
Well Site	• Dig out road crossing and clear snow.
Embankment Area	• Load drain rock and dig out embankment on top of haul road for pipeline road crossing
Fusing Station	• Fusing pipe and get pipeline chute ready for laying over bank
Pipe Route	• N/A
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A

MATERIALS CONSUMED

Quarry/Well Access	• N/A
Well Site	• N/A
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• N/A
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A

EQUIPMENT

Equipment	Notes
• D5 Dozer	– Clear snow and drain rock
• D9 Dozer	– Rip road crossing
• 200 Excavator	– Dig out road crossing and load drain rock
• 325 Excavator	– Dig out behind deep well for pipeline by pit road crossing.
• Light plant with generator	– Power equipment
• Fusing equipment, incl. Generator	– Fusing pipes
• Crew truck	– Transport crew
• Foreman truck	– Transport
• Haul Trucks	– Haul drain rock

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- N/A

SCHEDULE ISSUES/OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- N/A

COMMENTS, CONCERNS AND CORRESPONDENCE

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Engineers and Scientists

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DAILY REPORT – Anvil Range Mine Complex
S-Wells Pump and Pipeline System

Prepared by:	Alvin Tong (SRK)	**Date:**	2009.01.19
Site Source:	Wayne (Pelly)	**Project #:**	1CD003.120
Distribution List:	D&T: Wes Treleaven, Doug Sedgwick, Dana Haggar, Greg Stevens, Mike Bryson Hatch: Marius Pytlewski, Rui Adanjo SRK: Cam Scott, Dan Mackie Pelly: Jess Jewell, Dan Russell and Jennifer DeHart		

WEATHER (from site data of theweathernetwork.com for Faro, YT)

Temperature (°C)	7 AM: 0°C	2 PM:	6 PM: 4°C
Precipitation (mm)	Rain: none	Snow: none	
Conditions			

KEY SITE PERSONNEL

Pelly	• Wayne
D&T	• N/A
Hatch	• N/A
SRK	• N/A
Urecon	• N/A
Precision	• N/A
	•

ACTIVITY

Area	Description
Quarry/Well Access	• Load and haul drain rock to well site.
Well Site	• Stockpile material and pre-dig in the frozen ground. Cleared snow and pull back extra dirt
Embankment Area	• Finished road crossing at the top of bank. Centered ½ chute for embankment distance.
Fusing Station	• N/A
Pipe Route	• N/A
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A

MATERIALS CONSUMED

Quarry/Well Access	• N/A
Well Site	• N/A
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• N/A
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A

EQUIPMENT

Equipment	Notes
• D5 Dozer	– Snow clearance
• 200 Excavator	– Load drain rock
• 325 Excavator	– Stockpile drain rock and pre-dig s-wells frozen grounds
• Light plant with generator	– N/A
• Fusing equipment, incl. Generator	– N/A
• Crew truck	– Transport crew
• Foreman truck	– Transport
• Haul Trucks	– Haul drain rock

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- N/A

SCHEDULE ISSUES/OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- N/A

COMMENTS, CONCERNS AND CORRESPONDENCE

•

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DAILY REPORT – Anvil Range Mine Complex
S-Wells Pump and Pipeline System

Prepared by:	Alvin Tong (SRK)	**Date:**	2009.01.20
Site Source:	Wayne (Pelly)	**Project #:**	1CD003.120
Distribution List:	D&T: Wes Treleaven, Doug Sedgwick, Dana Haggar, Greg Stevens, Mike Bryson Hatch: Marius Pytlewski, Rui Adanjo SRK: Cam Scott, Dan Mackie Pelly: Jess Jewell, Dan Russell and Jennifer DeHart		

WEATHER (from site data of theweathernetwork.com for Faro, YT)

Temperature (°C)	7 AM: 0°C	2 PM:	6 PM: 4°C
Precipitation (mm)	Rain: none	Snow: none	
Conditions			

KEY SITE PERSONNEL

Pelly	• Wayne
D&T	• N/A
Hatch	• N/A
SRK	• N/A
Urecon	• N/A
Precision	• N/A

ACTIVITY

Area	Description
Quarry/Well Access	• Haul drain rock to well site
Well Site	• Cleared snow and pull back extra dirt around s-well area. Stockpile material and pre-dig in the frozen ground.
Embankment Area	• Prepared ½ chute and guide it onto position.
Fusing Station	• N/A
Pipe Route	• N/A
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A

MATERIALS CONSUMED

Quarry/Well Access	• N/A
Well Site	• N/A
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• N/A
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A

EQUIPMENT

Equipment	Notes
• D5 Dozer	– Snow clearance
• D9 Dozer	– Anchor onto ½ chute to pushover bank
• 200 Excavator	– Load drain rock
• 325 Excavator	– Stockpile drain rock and pre-dig s-wells frozen grounds
• Light plant with generator	– N/A
• Fusing equipment, incl. Generator	– N/A
• Crew truck	– Transport crew
• Foreman truck	– Transport
• Haul Trucks	– Haul drain rock

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- N/A

SCHEDULE ISSUES/OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- N/A

COMMENTS, CONCERNS AND CORRESPONDENCE

-

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DAILY REPORT – Anvil Range Mine Complex
S-Wells Pump and Pipeline System – January 21, 2009

Prepared by:	Alvin Tong (SRK)	**Date:**	2009.01.28
Site Source:	Wayne (Pelly)	**Project #:**	1CD003.120
Distribution List:	D&T: Wes Treleaven, Doug Sedgwick, Dana Haggar, Greg Stevens, Mike Bryson Hatch: Marius Pytlewski, Rui Adanjo SRK: Cam Scott, Dan Mackie Pelly: Jess Jewell, Dan Russell and Jennifer DeHart		

WEATHER (from site data of theweathernetwork.com for Faro, YT)

Temperature (°C)	7 AM: -6°C	2 PM: -10°C	6 PM: -14°C
Precipitation (mm)	Rain: none	Snow: none	
Conditions			

KEY SITE PERSONNEL

Pelly	• Wayne Dear
D&T	• N/A
Hatch	• N/A
SRK	• N/A
Urecon	• N/A
Precision	• N/A

ACTIVITY

Area	Description
Quarry/Well Access	• Rip road crossing at deep well and dig out trench for road crossing at deep well then backfill.
Well Site	• Dig to grade and push frozen dirt away at S-well for site preparation.
Embankment Area	• Installed cables on anchors and adjust pipe and cut off at bottom.
Fusing Station	• N/A
Pipe Route	• N/A
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A

MATERIALS CONSUMED

Quarry/Well Access	• N/A
Well Site	• N/A
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• N/A
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A

EQUIPMENT

Equipment	Notes
• D5 Dozer	– Push frozen dirt away at S-well
• D9 Dozer	– Rip road crossing
• 200 Excavator	– Dig trench for road crossing and backfill
• 325 Excavator	– Dig S-well pad to grade
• Light plant with generator	– Plug in machines
• Fusing equipment, incl. Generator	– Used for power tools
• Crew truck	– Transport crew
• Foreman truck	– Transport
• Haul Trucks	– Demobilized back to Warehouse

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- N/A

SCHEDULE ISSUES/OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- N/A

COMMENTS, CONCERNS AND CORRESPONDENCE

- N/A

PHOTOS

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DAILY REPORT – Anvil Range Mine Complex S-Wells Pump and Pipeline System, January 22, 2009

Prepared by:	Alvin Tong (SRK)	**Date:**	2009.01.29
Site Source:	Wayne (Pelly)	**Project #:**	1CD003.120
Distribution List:	D&T: Wes Treleaven, Doug Sedgwick, Dana Haggar, Greg Stevens, Mike Bryson Hatch: Marius Pytlewski, Rui Adanjo SRK: Cam Scott, Dan Mackie Pelly: Jess Jewell, Dan Russell and Jennifer DeHart		

WEATHER (from site data of theweathernetwork.com for Faro, YT)

Temperature (°C)	7 AM: -21°C	2 PM:	6 PM: -25°C
Precipitation (mm)	Rain: none	Snow: none	
Conditions			

KEY SITE PERSONNEL

Pelly	• Wayne Dear
D&T	• N/A
Hatch	• N/A
SRK	• N/A
Urecon	• N/A
Precision	• N/A

ACTIVITY

Area	Description
Quarry/Well Access	• N/A
Well Site	• Start to dig sump and trench.
Embankment Area	• N/A
Fusing Station	• Fusing pipe.
Pipe Route	• N/A
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A

MATERIALS CONSUMED

Quarry/Well Access	• N/A
Well Site	• N/A
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• N/A
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A

EQUIPMENT

Equipment	Notes
• D5 Dozer	– Doze spoil material away from trench
• D9 Dozer	– Demobilize back to Warehouse
• 200 Excavator	– Dig sump and trench
• 325 Excavator	– Dig sump and trench
• Light plant with generator	– Plug in machines
• Fusing equipment, incl. Generator	– Fuse pipe
• Crew truck	– Transport crew
• Foreman truck	– Transport
• Haul Trucks	– N/A

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- N/A

SCHEDULE ISSUES/OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- N/A

COMMENTS, CONCERNS AND CORRESPONDENCE

- N/A

PHOTOS

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DAILY REPORT – Anvil Range Mine Complex S-Wells Pump and Pipeline System, January 23, 2009

Prepared by:	Alvin Tong (SRK)	**Date:**	2009.01.29
Site Source:	Wayne (Pelly)	**Project #:**	1CD003.120
Distribution List:	D&T: Wes Treleaven, Doug Sedgwick, Dana Haggar, Greg Stevens, Mike Bryson Hatch: Marius Pytlewski, Rui Adanjo SRK: Cam Scott, Dan Mackie Pelly: Jess Jewell, Dan Russell and Jennifer DeHart		

WEATHER (from site data of theweathernetwork.com for Faro, YT)

Temperature (°C)	7 AM: -31°C	2 PM:	6 PM: -32°C
Precipitation (mm)	Rain: none	Snow: none	
Conditions			

KEY SITE PERSONNEL

Pelly	• Wayne Dear
D&T	• N/A
Hatch	• N/A
SRK	• N/A
Urecon	• N/A
Precision	• N/A

ACTIVITY

Area	Description
Quarry/Well Access	• N/A
Well Site	• Trench and sump excavation, deploy bentomat and backfill with drain rock.
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• N/A
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A

MATERIALS CONSUMED

Quarry/Well Access	• N/A
Well Site	• Bentomat
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• N/A
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A

EQUIPMENT

Equipment	Notes
• D5 Dozer	– Doze spoil material away from trench
• D9 Dozer	– N/A
• 200 Excavator	– Dig sump and trench
• 325 Excavator	– Dig sump and trench
• Light plant with generator	– Plug in machines
• Fusing equipment, incl. Generator	– N/A
• Crew truck	– Transport crew
• Foreman truck	– Transport
• Haul Trucks	– N/A

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- N/A

SCHEDULE ISSUES/OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- N/A

COMMENTS, CONCERNS AND CORRESPONDENCE

•

PHOTOS

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DAILY REPORT – Anvil Range Mine Complex
S-Wells Pump and Pipeline System, January 24, 2009

Prepared by:	Alvin Tong; Jozsef Miskolczi	**Date:**	2009.01.29
Site Source:	Wayne Dear	**Project #:**	1CD003.120
Distribution List:	D&T: Wes Treleaven, Doug Sedgwick, Dana Haggar, Greg Stevens, Mike Bryson Hatch: Marius Pytlewski, Rui Adanjo SRK: Cam Scott, Dan Mackie Pelly: Jess Jewell, Dan Russell and Jennifer DeHart		

WEATHER (from site data of theweathernetwork.com for Faro, YT)

Temperature (°C)	7 AM: -40°C	2 PM:	6 PM: -26°C
Precipitation (mm)	Rain: N/A	Snow: N/A	
Conditions	Sunny		

KEY SITE PERSONNEL

Pelly	• Wayne Dear
D&T	• N/A
Hatch	• N/A
SRK	• Alvin Tong; Jozsef Miskolczi
Urecon	• N/A
Precision	• N/A
ARMC	• N/A

ACTIVITY

Area	Description
Quarry/Well Access	• N/A
Well Site	• Trench and sump excavation, deploy geosynthetics and backfill with drain rock. Constructed dykes for water containment.
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• N/A
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A

MATERIALS CONSUMED

Quarry/Well Access	• N/A
Well Site	• Bentomat and Enviro-Liner
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• N/A
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A

EQUIPMENT

Equipment	Notes
• D5	- Doze spoil material away from trench
• Volvo Loader	- Construct dyke for water containment and feed drain rock to excavators
• 200 Excavator	- Excavate and backfill trench
• 325 Excavator	- Excavate and backfill trench
• Light plant with generator	- Power equipment
• Fusing equipment, incl. Generator	- N/A
• Crew truck	- Transport Crew
• Foreman truck	- Transport
• Haul Truck	- N/A

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- N/A

SCHEDULE ISSUES/OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- N/A

COMMENTS, CONCERNS AND CORRESPONDENCE

- SRK staff arrived on site at 2:30pm
- Pelly crew left site at 3:00pm
- Communication with Wayne Dear outlined the following information:
  - The sump was installed on Jan 23rd and the cut off trench completed and backfilled before 2:30 pm on Jan. 24th
  - The foundation of the trench is on stiff sandy silt in west bank, below the sump and most of the alignment of the trench. Wayne cannot confirm if the foundation of the east bank is on silt. SRK staff cannot confirm the above information from surface observations.
  - Bentomat was installed from East bank of the trench to approximately 10m from West bank as supply ran out on project site. Enviro-liner was installed in place of the Bentomat on the remaining 10 meters of the trench. SRK observed both Bentomat and Enviro-liner showing on the surface approximately 3 meters apart in the downstream side of the trench. No geotextile was observed in the installation.
  - The sump bottom is approximately 5.5m below grade and there is a layer of drain rock was place before culvert installation. SRK confirms the culvert extended 5.5m below grade and the standing water is approximately 3.1m below grade. However SRK cannot confirm the sump depth due to ice over the water table.
  - Wayne estimated 900 yd^3 of backfill material placed in the trench.
  - Sump monitoring pipes were not installed.
  - The fill material is a cobble with boulder and sand with traces of silt.
  - Ground water seepage rate was estimated to be 0.3 yd^3 per second from the middle/eastern middle part of the trench. The section area of the seepage zone is unknown. The water bailed was contained in a temporary containment area downstream of the trench.
- A preliminary plan and section of the as-built is shown in Figure 1 and 2.

PHOTOS

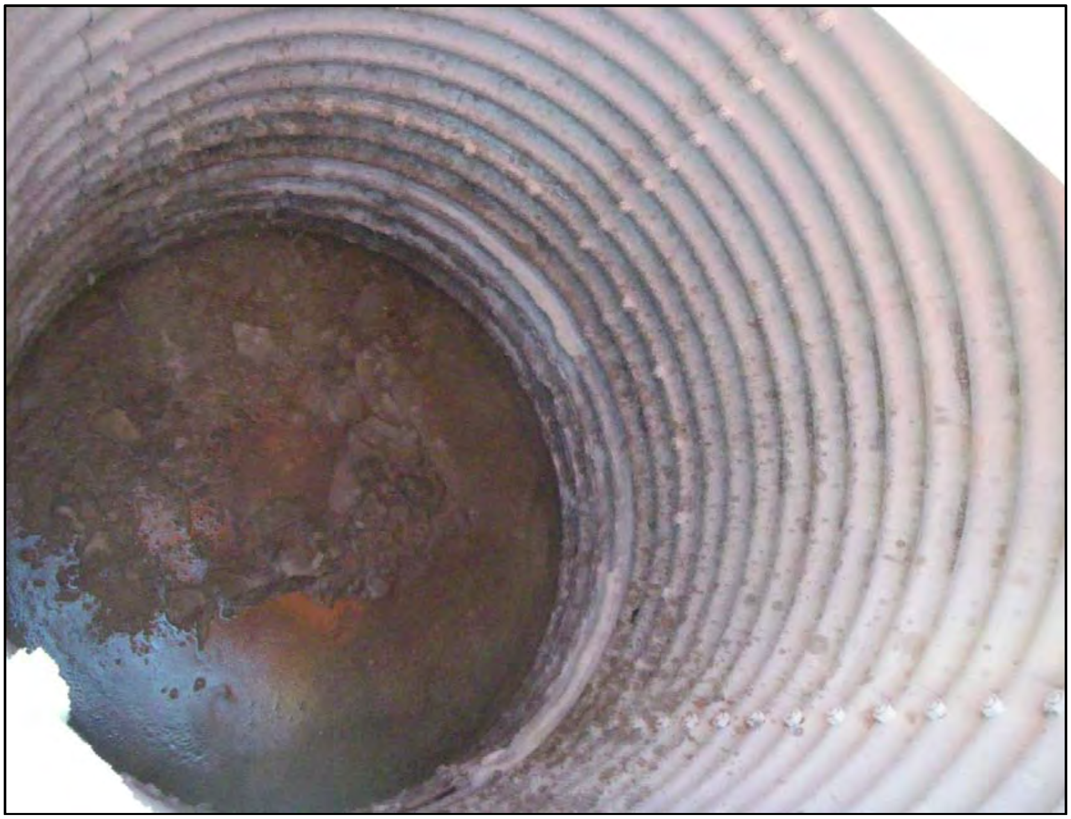

Photo 1: View downward inside the installed culvert, showing frozen water level

Photo 2: Installed culvert showing 0.6 meters stickup

Photo 3: View of the backfilled interceptor trench from East to West showing the culvert stickup

Photo 4: View of the backfilled interceptor trench from West to East

Photo 5: Left-over of the backfill material

Photo 6: Temporary storage ponds

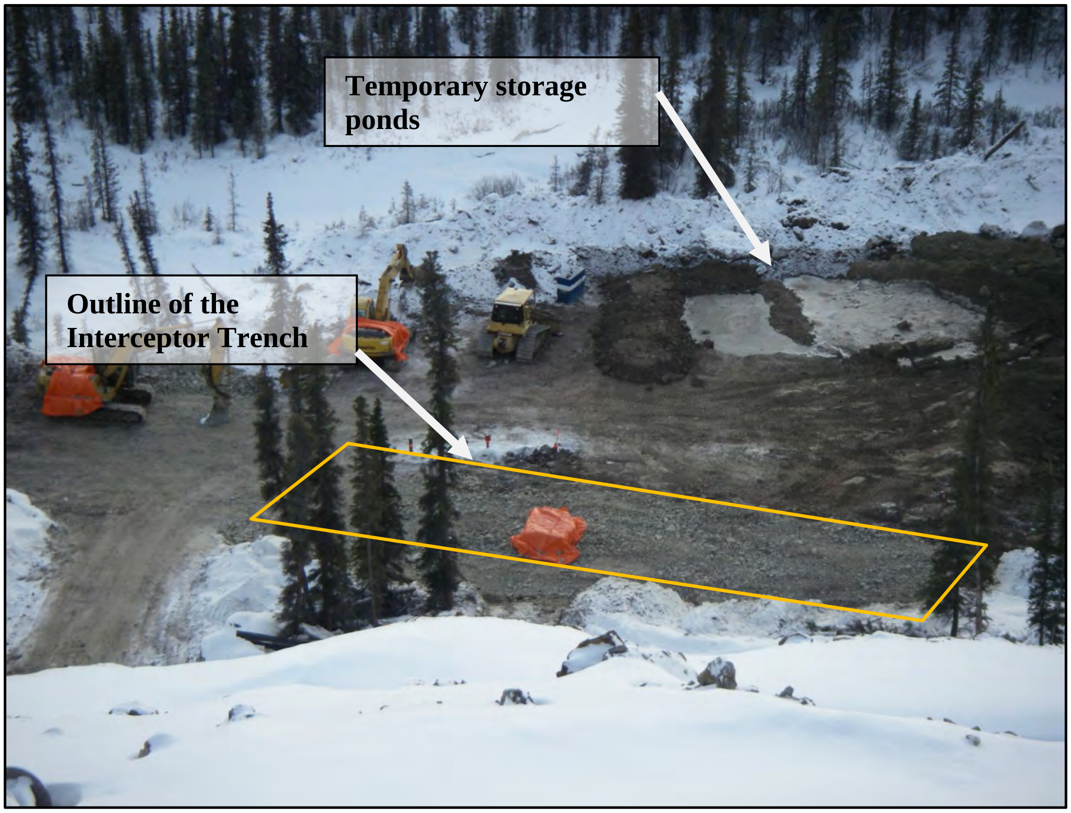

Photo 7: Panoramic view of the Interceptor Trench area

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DAILY REPORT – Anvil Range Mine Complex S-Wells Pump and Pipeline System, January 25, 2009

Prepared by:	Alvin Tong; Jozsef Miskolczi	**Date:**	2009.01.27
Site Source:	Wayne Dear	**Project #:**	1CD003.120
Distribution List:	D&T: Wes Treleaven, Doug Sedgwick, Dana Haggar, Greg Stevens, Mike Bryson Hatch: Marius Pytlewski, Rui Adanjo SRK: Cam Scott, Dan Mackie Pelly: Jess Jewell, Dan Russell and Jennifer DeHart		

WEATHER (from site data of theweathernetwork.com for Faro, YT)

Temperature (°C)	7 AM: -35°C	2 PM:	6 PM: -26°C
Precipitation (mm)	Rain: N/A	Snow: N/A	
Conditions	Sunny		

KEY SITE PERSONNEL

Pelly	• N/A
D&T	• N/A
Hatch	• N/A
SRK	• Alvin Tong; Jozsef Miskolczi
Urecon	• N/A
Precision	• N/A
ARMC	• N/A

ACTIVITY

Area	Description
Quarry/Well Access	• N/A
Well Site	• N/A
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• N/A
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A
	•

MATERIALS CONSUMED

Quarry/Well Access	• N/A
Well Site	• N/A
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• N/A
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A

EQUIPMENT

Equipment	Notes
• D5	- N/A
• D9	- N/A
• 200 Excavator	- N/A
• Light plant with generator	- Power equipment
• Fusing equipment, incl. Generator	- N/A
• Crew truck	- N/A
• Foreman truck	- N/A
• Haul Truck	- N/A

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- N/A

SCHEDULE ISSUES/OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- N/A

COMMENTS, CONCERNS AND CORRESPONDENCE

- Pelly crew is not on site.
- The water level at 11AM was 2.4m below grade, which represents a rise of 0.7 meters since 3 PM on the 24th
- The bottom of sump is found approximately 5.25m below grade. There is a thin layer of mud observed at the bottom of the sump above gravel at the bottom.
- The CMP is estimated to be around 6m in length based on previous photo. SRK will communicate with Pelly personnel on Monday morning to get the as-built dimensions.
- Overall site observation found smears of sand & gravel and sandy silt spoil materials. It is difficult to clearly identify the types of material and associated volumes due to the dozing operation and frozen conditions. There are evidences that show the silt material was dozed and place over the sand & gravel material.
- SRK has arranged a meeting with Wayne on Monday morning to discuss the work done.

PHOTOS

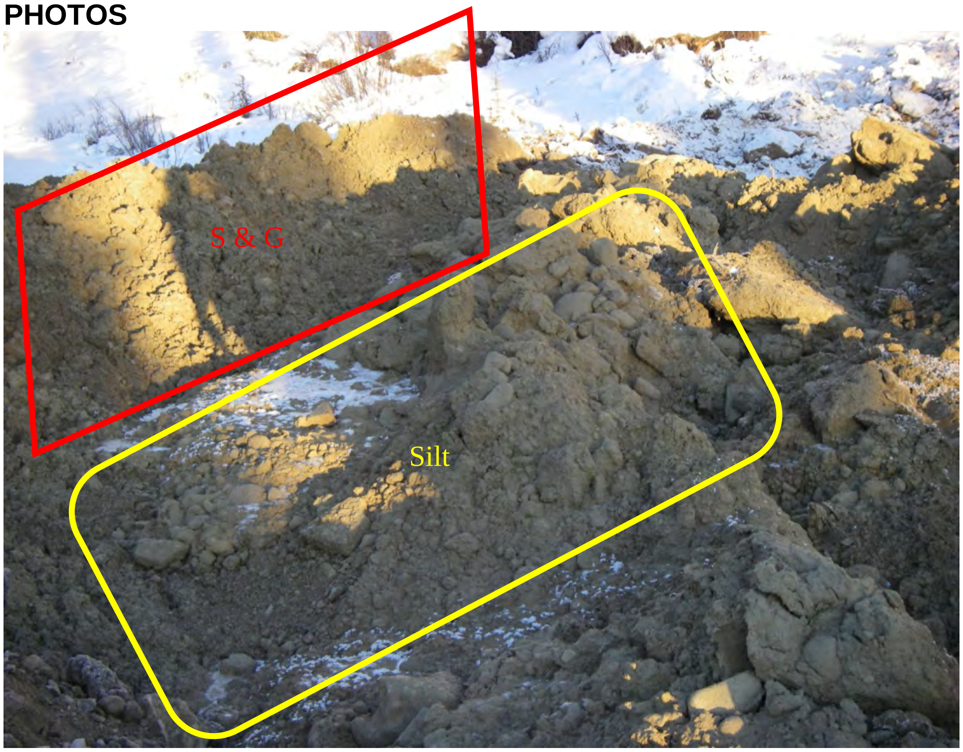

Photo 1: General view of spoil material where sandy silt over sand & gravel spoils.

Photo 2: Sand and gravel material that is assumed to be part of spoil material from excavation.

Photo 3: Close-up of the Sand and Gravel material.

Photo 4: Close up of the sandy silt material.

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DAILY REPORT – Anvil Range Mine Complex S-Wells Pump and Pipeline System, January 26, 2009

Prepared by:	Alvin Tong	**Date:**	2009.01.29
Site Source:	Wayne Dear	**Project #:**	1CD003.120
Distribution List:	D&T: Wes Treleaven, Doug Sedgwick, Dana Haggar, Greg Stevens, Mike Bryson Hatch: Marius Pytlewski, Rui Adanjo SRK: Cam Scott, Dan Mackie Pelly: Jess Jewell, Dan Russell and Jennifer DeHart		

WEATHER (from site data of theweathernetwork.com for Faro, YT)

Temperature (°C)	7 AM: -20°C	2 PM:	6 PM: -20°C
Precipitation (mm)	Rain: N/A	Snow: ~1cm	
Conditions	Light snow		

KEY SITE PERSONNEL

Pelly	• N/A
D&T	• N/A
Hatch	• N/A
SRK	• Alvin Tong
Urecon	• N/A
Precision	• N/A
ARMC	• N/A

ACTIVITY

Area	Description
Quarry/Well Access	• N/A
Well Site	• N/A
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• N/A
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A
Warehouse	• Build generator shed

MATERIALS CONSUMED

Quarry/Well Access	• N/A
Well Site	• N/A
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• N/A
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A

EQUIPMENT

Equipment	Notes
• D5	- N/A
• D9	- N/A
• 200 Excavator	- N/A
• Light plant with generator	- N/A
• Fusing equipment, incl. Generator	- N/A
• Crew truck	- N/A
• Foreman truck	- N/A
• Haul Truck	- N/A

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- N/A

SCHEDULE ISSUES/OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- N/A

COMMENTS, CONCERNS AND CORRESPONDENCE

- SRK returned to Whitehorse over night.
- SRK meet with Wayne at Arctic Backhoe and discussed the following:
  - The estimated drainage gravel delivered to site is approximately 944 yd^3 by truck count. SRK estimated 60 yd^3 of material is left used, hence it is inferred that 880 yd^3 of material went into backfilling the trench.
  - The dimensions of the CMP are 7' by 18' (2.1m by 6m). Wayne indicated that the CMP was installed 16' feet below grade. He dumped approximately 1.5 yd^3 of gravel inside the sump as filter for the pump.
  - SRK got through the photos Wayne in Arctic Backhoe's office. SRK was unable to download the pictures due to technical difficulties. It is communicated that Arctic Backhoe will mail a CD containing the photo to SRK before end of the week.
  - The photos along with videos showed excavation process. Photos indicated sandy silt material excavated from the bottom of the trench. It also showed the sand and gravel seam which indicated by Wayne is about 4'-6' thick.
  - SRK requested Wayne to measure the water level in sump when he arrives on site tomorrow morning.
  - Arctic Backhoe crew is schedule to return to site for heat trace installation and other miscellaneous works.

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DAILY REPORT – Anvil Range Mine Complex S-Wells Pump and Pipeline System, January 27, 2009

Prepared by:	Alvin Tong	**Date:**	2009.01.29
Site Source:	Wayne Dear	**Project #:**	1CD003.120
Distribution List:	D&T: Wes Treleaven, Doug Sedgwick, Dana Haggar, Greg Stevens, Mike Bryson Hatch: Marius Pytlewski, Rui Adanjo SRK: Cam Scott, Dan Mackie Pelly: Jess Jewell, Dan Russell and Jennifer DeHart		

WEATHER (from site data of theweathernetwork.com for Faro, YT)

Temperature (°C)	7 AM: -20°C	2 PM:	6 PM: -28°C
Precipitation (mm)	Rain: N/A	Snow: N/A	
Conditions			

KEY SITE PERSONNEL

Pelly	• Wayne Dear
D&T	• N/A
Hatch	• N/A
SRK	• N/A
Urecon	• N/A
Precision	• N/A
ARMC	• N/A

ACTIVITY

Area	Description
Quarry/Well Access	• N/A
Well Site	• N/A
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• N/A
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A
Warehouse	• Build generator shed and prepare material for heat trace.

MATERIALS CONSUMED

Quarry/Well Access	• N/A
Well Site	• N/A
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• N/A
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A

EQUIPMENT

Equipment	Notes
• D5	- N/A
• 325 Excavator	- Mobilized to top of Embankment
• 200 Excavator	- Mobilized to top of Embankment
• Light plant with generator	- N/A
• Fusing equipment, incl. Generator	- N/A
• Crew truck	- N/A
• Foreman truck	- N/A
• Haul Truck	- N/A

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- N/A

SCHEDULE ISSUES/OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- N/A

COMMENTS, CONCERNS AND CORRESPONDENCE

- N/A

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DAILY REPORT – Anvil Range Mine Complex
S-Wells Pump and Pipeline System, January 28, 2009

Prepared by:	Alvin Tong	**Date:**	2009.01.29
Site Source:	Wayne Dear	**Project #:**	1CD003.120
Distribution List:	D&T: Wes Treleaven, Doug Sedgwick, Dana Haggar, Greg Stevens, Mike Bryson Hatch: Marius Pytlewski, Rui Adanjo SRK: Cam Scott, Dan Mackie Pelly: Jess Jewell, Dan Russell and Jennifer DeHart		

WEATHER (from site data of theweathernetwork.com for Faro, YT)

Temperature (°C)	7 AM: -13°C	2 PM:	6 PM: -10°C
Precipitation (mm)	Rain: N/A	Snow: N/A	
Conditions			

KEY SITE PERSONNEL

Pelly	• Wayne Dear
D&T	• N/A
Hatch	• N/A
SRK	• N/A
Urecon	• N/A
Precision	• N/A
ARMC	• N/A

ACTIVITY

Area	Description
Quarry/Well Access	• N/A
Well Site	• N/A
Embankment Area	• Deploy pipe over the bank to the S-well area
Fusing Station	• Fusing pipe
Pipe Route	• N/A
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A
Warehouse	• N/A

MATERIALS CONSUMED

Quarry/Well Access	• N/A
Well Site	• N/A
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• N/A
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A

EQUIPMENT

Equipment	Notes
• D5	- N/A
• 325 Excavator	- Deploy pipe over embankment
• 200 Excavator	- Deploy pipe over embankment
• Light plant with generator	- Power equipment
• Fusing equipment, incl. Generator	- Fusing pipe
• Crew truck	- Transport Crew
• Foreman truck	- Transport Crew
• Haul Truck	- N/A
• 2 x Service Truck	- Service equipment

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- N/A

SCHEDULE ISSUES/OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- N/A

COMMENTS, CONCERNS AND CORRESPONDENCE

- N/A

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DAILY REPORT – Anvil Range Mine Complex S-Wells Pump and Pipeline System, January 29, 2009

Prepared by:	Alvin Tong	**Date:**	2009.01.29
Site Source:	Wayne Dear	**Project #:**	1CD003.120
Distribution List:	D&T: Wes Treleaven, Doug Sedgwick, Dana Haggar, Greg Stevens, Mike Bryson Hatch: Marius Pytlewski, Rui Adanjo SRK: Cam Scott, Dan Mackie Pelly: Jess Jewell, Dan Russell and Jennifer DeHart		

WEATHER (from site data of theweathernetwork.com for Faro, YT)

Temperature (°C)	7 AM: -11°C	2 PM:	6 PM: -8°C
Precipitation (mm)	Rain: N/A	Snow: N/A	
Conditions			

KEY SITE PERSONNEL

Pelly	• Wayne Dear
D&T	• N/A
Hatch	• N/A
SRK	• N/A
Urecon	• N/A
Precision	• N/A
ARMC	• N/A

ACTIVITY

Area	Description
Quarry/Well Access	• N/A
Well Site	• Dig out around sump and install geotextile and backfill.
Embankment Area	• Deploy pipe over the bank to the S-well area
Fusing Station	• Fusing pipe
Pipe Route	• Install heat trace
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A
Warehouse	• N/A

MATERIALS CONSUMED

Quarry/Well Access	• N/A
Well Site	• Geotextile around sump
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• Heat trace cables
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A

EQUIPMENT

Equipment	Notes
• D5	- N/A
• 325 Excavator	- Deploy pipe over embankment
• 200 Excavator	- Dig out around sump area and install geotextile and backfill.
• Light plant with generator	- Power equipment
• Fusing equipment, incl. Generator	- Fusing pipe
• Crew truck	- Transport Crew
• Foreman truck	- Transport Crew
• Haul Truck	- N/A
• 2 x Service Truck	- Service equipment

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- N/A

SCHEDULE ISSUES/OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- N/A

COMMENTS, CONCERNS AND CORRESPONDENCE

- N/A

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DAILY REPORT – Anvil Range Mine Complex S-Wells Pump and Pipeline System, January 30, 2009

Prepared by:	Alvin Tong	**Date:**	2009.01.30
Site Source:	Wayne Dear	**Project #:**	1CD003.120
Distribution List:	D&T: Wes Treleaven, Doug Sedgwick, Dana Haggar, Greg Stevens, Mike Bryson Hatch: Marius Pytlewski, Rui Adanjo SRK: Cam Scott, Dan Mackie Pelly: Jess Jewell, Dan Russell and Jennifer DeHart		

WEATHER (from site data of theweathernetwork.com for Faro, YT)

Temperature (°C)	7 AM: -11°C	2 PM:	6 PM: -6°C
Precipitation (mm)	Rain: N/A	Snow: yes	
Conditions	Snow storm		

KEY SITE PERSONNEL

Pelly	• Wayne Dear
D&T	• N/A
Hatch	• N/A
SRK	• N/A
Urecon	• N/A
Precision	• N/A
ARMC	• N/A

ACTIVITY

Area	Description
Quarry/Well Access	• N/A
Well Site	• N/A
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• N/A
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A
Warehouse	• Building generator shed

MATERIALS CONSUMED

Quarry/Well Access	• N/A
Well Site	• N/A
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• N/A
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A

EQUIPMENT

Equipment	Notes
• D5	- N/A
• 325 Excavator	- N/A
• 200 Excavator	- N/A
• Light plant with generator	- N/A
• Fusing equipment, incl. Generator	- N/A
• Crew truck	- Transport Crew
• Foreman truck	- Transport Crew
• Haul Truck	- N/A
• 2 x Service Truck	- Service equipment

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- N/A

SCHEDULE ISSUES/OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- N/A

COMMENTS, CONCERNS AND CORRESPONDENCE

- Electricians are on site and prepare for C-Can arrival.

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DAILY REPORT – Anvil Range Mine Complex
S-Wells Pump and Pipeline System, February 2, 2009

Prepared by:	Alvin Tong	**Date:**	2009.03.06
Site Source:	Wayne Dear	**Project #:**	1CD003.120
Distribution List:	D&T: Wes Treleaven, Doug Sedgwick, Dana Haggar, Greg Stevens, Mike Bryson Hatch: Marius Pytlewski, Rui Adanjo SRK: Cam Scott, Dan Mackie Pelly: Jess Jewell, Dan Russell and Jennifer DeHart		

WEATHER (from site data of theweathernetwork.com for Faro, YT)

Temperature (°C)	7 AM: -10°C	2 PM:	6 PM: -10°C
Precipitation (mm)	Rain: N/A	Snow: N/A	
Conditions			

KEY SITE PERSONNEL

Pelly	• Richard
D&T	• N/A
Hatch	• N/A
SRK	• N/A
Urecon	• N/A
Precision	• N/A
ARMC	• N/A

ACTIVITY

Area	Description
Quarry/Well Access	• N/A
Well Site	• N/A
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• Snow Removal around pipe connections
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A
Warehouse	• Building generator shed

MATERIALS CONSUMED

Quarry/Well Access	• N/A
Well Site	• N/A
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• N/A
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A

EQUIPMENT

Equipment	Notes
• D5	- N/A
• 325 Excavator	- N/A
• 200 Excavator	- N/A
• Light plant with generator	- N/A
• Fusing equipment, incl. Generator	- N/A
• Crew truck	- Transport Crew
• Foreman truck	- Transport Crew
• Haul Truck	- N/A
• 2 x Service Truck	- Service equipment

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- N/A

SCHEDULE ISSUES/OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- N/A

COMMENTS, CONCERNS AND CORRESPONDENCE

- N/A

SRK Consulting
Engineers and Scientists

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DAILY REPORT – Anvil Range Mine Complex S-Wells Pump and Pipeline System, February 3, 2009

Prepared by:	Alvin Tong	**Date:**	2009.03.06
Site Source:	Wayne Dear	**Project #:**	1CD003.120
Distribution List:	D&T: Wes Treleaven, Doug Sedgwick, Dana Haggar, Greg Stevens, Mike Bryson Hatch: Marius Pytlewski, Rui Adanjo SRK: Cam Scott, Dan Mackie Pelly: Jess Jewell, Dan Russell and Jennifer DeHart		

WEATHER (from site data of theweathernetwork.com for Faro, YT)

Temperature (°C)	7 AM: -6°C	2 PM:	6 PM: -6°C
Precipitation (mm)	Rain: N/A	Snow: N/A	
Conditions			

KEY SITE PERSONNEL

Pelly	• Richard
D&T	• N/A
Hatch	• N/A
SRK	• N/A
Urecon	• N/A
Precision	• N/A
ARMC	• N/A

ACTIVITY

Area	Description
Quarry/Well Access	• N/A
Well Site	• N/A
Embankment Area	• Install anchor and flanges.
Fusing Station	• N/A
Pipe Route	• N/A
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A
Warehouse	• N/A

MATERIALS CONSUMED

Quarry/Well Access	• N/A
Well Site	• N/A
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• N/A
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A

EQUIPMENT

Equipment	Notes
• D5	- N/A
• 325 Excavator	- Assist anchor installation
• 200 Excavator	- N/A
• Light plant with generator	- Power equipment
• Fusing equipment, incl. Generator	- Fuse flanges
• Crew truck	- Transport Crew
• Foreman truck	- Transport Crew
• Haul Truck	- N/A
• 2 x Service Truck	- N/A

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- N/A

SCHEDULE ISSUES/OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- N/A

COMMENTS, CONCERNS AND CORRESPONDENCE

- N/A

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DAILY REPORT – Anvil Range Mine Complex S-Wells Pump and Pipeline System, February 4, 2009

Prepared by:	Alvin Tong	**Date:**	2009.03.06
Site Source:	Wayne Dear	**Project #:**	1CD003.120
Distribution List:	D&T: Wes Treleaven, Doug Sedgwick, Dana Haggar, Greg Stevens, Mike Bryson Hatch: Marius Pytlewski, Rui Adanjo SRK: Cam Scott, Dan Mackie Pelly: Jess Jewell, Dan Russell and Jennifer DeHart		

WEATHER (from site data of theweathernetwork.com for Faro, YT)

Temperature (°C)	7 AM: -25°C	2 PM:	6 PM: -25°C
Precipitation (mm)	Rain: N/A	Snow: N/A	
Conditions			

KEY SITE PERSONNEL

Pelly	• Richard
D&T	• N/A
Hatch	• N/A
SRK	• N/A
Urecon	• N/A
Precision	• N/A
ARMC	• N/A

ACTIVITY

Area	Description
Quarry/Well Access	• N/A
Well Site	• N/A
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• Moved pipe into final alignment and installed heat trace
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• Moved pipe into final alignment
Warehouse	• N/A

MATERIALS CONSUMED

Quarry/Well Access	• N/A
Well Site	• N/A
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• Heat trace
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A

EQUIPMENT

Equipment	Notes
• D5	- N/A
• 325 Excavator	- Move pipe into final alignment
• 200 Excavator	- N/A
• Light plant with generator	- Power equipment
• Fusing equipment, incl. Generator	- N/A
• Crew truck	- Transport Crew
• Foreman truck	- Transport Crew
• Haul Truck	- N/A
• 2 x Service Truck	- N/A

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- N/A

SCHEDULE ISSUES/OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- N/A

COMMENTS, CONCERNS AND CORRESPONDENCE

- N/A

SRK Consulting
Engineers and Scientists

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DAILY REPORT – Anvil Range Mine Complex S-Wells Pump and Pipeline System, February 5, 2009

Prepared by:	Alvin Tong	**Date:**	2009.03.06
Site Source:	Wayne Dear	**Project #:**	1CD003.120
Distribution List:	D&T: Wes Treleaven, Doug Sedgwick, Dana Haggar, Greg Stevens, Mike Bryson Hatch: Marius Pytlewski, Rui Adanjo SRK: Cam Scott, Dan Mackie Pelly: Jess Jewell, Dan Russell and Jennifer DeHart		

WEATHER (from site data of theweathernetwork.com for Faro, YT)

Temperature (°C)	7 AM: -25°C	2 PM:	6 PM: -25°C
Precipitation (mm)	Rain: N/A	Snow: N/A	
Conditions			

KEY SITE PERSONNEL

Pelly	• Richard
D&T	• N/A
Hatch	• N/A
SRK	• N/A
Urecon	• N/A
Precision	• N/A
ARMC	• N/A

ACTIVITY

Area	Description
Quarry/Well Access	• N/A
Well Site	• N/A
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• Moved pipe into final alignment and installed heat trace and joints
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• Moved pipe into final alignment
Warehouse	• N/A

MATERIALS CONSUMED

Quarry/Well Access	• N/A
Well Site	• N/A
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• Heat trace
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A

EQUIPMENT

Equipment	Notes
• D5	- N/A
• 325 Excavator	- Move pipe into final alignment
• 200 Excavator	- N/A
• Light plant with generator	- Power equipment
• Fusing equipment, incl. Generator	- N/A
• Crew truck	- Transport Crew
• Foreman truck	- Transport Crew
• Haul Truck	- N/A
• 2 x Service Truck	- N/A

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- N/A

SCHEDULE ISSUES/OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- N/A

COMMENTS, CONCERNS AND CORRESPONDENCE

- N/A

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DAILY REPORT – Anvil Range Mine Complex
S-Wells Pump and Pipeline System, February 6, 2009

Prepared by:	Alvin Tong	**Date:**	2009.03.06
Site Source:	Wayne Dear	**Project #:**	1CD003.120
Distribution List:	D&T: Wes Treleaven, Doug Sedgwick, Dana Haggar, Greg Stevens, Mike Bryson Hatch: Marius Pytlewski, Rui Adanjo SRK: Cam Scott, Dan Mackie Pelly: Jess Jewell, Dan Russell and Jennifer DeHart		

WEATHER (from site data of theweathernetwork.com for Faro, YT)

Temperature (°C)	7 AM: -25°C	2 PM:	6 PM: -25°C
Precipitation (mm)	Rain: N/A	Snow: N/A	
Conditions			

KEY SITE PERSONNEL

Pelly	• Richard
D&T	• N/A
Hatch	• N/A
SRK	• N/A
Urecon	• N/A
Precision	• N/A
ARMC	• N/A

ACTIVITY

Area	Description
Quarry/Well Access	• N/A
Well Site	• N/A
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• Installed heat trace and joints
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A
Warehouse	• N/A

MATERIALS CONSUMED

Quarry/Well Access	• N/A
Well Site	• N/A
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• Heat trace
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A

EQUIPMENT

Equipment	Notes
• D5	- N/A
• 325 Excavator	- N/A
• 200 Excavator	- N/A
• Light plant with generator	- Power equipment
• Fusing equipment, incl. Generator	- N/A
• Crew truck	- Transport Crew
• Foreman truck	- Transport Crew
• Haul Truck	- N/A
• Service Truck	- N/A

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- N/A

SCHEDULE ISSUES/OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- N/A

COMMENTS, CONCERNS AND CORRESPONDENCE

- N/A

SRK Consulting (Canada) Inc.
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Vancouver, B.C. V6E 3X2, Canada
Tel: **604.681.4196**
Fax: **604.687.5532**

DAILY REPORT – Anvil Range Mine Complex S-Wells Pump and Pipeline System, February 7, 2009

Prepared by:	Alvin Tong	**Date:**	2009.03.06
Site Source:	Wayne Dear	**Project #:**	1CD003.120
Distribution List:	D&T: Wes Treleaven, Doug Sedgwick, Dana Haggar, Greg Stevens, Mike Bryson Hatch: Marius Pytlewski, Rui Adanjo SRK: Cam Scott, Dan Mackie Pelly: Jess Jewell, Dan Russell and Jennifer DeHart		

WEATHER (from site data of theweathernetwork.com for Faro, YT)

Temperature (°C)	7 AM: -20°C	2 PM:	6 PM: -20°C
Precipitation (mm)	Rain: N/A	Snow: N/A	
Conditions			

KEY SITE PERSONNEL

Pelly	• Richard
D&T	• N/A
Hatch	• N/A
SRK	• N/A
Urecon	• N/A
Precision	• N/A
ARMC	• N/A

ACTIVITY

Area	Description
Quarry/Well Access	• N/A
Well Site	• N/A
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• Installed heat trace and joints
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A
Warehouse	• N/A

MATERIALS CONSUMED

Quarry/Well Access	• N/A
Well Site	• N/A
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• Heat trace
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A

EQUIPMENT

Equipment	Notes
• D5	- N/A
• 325 Excavator	- N/A
• 200 Excavator	- N/A
• Light plant with generator	- Power equipment
• Fusing equipment, incl. Generator	- N/A
• Crew truck	- Transport Crew
• Foreman truck	- Transport Crew
• Haul Truck	- N/A
• Service Truck	- N/A

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- N/A

SCHEDULE ISSUES/OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- N/A

COMMENTS, CONCERNS AND CORRESPONDENCE

- N/A

SRK Consulting (Canada) Inc.
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Fax: **604.687.5532**

DAILY REPORT – Anvil Range Mine Complex S-Wells Pump and Pipeline System, February 8, 2009

Prepared by:	Alvin Tong	**Date:**	2009.03.06
Site Source:	Wayne Dear	**Project #:**	1CD003.120
Distribution List:	D&T: Wes Treleaven, Doug Sedgwick, Dana Haggar, Greg Stevens, Mike Bryson Hatch: Marius Pytlewski, Rui Adanjo SRK: Cam Scott, Dan Mackie Pelly: Jess Jewell, Dan Russell and Jennifer DeHart		

WEATHER (from site data of theweathernetwork.com for Faro, YT)

Temperature (°C)	7 AM: -20°C	2 PM:	6 PM: -20°C
Precipitation (mm)	Rain: N/A	Snow: N/A	
Conditions			

KEY SITE PERSONNEL

Pelly	• Richard
D&T	• N/A
Hatch	• N/A
SRK	• N/A
Urecon	• N/A
Precision	• N/A
ARMC	• N/A

ACTIVITY

Area	Description
Quarry/Well Access	• N/A
Well Site	• N/A
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• Installed heat insulation and joints
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A
Warehouse	• N/A

MATERIALS CONSUMED

Quarry/Well Access	• N/A
Well Site	• N/A
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• Heat insulations
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A

EQUIPMENT

Equipment	Notes
• D5	- N/A
• 325 Excavator	- N/A
• 200 Excavator	- N/A
• Light plant with generator	- Power equipment
• Fusing equipment, incl. Generator	- N/A
• Crew truck	- Transport Crew
• Foreman truck	- Transport Crew
• Haul Truck	- N/A
• Service Truck	- N/A

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- N/A

SCHEDULE ISSUES/OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- N/A

COMMENTS, CONCERNS AND CORRESPONDENCE

- N/A

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DAILY REPORT – Anvil Range Mine Complex S-Wells Pump and Pipeline System, February 9, 2009

Prepared by:	Alvin Tong	**Date:**	2009.03.06
Site Source:	Wayne Dear	**Project #:**	1CD003.120
Distribution List:	D&T: Wes Treleaven, Doug Sedgwick, Dana Haggar, Greg Stevens, Mike Bryson Hatch: Marius Pytlewski, Rui Adanjo SRK: Cam Scott, Dan Mackie Pelly: Jess Jewell, Dan Russell and Jennifer DeHart		

WEATHER (from site data of theweathernetwork.com for Faro, YT)

Temperature (°C)	7 AM: -23°C	2 PM:	6 PM: -18°C
Precipitation (mm)	Rain: N/A	Snow: N/A	
Conditions			

KEY SITE PERSONNEL

Pelly	• Richard
D&T	• N/A
Hatch	• N/A
SRK	• N/A
Urecon	• N/A
Precision	• N/A
ARMC	• N/A

ACTIVITY

Area	Description
Quarry/Well Access	• N/A
Well Site	• N/A
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• Installed heat insulation and joints
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A
Warehouse	• Building generator shack and insulate. Preparation of electrical components.

MATERIALS CONSUMED

Quarry/Well Access	• N/A
Well Site	• N/A
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• Heat insulations
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A

EQUIPMENT

Equipment	Notes
• D5	- N/A
• 325 Excavator	- Offload material
• 200 Excavator	- N/A
• Light plant with generator	- Power equipment
• Fusing equipment, incl. Generator	- N/A
• Crew truck	- Transport Crew
• Foreman truck	- Transport Crew
• Haul Truck	- N/A
• Service Truck	- N/A

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- N/A

SCHEDULE ISSUES/OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- N/A

COMMENTS, CONCERNS AND CORRESPONDENCE

- N/A

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DAILY REPORT – Anvil Range Mine Complex S-Wells Pump and Pipeline System, February 10, 2009

Prepared by:	Alvin Tong	**Date:**	2009.03.06
Site Source:	Wayne Dear	**Project #:**	1CD003.120
Distribution List:	D&T: Wes Treleaven, Doug Sedgwick, Dana Haggar, Greg Stevens, Mike Bryson Hatch: Marius Pytlewski, Rui Adanjo SRK: Cam Scott, Dan Mackie Pelly: Jess Jewell, Dan Russell and Jennifer DeHart		

WEATHER (from site data of theweathernetwork.com for Faro, YT)

Temperature (°C)	7 AM: -25°C	2 PM:	6 PM: -22°C
Precipitation (mm)	Rain: N/A	Snow: N/A	
Conditions			

KEY SITE PERSONNEL

Pelly	• Richard
D&T	• N/A
Hatch	• N/A
SRK	• N/A
Urecon	• N/A
Precision	• N/A
ARMC	• N/A

ACTIVITY

Area	Description
Quarry/Well Access	• N/A
Well Site	• N/A
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• N/A
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A
Warehouse	• Building generator shack and insulate. Preparation of electrical components.

MATERIALS CONSUMED

Quarry/Well Access	• N/A
Well Site	• N/A
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• Heat insulations
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A

EQUIPMENT

Equipment	Notes
• D5	- N/A
• 325 Excavator	- Loading material
• 200 Excavator	- N/A
• Light plant with generator	- Power equipment
• Fusing equipment, incl. Generator	- N/A
• Crew truck	- Transport Crew
• Foreman truck	- Transport Crew
• Haul Truck	- N/A
• 3xService Truck	- Service work

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- N/A

SCHEDULE ISSUES/OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- N/A

COMMENTS, CONCERNS AND CORRESPONDENCE

- N/A

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DAILY REPORT – Anvil Range Mine Complex S-Wells Pump and Pipeline System, February 11, 2009

Prepared by:	Alvin Tong	**Date:**	2009.03.06
Site Source:	Wayne Dear	**Project #:**	1CD003.120
Distribution List:	D&T: Wes Treleaven, Doug Sedgwick, Dana Haggar, Greg Stevens, Mike Bryson Hatch: Marius Pytlewski, Rui Adanjo SRK: Cam Scott, Dan Mackie Pelly: Jess Jewell, Dan Russell and Jennifer DeHart		

WEATHER (from site data of theweathernetwork.com for Faro, YT)

Temperature (°C)	7 AM: -30°C	2 PM:	6 PM: -22°C
Precipitation (mm)	Rain: N/A	Snow: N/A	
Conditions			

KEY SITE PERSONNEL

Pelly	• Richard
D&T	• N/A
Hatch	• N/A
SRK	• N/A
Urecon	• N/A
Precision	• N/A
ARMC	• N/A

ACTIVITY

Area	Description
Quarry/Well Access	• N/A
Well Site	• N/A
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• N/A
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A
Warehouse	• Building generator shack and insulate. Preparation of electrical components.

MATERIALS CONSUMED

Quarry/Well Access	• N/A
Well Site	• N/A
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• Heat insulations
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A

EQUIPMENT

Equipment	Notes
• D5	- N/A
• 325 Excavator	- Loading material
• 200 Excavator	- N/A
• Light plant with generator	- Power equipment
• Fusing equipment, incl. Generator	- N/A
• Crew truck	- Transport Crew
• Foreman truck	- Transport Crew
• Haul Truck	- N/A
• 3xService Truck	- Service work

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- N/A

SCHEDULE ISSUES/OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- N/A

COMMENTS, CONCERNS AND CORRESPONDENCE

- N/A

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DAILY REPORT – Anvil Range Mine Complex S-Wells Pump and Pipeline System, February 12, 2009

Prepared by:	Alvin Tong	**Date:**	2009.03.06
Site Source:	Wayne Dear	**Project #:**	1CD003.120
Distribution List:	D&T: Wes Treleaven, Doug Sedgwick, Dana Haggar, Greg Stevens, Mike Bryson Hatch: Marius Pytlewski, Rui Adanjo SRK: Cam Scott, Dan Mackie Pelly: Jess Jewell, Dan Russell and Jennifer DeHart		

WEATHER (from site data of theweathernetwork.com for Faro, YT)

Temperature (°C)	7 AM: -32°C	2 PM:	6 PM: -19°C
Precipitation (mm)	Rain: N/A	Snow: N/A	
Conditions			

KEY SITE PERSONNEL

Pelly	• Richard
D&T	• N/A
Hatch	• N/A
SRK	• N/A
Urecon	• N/A
Precision	• N/A
ARMC	• N/A

ACTIVITY

Area	Description
Quarry/Well Access	• N/A
Well Site	• N/A
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• N/A
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A
Warehouse	• Building generator shack and insulate. Preparation of electrical components.

MATERIALS CONSUMED

Quarry/Well Access	• N/A
Well Site	• N/A
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• Heat insulations
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A

EQUIPMENT

Equipment	Notes
• D5	- N/A
• 325 Excavator	- Loading material
• 200 Excavator	- N/A
• Light plant with generator	- Power equipment
• Fusing equipment, incl. Generator	- N/A
• Crew truck	- Transport Crew
• Foreman truck	- Transport Crew
• Haul Truck	- N/A
• 3xService Truck	- Service work

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- N/A

SCHEDULE ISSUES/OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- N/A

COMMENTS, CONCERNS AND CORRESPONDENCE

- N/A

SRK Consulting
Engineers and Scientists

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DAILY REPORT – Anvil Range Mine Complex S-Wells Pump and Pipeline System, February 13, 2009

Prepared by:	Alvin Tong	**Date:**	2009.03.06
Site Source:	Wayne Dear	**Project #:**	1CD003.120
Distribution List:	D&T: Wes Treleaven, Doug Sedgwick, Dana Haggar, Greg Stevens, Mike Bryson Hatch: Marius Pytlewski, Rui Adanjo SRK: Cam Scott, Dan Mackie Pelly: Jess Jewell, Dan Russell and Jennifer DeHart		

WEATHER (from site data of theweathernetwork.com for Faro, YT)

Temperature (°C)	7 AM: -31°C	2 PM:	6 PM: -20°C
Precipitation (mm)	Rain: N/A	Snow: N/A	
Conditions			

KEY SITE PERSONNEL

Pelly	• Richard
D&T	• N/A
Hatch	• N/A
SRK	• N/A
Urecon	• N/A
Precision	• N/A
ARMC	• N/A

ACTIVITY

Area	Description
Quarry/Well Access	• N/A
Well Site	• N/A
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• N/A
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A
Warehouse	• Building generator shack and insulate. Preparation of electrical components.

MATERIALS CONSUMED

Quarry/Well Access	• N/A
Well Site	• N/A
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• Heat insulations
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A

EQUIPMENT

Equipment	Notes
• D5	- N/A
• 325 Excavator	- Cleaning up site
• 200 Excavator	- N/A
• Light plant with generator	- Power equipment
• Fusing equipment, incl. Generator	- N/A
• Crew truck	- Transport Crew
• Foreman truck	- Transport Crew
• Haul Truck	- N/A
• 3xService Truck	- Service work

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- N/A

SCHEDULE ISSUES/OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- N/A

COMMENTS, CONCERNS AND CORRESPONDENCE

- N/A

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DAILY REPORT – Anvil Range Mine Complex
S-Wells Pump and Pipeline System, February 14, 2009

Prepared by:	Alvin Tong	**Date:**	2009.03.06
Site Source:	Wayne Dear	**Project #:**	1CD003.120
Distribution List:	D&T: Wes Treleaven, Doug Sedgwick, Dana Haggar, Greg Stevens, Mike Bryson Hatch: Marius Pytlewski, Rui Adanjo SRK: Cam Scott, Dan Mackie Pelly: Jess Jewell, Dan Russell and Jennifer DeHart		

WEATHER (from site data of theweathernetwork.com for Faro, YT)

Temperature (°C)	7 AM: -33°C	2 PM:	6 PM: -15°C
Precipitation (mm)	Rain: N/A	Snow: N/A	
Conditions			

KEY SITE PERSONNEL

Pelly	• Richard
D&T	• N/A
Hatch	• N/A
SRK	• N/A
Urecon	• N/A
Precision	• N/A
ARMC	• N/A

ACTIVITY

Area	Description
Quarry/Well Access	• N/A
Well Site	• Generator shack foundation preparation
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• N/A
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A
Warehouse	• Preparation of electrical components.

MATERIALS CONSUMED

Quarry/Well Access	• N/A
Well Site	• N/A
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• Heat insulations
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A

EQUIPMENT

Equipment	Notes
• D5	- N/A
• 325 Excavator	- Prepare foundation for generator shack
• 200 Excavator	- N/A
• Light plant with generator	- Power equipment
• Fusing equipment, incl. Generator	- N/A
• Crew truck	- Transport Crew
• Foreman truck	- Transport Crew
• Haul Truck	- N/A
• 3xService Truck	- Service work

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- N/A

SCHEDULE ISSUES/OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- N/A

COMMENTS, CONCERNS AND CORRESPONDENCE

- N/A

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DAILY REPORT – Anvil Range Mine Complex
S-Wells Pump and Pipeline System, February 15, 2009

Prepared by:	Alvin Tong	**Date:**	2009.03.06
Site Source:	Wayne Dear	**Project #:**	1CD003.120
Distribution List:	D&T: Wes Treleaven, Doug Sedgwick, Dana Haggar, Greg Stevens, Mike Bryson Hatch: Marius Pytlewski, Rui Adanjo SRK: Cam Scott, Dan Mackie Pelly: Jess Jewell, Dan Russell and Jennifer DeHart		

WEATHER (from site data of theweathernetwork.com for Faro, YT)

Temperature (°C)	7 AM: -28°C	2 PM:	6 PM: -16°C
Precipitation (mm)	Rain: N/A	Snow: N/A	
Conditions			

KEY SITE PERSONNEL

Pelly	• Richard
D&T	• N/A
Hatch	• N/A
SRK	• N/A
Urecon	• N/A
Precision	• N/A
ARMC	• N/A

ACTIVITY

Area	Description
Quarry/Well Access	• N/A
Well Site	• Grounding system for generator
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• N/A
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A
Warehouse	• Preparation of electrical components.

MATERIALS CONSUMED

Quarry/Well Access	• N/A
Well Site	• N/A
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• Heat insulations
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A

EQUIPMENT

Equipment	Notes
• D5	- N/A
• 325 Excavator	- Grounding system for generator shack
• 200 Excavator	- N/A
• Light plant with generator	- Power equipment
• Fusing equipment, incl. Generator	- N/A
• Crew truck	- Transport Crew
• Foreman truck	- Transport Crew
• Haul Truck	- N/A
• 3xService Truck	- Service work

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- N/A

SCHEDULE ISSUES/OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- N/A

COMMENTS, CONCERNS AND CORRESPONDENCE

- N/A

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DAILY REPORT – Anvil Range Mine Complex S-Wells Pump and Pipeline System, February 16, 2009

Prepared by:	Alvin Tong	**Date:**	2009.03.06
Site Source:	Wayne Dear	**Project #:**	1CD003.120
Distribution List:	D&T: Wes Treleaven, Doug Sedgwick, Dana Haggar, Greg Stevens, Mike Bryson Hatch: Marius Pytlewski, Rui Adanjo SRK: Cam Scott, Dan Mackie Pelly: Jess Jewell, Dan Russell and Jennifer DeHart		

WEATHER (from site data of theweathernetwork.com for Faro, YT)

Temperature (°C)	7 AM: -24°C	2 PM:	6 PM: -15°C
Precipitation (mm)	Rain: N/A	Snow: N/A	
Conditions			

KEY SITE PERSONNEL

Pelly	• Richard
D&T	• N/A
Hatch	• N/A
SRK	• N/A
Urecon	• N/A
Precision	• N/A
ARMC	• N/A

ACTIVITY

Area	Description
Quarry/Well Access	• N/A
Well Site	• Clean up
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• N/A
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A
Warehouse	• N/A

MATERIALS CONSUMED

Quarry/Well Access	• N/A
Well Site	• N/A
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• N/A
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A

EQUIPMENT

Equipment	Notes
• D5	- N/A
• 325 Excavator	- Clean up.
• 200 Excavator	- N/A
• Light plant with generator	- Power equipment
• Fusing equipment, incl. Generator	- N/A
• Crew truck	- Transport Crew
• Foreman truck	- Transport Crew
• Haul Truck	- N/A
• 3xService Truck	- Service work

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- N/A

SCHEDULE ISSUES/OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- N/A

COMMENTS, CONCERNS AND CORRESPONDENCE

- N/A

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DAILY REPORT – Anvil Range Mine Complex S-Wells Pump and Pipeline System, February 17, 2009

Prepared by:	Alvin Tong	**Date:**	2009.03.06
Site Source:	Wayne Dear	**Project #:**	1CD003.120
Distribution List:	D&T: Wes Treleaven, Doug Sedgwick, Dana Haggar, Greg Stevens, Mike Bryson Hatch: Marius Pytlewski, Rui Adanjo SRK: Cam Scott, Dan Mackie Pelly: Jess Jewell, Dan Russell and Jennifer DeHart		

WEATHER (from site data of theweathernetwork.com for Faro, YT)

Temperature (°C)	7 AM: -24°C	2 PM:	6 PM: -15°C
Precipitation (mm)	Rain: N/A	Snow: N/A	
Conditions			

KEY SITE PERSONNEL

Pelly	• Richard
D&T	• N/A
Hatch	• N/A
SRK	• N/A
Urecon	• N/A
Precision	• N/A
ARMC	• N/A

ACTIVITY

Area	Description
Quarry/Well Access	• N/A
Well Site	• N/A
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• Fuse pipes, completed generator shack and insulation.
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A
Warehouse	• N/A

MATERIALS CONSUMED

Quarry/Well Access	• N/A
Well Site	• N/A
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• N/A
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A

EQUIPMENT

Equipment	Notes
• D5	- N/A
• 325 Excavator	- N/A
• 200 Excavator	- N/A
• Light plant with generator	- Power equipment
• Fusing equipment, incl. Generator	- N/A
• Crew truck	- Transport Crew
• Foreman truck	- Transport Crew
• Haul Truck	- N/A
• 3xService Truck	- Service work

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- N/A

SCHEDULE ISSUES/OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- N/A

COMMENTS, CONCERNS AND CORRESPONDENCE

- N/A

SRK Consulting (Canada) Inc.
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Fax: **604.687.5532**

DAILY REPORT – Anvil Range Mine Complex
S-Wells Pump and Pipeline System, February 19, 2009

Prepared by:	Alvin Tong	**Date:**	2009.03.06
Site Source:	Wayne Dear	**Project #:**	1CD003.120
Distribution List:	D&T: Wes Treleaven, Doug Sedgwick, Dana Haggar, Greg Stevens, Mike Bryson Hatch: Marius Pytlewski, Rui Adanjo SRK: Cam Scott, Dan Mackie Pelly: Jess Jewell, Dan Russell and Jennifer DeHart		

WEATHER (from site data of theweathernetwork.com for Faro, YT)

Temperature (°C)	7 AM: -24°C	2 PM:	6 PM: -15°C
Precipitation (mm)	Rain: N/A	Snow: N/A	
Conditions			

KEY SITE PERSONNEL

Pelly	• Richard
D&T	• N/A
Hatch	• N/A
SRK	• N/A
Urecon	• N/A
Precision	• N/A
ARMC	• N/A

ACTIVITY

Area	Description
Quarry/Well Access	• N/A
Well Site	• C-can fuse and vent setup
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• Pipe repair
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A
Warehouse	• N/A

MATERIALS CONSUMED

Quarry/Well Access	• N/A
Well Site	• N/A
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• N/A
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A

EQUIPMENT

Equipment	Notes
• D5	- N/A
• 325 Excavator	- N/A
• 200 Excavator	- Pipe repair
• Light plant with generator	- Power equipment
• Fusing equipment, incl. Generator	- N/A
• Crew truck	- Transport Crew
• Foreman truck	- Transport Crew
• Haul Truck	- N/A
• 3xService Truck	- Service work

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- N/A

SCHEDULE ISSUES/OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- N/A

COMMENTS, CONCERNS AND CORRESPONDENCE

- N/A

SRK Consulting (Canada) Inc.
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DAILY REPORT – Anvil Range Mine Complex S-Wells Pump and Pipeline System, February 20, 2009

Prepared by:	Alvin Tong	**Date:**	2009.03.06
Site Source:	Wayne Dear	**Project #:**	1CD003.120
Distribution List:	D&T: Wes Treleaven, Doug Sedgwick, Dana Haggar, Greg Stevens, Mike Bryson Hatch: Marius Pytlewski, Rui Adanjo SRK: Cam Scott, Dan Mackie Pelly: Jess Jewell, Dan Russell and Jennifer DeHart		

WEATHER (from site data of theweathernetwork.com for Faro, YT)

Temperature (°C)	7 AM: -12°C	2 PM:	6 PM: -3°C
Precipitation (mm)	Rain: N/A	Snow: N/A	
Conditions			

KEY SITE PERSONNEL

Pelly	• Richard
D&T	• N/A
Hatch	• N/A
SRK	• N/A
Urecon	• N/A
Precision	• N/A
ARMC	• N/A

ACTIVITY

Area	Description
Quarry/Well Access	• N/A
Well Site	• C-can fuse and pipe setup
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• Pipe repair
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A
Warehouse	• N/A

MATERIALS CONSUMED

Quarry/Well Access	• N/A
Well Site	• N/A
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• N/A
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A

EQUIPMENT

Equipment	Notes
• D5	- N/A
• 325 Excavator	- N/A
• 200 Excavator	- Pipe repair
• Light plant with generator	- Power equipment
• Fusing equipment, incl. Generator	- N/A
• Crew truck	- Transport Crew
• Foreman truck	- Transport Crew
• Haul Truck	- N/A
• 3xService Truck	- Service work

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- N/A

SCHEDULE ISSUES/OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- N/A

COMMENTS, CONCERNS AND CORRESPONDENCE

- N/A

SRK Consulting
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DAILY REPORT – Anvil Range Mine Complex S-Wells Pump and Pipeline System, February 21, 2009

Prepared by:	Alvin Tong	**Date:**	2009.03.06
Site Source:	Wayne Dear	**Project #:**	1CD003.120
Distribution List:	D&T: Wes Treleaven, Doug Sedgwick, Dana Haggar, Greg Stevens, Mike Bryson Hatch: Marius Pytlewski, Rui Adanjo SRK: Cam Scott, Dan Mackie Pelly: Jess Jewell, Dan Russell and Jennifer DeHart		

WEATHER (from site data of theweathernetwork.com for Faro, YT)

Temperature (°C)	7 AM: -12°C	2 PM:	6 PM: -8°C
Precipitation (mm)	Rain: N/A	Snow: N/A	
Conditions			

KEY SITE PERSONNEL

Pelly	• Richard
D&T	• N/A
Hatch	• N/A
SRK	• N/A
Urecon	• N/A
Precision	• N/A
ARMC	• N/A

ACTIVITY

Area	Description
Quarry/Well Access	• N/A
Well Site	• C-can fuse, insulation and pipe setup
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• Strategic rock placement
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A
Warehouse	• N/A

MATERIALS CONSUMED

Quarry/Well Access	• N/A
Well Site	• N/A
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• N/A
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A

EQUIPMENT

Equipment	Notes
• D5	- N/A
• 325 Excavator	- N/A
• 200 Excavator	- Rock placement
• Light plant with generator	- Power equipment
• Fusing equipment, incl. Generator	- N/A
• Crew truck	- Transport Crew
• Foreman truck	- Transport Crew
• Haul Truck	- N/A
• 3xService Truck	- Service work

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- N/A

SCHEDULE ISSUES/OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- N/A

COMMENTS, CONCERNS AND CORRESPONDENCE

- N/A

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DAILY REPORT – Anvil Range Mine Complex
S-Wells Pump and Pipeline System, February 22, 2009

Prepared by:	Alvin Tong	**Date:**	2009.03.06
Site Source:	Wayne Dear	**Project #:**	1CD003.120
Distribution List:	D&T: Wes Treleaven, Doug Sedgwick, Dana Haggar, Greg Stevens, Mike Bryson Hatch: Marius Pytlewski, Rui Adanjo SRK: Cam Scott, Dan Mackie Pelly: Jess Jewell, Dan Russell and Jennifer DeHart		

WEATHER (from site data of theweathernetwork.com for Faro, YT)

Temperature (°C)	7 AM: -12°C	2 PM:	6 PM: -8°C
Precipitation (mm)	Rain: N/A	Snow: N/A	
Conditions			

KEY SITE PERSONNEL

Pelly	• Richard
D&T	• N/A
Hatch	• N/A
SRK	• N/A
Urecon	• N/A
Precision	• N/A
ARMC	• N/A

ACTIVITY

Area	Description
Quarry/Well Access	• N/A
Well Site	• C-can fuse, fuel, insulation and pipe setup
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• N/A
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A
Warehouse	• N/A

MATERIALS CONSUMED

Quarry/Well Access	• N/A
Well Site	• N/A
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• N/A
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A

EQUIPMENT

Equipment	Notes
• D5	- N/A
• 325 Excavator	- N/A
• 200 Excavator	- Pipe setup
• Light plant with generator	- Power equipment
• Fusing equipment, incl. Generator	- N/A
• Crew truck	- Transport Crew
• Foreman truck	- Transport Crew
• Haul Truck	- N/A
• 3xService Truck	- Service work

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- N/A

SCHEDULE ISSUES/OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- N/A

COMMENTS, CONCERNS AND CORRESPONDENCE

- N/A

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DAILY REPORT – Anvil Range Mine Complex S-Wells Pump and Pipeline System, February 23, 2009

Prepared by:	Alvin Tong	**Date:**	2009.03.06
Site Source:	Wayne Dear	**Project #:**	1CD003.120
Distribution List:	D&T: Wes Treleaven, Doug Sedgwick, Dana Haggar, Greg Stevens, Mike Bryson Hatch: Marius Pytlewski, Rui Adanjo SRK: Cam Scott, Dan Mackie Pelly: Jess Jewell, Dan Russell and Jennifer DeHart		

WEATHER (from site data of theweathernetwork.com for Faro, YT)

Temperature (°C)	7 AM: -26°C	2 PM:	6 PM: -14°C
Precipitation (mm)	Rain: N/A	Snow: N/A	
Conditions			

KEY SITE PERSONNEL

Pelly	• Richard
D&T	• N/A
Hatch	• N/A
SRK	• N/A
Urecon	• N/A
Precision	• N/A
ARMC	• N/A

ACTIVITY

Area	Description
Quarry/Well Access	• N/A
Well Site	• C-can control and pipe setup
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• N/A
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A
Warehouse	• N/A

MATERIALS CONSUMED

Quarry/Well Access	• N/A
Well Site	• N/A
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• N/A
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A

EQUIPMENT

Equipment	Notes
• D5	- N/A
• 325 Excavator	- N/A
• 200 Excavator	- N/A
• Light plant with generator	- Power equipment
• Fusing equipment, incl. Generator	- N/A
• Crew truck	- Transport Crew
• Foreman truck	- Transport Crew
• Haul Truck	- N/A
• 3xService Truck	- Service work

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- N/A

SCHEDULE ISSUES/OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- N/A

COMMENTS, CONCERNS AND CORRESPONDENCE

- N/A

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DAILY REPORT – Anvil Range Mine Complex S-Wells Pump and Pipeline System, February 24, 2009

Prepared by:	Alvin Tong	**Date:**	2009.03.06
Site Source:	Wayne Dear	**Project #:**	1CD003.120
Distribution List:	D&T: Wes Treleaven, Doug Sedgwick, Dana Haggar, Greg Stevens, Mike Bryson Hatch: Marius Pytlewski, Rui Adanjo SRK: Cam Scott, Dan Mackie Pelly: Jess Jewell, Dan Russell and Jennifer DeHart		

WEATHER (from site data of theweathernetwork.com for Faro, YT)

Temperature (°C)	7 AM: -24°C	2 PM:	6 PM: -10°C
Precipitation (mm)	Rain: N/A	Snow: N/A	
Conditions			

KEY SITE PERSONNEL

Pelly	• Richard
D&T	• N/A
Hatch	• N/A
SRK	• N/A
Urecon	• N/A
Precision	• N/A
ARMC	• N/A

ACTIVITY

Area	Description
Quarry/Well Access	• N/A
Well Site	• C-can controls, insulation, electrical and pipe setup
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• N/A
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A
Warehouse	• N/A

MATERIALS CONSUMED

Quarry/Well Access	• N/A
Well Site	• N/A
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• N/A
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A

EQUIPMENT

Equipment	Notes
• D5	- N/A
• 325 Excavator	- N/A
• 200 Excavator	- N/A
• Light plant with generator	- Power equipment
• Fusing equipment, incl. Generator	- N/A
• Crew truck	- Transport Crew
• Foreman truck	- Transport Crew
• Haul Truck	- N/A
• 3xService Truck	- Service work

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- N/A

SCHEDULE ISSUES/OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- N/A

COMMENTS, CONCERNS AND CORRESPONDENCE

- N/A

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DAILY REPORT – Anvil Range Mine Complex
S-Wells Pump and Pipeline System, February 25, 2009

Prepared by:	Alvin Tong	**Date:**	2009.03.06
Site Source:	Wayne Dear	**Project #:**	1CD003.120
Distribution List:	D&T: Wes Treleaven, Doug Sedgwick, Dana Haggar, Greg Stevens, Mike Bryson Hatch: Marius Pytlewski, Rui Adanjo SRK: Cam Scott, Dan Mackie Pelly: Jess Jewell, Dan Russell and Jennifer DeHart		

WEATHER (from site data of theweathernetwork.com for Faro, YT)

Temperature (°C)	7 AM: -27°C	2 PM:	6 PM: -16°C
Precipitation (mm)	Rain: N/A	Snow: N/A	
Conditions			

KEY SITE PERSONNEL

Pelly	• Richard
D&T	• N/A
Hatch	• N/A
SRK	• N/A
Urecon	• N/A
Precision	• N/A
ARMC	• N/A

ACTIVITY

Area	Description
Quarry/Well Access	• N/A
Well Site	• C-can controls, insulation, electrical and pipe setup
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• N/A
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A
Warehouse	• N/A

MATERIALS CONSUMED

Quarry/Well Access	• N/A
Well Site	• N/A
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• N/A
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A

EQUIPMENT

Equipment	Notes
• D5	- N/A
• 325 Excavator	- N/A
• 200 Excavator	- N/A
• Light plant with generator	- Power equipment
• Fusing equipment, incl. Generator	- N/A
• Crew truck	- Transport Crew
• Foreman truck	- Transport Crew
• Haul Truck	- N/A
• 3xService Truck	- Service work

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- N/A

SCHEDULE ISSUES/OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- N/A

COMMENTS, CONCERNS AND CORRESPONDENCE

- N/A

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DAILY REPORT – Anvil Range Mine Complex
S-Wells Pump and Pipeline System

Prepared by:	Dan Mackie	**Date:** 2009.02.26
Site Source:	Brian Dear/Dana Haggar	**Project #:** 1CD003.120
Distribution List:	D&T: Wes Treleaven, Doug Sedgwick, Dana Haggar, Greg Stevens, Mike Bryson Hatch: Marius Pytlewski, Rui Adanjo SRK: Cam Scott, Dan Mackie Pelly: Jess Jewell, Dan Russell and Jennifer DeHart	

WEATHER (from temperatures measured at site)

Temperature (°C)	7 AM: -25	2 PM: -10	6 PM: -12
Precipitation (mm)	Rain: N/A	Snow: N/A	
Conditions	Flurries in morning; sunny and cool in afternoon		

KEY SITE PERSONNEL

Pelly	• Brian Dear
D&T	• Dana Haggar; Mike Bryson; Wes Treleaven ;Greg Stevens.
Hatch	• Rui Adanjo left mid-day
SRK	• Dan Mackie
Urecon	• N/A
Precision	• Ron Nelson
ARMC	• N/A

ACTIVITY

Area	**Description**
Quarry/Well Access	• N/A
Well Site	• Continue 48 hour test. VFD and logic setting adjustments. Wellhead and C-can connection covers completed. Minor electrical touch-up.
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• Sandbags on pipeline for stabilization; Additional heat trace linked to one controller for vacuum break. Vacuum break box insulated.
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A
Generator	• power imbalance corrected; investigate generator failure; correct battery terminal connection.

MATERIALS CONSUMED

Quarry/Well Access	• N/A
Well Site	• N/A
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• N/A
Zone 2 Pump Area	• N/A
Faro Pit Discharge	•
	•

EQUIPMENT

Equipment	Notes
• D5	-N/A
• D9	-N/A
• 200 Excavator	-N/A
• Light plant with generator	- N/A
• Fusing equipment, incl. Generator	- N/A
• Crew truck	-Crew Transport and Electrician transport
• Foreman truck	-Transport
• Haul Truck	-N/A

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

• N/A

SCHEDULE ISSUES/OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- 1000-gallon fuel tank for the generator is at site, but does not have appropriate hardware/stands to be connected. Work on stand will commence Monday. Stand for 1000-gallon tank will not be ready until later this week. In order to keep from interfering with testing, tank will have to be installed next week.
- The generator shut down twice. Once for oil and a second time because a battery connection was lose. Generator performance sufficient for now, but longer term is uncertain. If it keeps breaking down, this will require more attention.
- An additional heat trace line was installed on the vacuum break, connected via Teck cable to the nearest controller (2 I think). Additional wire and a programming chip have been ordered from Urecon to allow installation of a RTD sensor on the vacuum break. Wire and RTD are not scheduled to arrive until Saturday, at which point the 48hour test will be over and people demobing. Request guidance on how this should be dealt with.
- There have been some electrical deficiencies noted, and these will be commented on by Rui Adanjo. None are significant to the degree the system cannot, or should not, operate.

COMMENTS, CONCERNS AND CORRESPONDENCE

The following work was done today:

- The 3-phase imbalance was corrected.
- The sump pump started pumping over the hill at about 11am. Max rate of just under 4 L/s.
- The 48 hour test was initiated at 3pm. At 9pm, the flow rate was valved back to 3.15L/s (50usgpm). Sump level continues to drop slowly. Groundwater well levels steady. Control systems operating properly. I believe the flow rate will

decrease slightly at some point this evening as the sump water level drops into the range that the VFD speed control starts to kick in.

- As of 9pm:
  Sump running at 3.15 L/s – total pumped water 80,000 litres.
  PW1 running at 0.44 L/s – total pumped water 14,000 litres – significant drawdown remains, as expected. This well is capable of more, but we have purposely valved down to allow increased collection of more highly contaminated water.
  PW2 running at 0.89L/s – total pumped water 16,000 litres – possibly some available drawdown remains. Water level close to top of intake screen.
- Note: the total volumes here may not add up nicely. Rates were adjusted over the course of the day and will likely be adjusted again Thursday.
- Had brief discussion with Wes Treleaven about meeting with DES and D&T on Thursday to discuss hand over and outstanding issues, such as clean up and minor adjustment tasks that will be required over the coming weeks.

Pipeline discharge

pipeline discharge

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DAILY REPORT – Anvil Range Mine Complex S-Wells Pump and Pipeline System

Prepared by:	Dan Mackie	**Date:** 2009.02.27
Site Source:	Brian Dear/Dana Haggar	**Project #:** 1CD003.120
Distribution List:	D&T: Wes Treleaven, Doug Sedgwick, Dana Haggar, Greg Stevens, Mike Bryson Hatch: Marius Pytlewski, Rui Adanjo SRK: Cam Scott, Dan Mackie Pelly: Jess Jewell, Dan Russell and Jennifer DeHart	

WEATHER (from temperatures measured at site)

Temperature (°C)	7 AM: -25	2 PM: -10	6 PM: -12
Precipitation (mm)	Rain: N/A	Snow: N/A	
Conditions	Partly cloudy		

KEY SITE PERSONNEL

Pelly	• Brian Dear
D&T	• Dana Haggar; Mike Bryson; Wes Treleaven ;Greg Stevens.
Hatch	• N/A
SRK	• Dan Mackie
Urecon	• N/A
Precision	• Ron Nelson
ARMC	• N/A

ACTIVITY

Area	**Description**
Quarry/Well Access	• N/A
Well Site	• Continue 48 hour test. VFD and logic setting adjustments. Wellhead and C-can connection covers completed. Minor electrical touch-up. Minor sump pump adjustments.
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• Controller 1 heat trace fault being corrected. Short caused at power control unit. Vacuum break housing and heating being corrected.
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A
Generator	• Generator failed twice. Cause investigated and corrective actions being attempted. Possible battery issues and exhaust venting.

MATERIALS CONSUMED

Quarry/Well Access	• N/A
Well Site	• N/A
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• N/A
Zone 2 Pump Area	• N/A
Faro Pit Discharge	•
	•

EQUIPMENT

Equipment	Notes
• D5	-N/A
• D9	-N/A
• 200 Excavator	-N/A
• Light plant with generator	- N/A
• Fusing equipment, incl. Generator	- N/A
• Crew truck	-Crew Transport and Electrician transport
• Foreman truck	-Transport
• Haul Truck	-N/A

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- N/A

SCHEDULE ISSUES/OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- 1000-gallon fuel tank for the generator is at site, but does not have appropriate hardware/stands to be connected. Work on stand will commence Monday. Stand for 1000-gallon tank will not be ready until later this week. In order to keep from interfering with testing, tank will have to be installed next week.
- The generator shut down twice. Once for oil and a second time because a battery connection was lose. Generator performance sufficient for now, but longer term is uncertain. If it keeps breaking down, this will require more attention.
- Failures of individual heat trace strings lead to complete system shut-down. Based on discussion with site staff and Precision, available switch in C-can controller will be used to allow “lock-out” of heat trace alarms. The system will be able to run with heat trace off, if desired.
- A number of tasks are considered sufficient for the time being, but will require monitoring: generator, heat trace, pipeline alignment, etc. Some of these will require regular monitoring and potential adjustment. Others will require modification after thaw.

COMMENTS, CONCERNS AND CORRESPONDENCE

The following work was done today:

- Generator issues troubleshooted.
- Heat trace issues troubleshooted.
- Sump pump VFD adjusted to allow better range of operating flows. Max pressure set to keep pipeline pressure below thresholds. Operating pressure in the pipeline is about 190psi at 3.15 L/s (50USgpm), but only very close to Ccan. Based on

discussions with Marius Pytlewski, this is considered sufficient.

- As of mid-day, on the order of 240,000 L had been pumped to the Faro Pit. On Feb 26, sump discharge zinc concentration, as measured at the site lab, was 312 mg/L, diluted somewhat by the 1 mg/L PW1 inflow.
- A conference call was held with D&T, DES, Pelly, SRK and Precision to discuss status:

1. A brief overview of performance so far was provided by Dan Mackie. In summary, the pumps work fine, but power supply and heat trace are shutting down system. These shut downs have provided the opportunity to monitor system drain down during shut-downs. The pipeline drains properly as designed. This is considered a plus of the 48 hour test.
2. The generator is a weak link. Wes Treleaven and site staff have discussed options and Pelly was instructed to look into cost and availability of a new generator, if one required. Wes Treleaven said that, in terms of the 48hour test, if the system made it through the night, to Saturday morning, he would consider the test successful.

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DAILY REPORT – Anvil Range Mine Complex S-Wells Pump and Pipeline System

Prepared by:	Dan Mackie	**Date:** 2009.02.28
Site Source:	Brian Dear/Dana Haggar	**Project #:** 1CD003.120
Distribution List:	D&T: Wes Treleaven, Doug Sedgwick, Dana Haggar, Greg Stevens, Mike Bryson Hatch: Marius Pytlewski, Rui Adanjo SRK: Cam Scott, Dan Mackie Pelly: Jess Jewell, Dan Russell and Jennifer DeHart	

WEATHER (from temperatures measured at site)

Temperature (°C)	7 AM: -25	2 PM: -10	6 PM: N/A
Precipitation (mm)	Rain: N/A	Snow: N/A	
Conditions	Partly cloudy		

KEY SITE PERSONNEL

Pelly	• Brian Dear/Wayne Dear
D&T	• Dana Haggar; Mike Bryson; Wes Treleaven ;Greg Stevens.
Hatch	• N/A
SRK	• Dan Mackie
Urecon	• N/A
Precision	• Ron Nelson
ARMC	• N/A

ACTIVITY

Area	Description
Quarry/Well Access	• N/A
Well Site	• Continue 48 hour test. Clean up. Download loggers. Final walk through with D&T and DES
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• Finalize controller 1 heat trace fault. Cleanup
Zone 2 Pump Area	• N/A
Faro Pit Discharge	• N/A
Generator	• Running.

MATERIALS CONSUMED

Quarry/Well Access	• N/A
Well Site	• N/A
Embankment Area	• N/A
Fusing Station	• N/A
Pipe Route	• N/A
Zone 2 Pump Area	• N/A
Faro Pit Discharge	•
	•

EQUIPMENT

Equipment	Notes
• D5	-N/A
• D9	-N/A
• 200 Excavator	-N/A
• Light plant with generator	- N/A
• Fusing equipment, incl. Generator	- N/A
• Crew truck	-Crew Transport and Electrician transport
• Foreman truck	-Transport
• Haul Truck	-N/A

HEALTH & SAFETY and ENVIRONMENTAL ISSUES

- N/A

SCHEDULE ISSUES/OUTSTANDING TASKS & AREAS REQUIRING ATTENTION

- 1000-gallon fuel tank for the generator is at site, but does not have appropriate hardware/stands to be connected. Work on stand will commence Monday. Stand for 1000-gallon tank will not be ready until later this week. In order to keep from interfering with testing, tank will have to be installed next week.
- The generator and pumping system ran all night with no supervision.

COMMENTS, CONCERNS AND CORRESPONDENCE

The following work was done today:

- Pipeline/C-can final cleanup.
- Pumping rates stabilized for departure. System will probably run at around 2 to 2.5 L/s without low level shut downs. Flows left at these levels for departure. After a week or two, adjustments can be made as necessary.
- Final walk through with D&T, Arctic and DES completed along entire system. Areas likely needing future adjustment noted.
- As of approximately 12pm, the system was considered operational, with all systems active, including heat trace.
- As of mid-day, on the order of 340,000 L had been pumped to the Faro Pit. On Feb 26, sump discharge zinc concentration, as measured at the site lab, was 312 mg/L, diluted somewhat by the 1 mg/L PW1 inflow.

Appendix H
Construction and Installation Information

Appendix H.1

Interception Trench Construction Drawings

SRK Consulting (Canada) Inc.
Suite 2200 – 1066 West Hastings Street
Vancouver, B.C. V6E 3X2
Canada

vancouver@srk.com
www.srk.com

Tel: **604.681.4196**
Fax: **604.687.5532**

Memorandum

To:	Dan Mackie, Cam Scott	**Date:**	February 2nd, 2009
cc:	Jozsef Miskolczi	**From:**	Alvin Tong
Subject:	Faro S-wells Area – Site Visit related to SIS Construction	**Project #:**	1CD003.120

1 Introduction

Based on results of the 2008 groundwater investigation at the S-wells area and subsequent discussions with the Faro Technical Advisory Team (TAT), the TAT recommended that an action plan, consisting of the interception of contaminated groundwater at the S-wells area, be implemented as soon as practically possible. Following a series of discussions with the project team (including Deloitte, Denison Environmental, Precision Pumps and Services, members of the TAT, SRK, Hatch and various contractors), SRK designed a seepage interception system (SIS). Site preparation, construction of the SIS, and installation of a 2-inch, heat traced, insulated pipeline to convey water from the S-wells area to the Faro Pit was contracted to Pelly Construction. Construction of the SIS trench occurred during the week of January 19, 2009, under the supervision of Pelly and Deloitte.

Two engineers from SRK conducted a site visit on January 24th and 25th in order to inspect the final construction details at the SIS, but were unable to get to site before the SIS trench had been completed. It is the understanding of SRK that quality control and quality assurance for the SIS was done by site personnel.

This document outlines the post-construction observations and communications with the contractor.

2 Observations

SRK personnel made the following observations during the site visit. Detailed observations are outlined in the daily reports that were issued to the project team under separate cover.

- The sump was installed on Jan 23rd and the cut off trench completed and backfilled before 2:30 pm on Jan. 24th.
- The foundation of the trench is reported to be in stiff sandy silt in the west bank, below the sump and most of the alignment of the trench. The site contractor cannot confirm if the foundation of the east bank is founded on silty material. SRK staff cannot confirm if the aquifer is completely cut off from surface observations.
- Bentomat, a geosynthetic clay liner (GCL), was installed from east bank of the trench to approximately 10 m from west bank as the supply of Bentomat on site was exhausted. Enviro-liner, a geomembrance made from polyolefin material, was installed in place of the Bentomat on the remaining (western-most) 10 m of the trench. SRK observed both Bentomat and Enviro-liner showing at surface, approximately 3 m apart, in the downstream side of the trench.
- The sump bottom inside the vertical corrugated metal pipe (CMP) is approximately 5.25m below grade and a layer of drain rock was placed as a foundation for the vertical CMP. SRK confirms the CMP extends 5.5m below finished construction grade (design called for at least 6.0 m).
- Sump monitoring pipes were not installed.

- The fill material is a cobble material with boulders and sand with traces of silt.
- Groundwater is observed in the sump and the water level increased with time during the site visit.
- Contaminated groundwater in the pore spaces of waste soils excavated from the SIS trench is situated behind a temporary earth containment area downstream of the trench.
- Figure 1 shows the typical plan of the SIS at the S-wells area.

3 Preliminary Recommendations

Based on the site observations, SRK has the following initial recommendations:

- It should be confirmed that the east bank of the trench is founded on silty material and the aquifer is completely cut off, as intended. This could be achieved by digging one test pit directly east of the trench.
- The water level within the sump should be monitored to ensure it will not be overtop the CMP.
- The seepage collecting in the sump currently contains a high level of fines due to construction activities and related disturbance. It will be beneficial to have the sump flushed prior to the pump installation to minimize sedimentation during pumping. This should be done until the seepage runs relatively clear and sediment-free. The flushing could either be done with a water truck or a trash pump linked to the permanent pipeline, when it's ready.
- It is recommended that an as-built survey be done on all installations for performance and record purposes.

4 Photographs

Photo 1: Typical trench excavation.

Photo 2: Typical trench excavation

Photo 3: The corrugated metal pipe (CMP).

Photo 4: CMP and GCL installation.

Photo 5: Enviro-Liner installation and backfill.

Photo 6: Temporary water containment and backfilled trench.

LEGEND

- Drainage Rock Backfill
- 2005 Groundwater Monitoring Well
- Shallow Drivepoint
- NFRC Monitoring Station
- S-Cluster Monitoring Well
- Test Pit (2004)
- Test Pit (2008)
- Bentonite GCL
- Enviro Liner

SRK CONSULTING
Faro Mine, Yukon

Contour Interval: 2m
Date of Photography: 03/07/25
Scale of Photography: 1:20,000
Survey control derived from existing 1:20,000 photography
Survey control based on: UTM Projection, NAD27, Zone 8
Compiled by The ORTHOSHOP, Calgary, September 2003
WO 8856

Note:

Limits and locations are marked by hand held GPS.

SRK Consulting
Engineers and Scientists
Vancouver B.C.

SRK JOB NO.: 1CD003.120
FILE NAME: S-Wells Draft Asbuilt.dwg

Deloitte & Touche

S-WELLS ACTION PLAN

S-Wells Shallow Aquifer Groundwater Collection

Preliminary SIS Trench Location and Excavation Limits

DATE:	APPROVED:	FIGURE:
Dec. 2008	-	1

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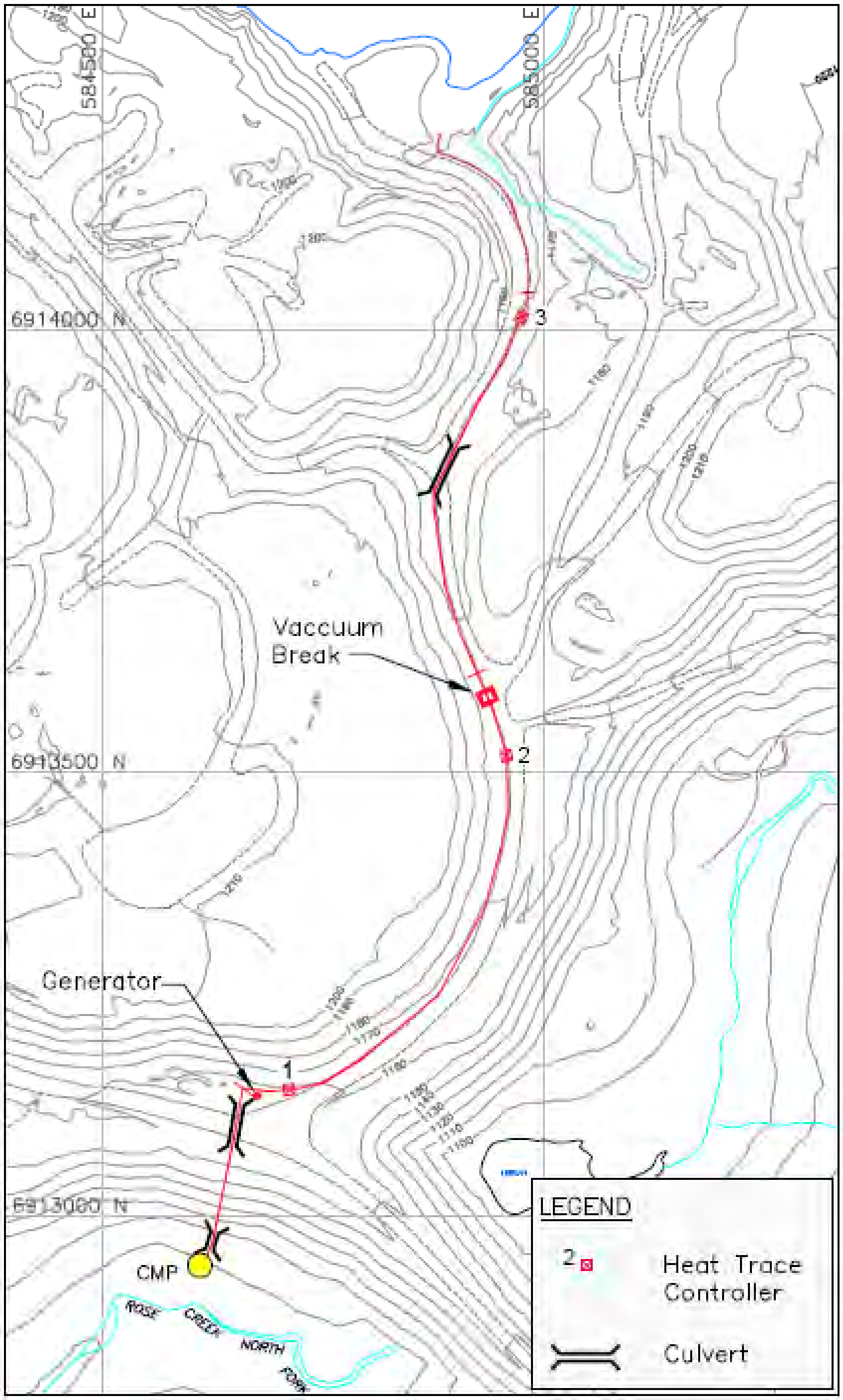
Appendix H.2
Final Pipeline Alignment



Note: Alignment is approximate – survey to be completed during summer 2009

SRK Consulting *Engineers and Scientists*	S-Wells Seepage Interception System			
	Final Pipeline Alignment			
Deloitte & Touche	PROJECT: 1CD003.120	DATE: May 2009	APPROVED: DM	FIGURE:: **H2**

Appendix H.3

Generator and Electrical System Construction Reports

From: Adanjo, Rui [RAdanjo@hatch.ca]
Sent: February 23, 2009 10:13 PM
To: Mackie, Daniel
Subject: Testing Procedure & Deficiencies

Dan,
Getting back to you on the testing procedure the following systems should be verified:

- Both well pumps, which I believe were tested today, albeit some issues. Ron from Precision will have to correct the issue that on a low level point the pumps go on alarm and changing status from hand to off also gives an alarm (PLC fix). The solenoid has to be repaired or replaced. Ensure pumps start and stop at the defined level setpoints without any issues.
- Heat Tracing. Ron Gravel is going to assist tomorrow in testing and configuring the controllers in the system. We should be in a position tomorrow afternoon to be able to test the whole heat trace system. Ensure the ground fault circuit breaker operates properly. Wires need to be marked to be able to troubleshoot and relay needs to be configured.
- Main pump, ensure it pumps over the hill. Fine tune VFD parameters as required.
- Full system operational checks, complete with various system faults, ie. heat trace fault, complete power failure.

23 Feb 2009 Deficiencies

- Power and control cable spliced close to Control Panel #3. This is unfortunate but not the end of the world. Asked Brian to raise two feet of the ground and mount it on a stand.
- Possible fault with the well pumps solenoid.
- I believe this might not be an issue any more, but end of pipe, heat trace end termination has to be in insulation.
- Generator housing is too hot, and the transformer could barely be touched because it was so hot. Ventillation in the room needs to be improved.
- Vacuum break valve needs to be insulated. It was suppose to have heat trace wrapped around it too, but it's too late now.

Rui

Vacuum Brake valve, was installed today and discussed with the contractor to install a box over it and insulating with a pipe protruding out, just like you had shown on your original sketches.

Heat tracing and temperature sensors, ready to be terminated in the control panel.

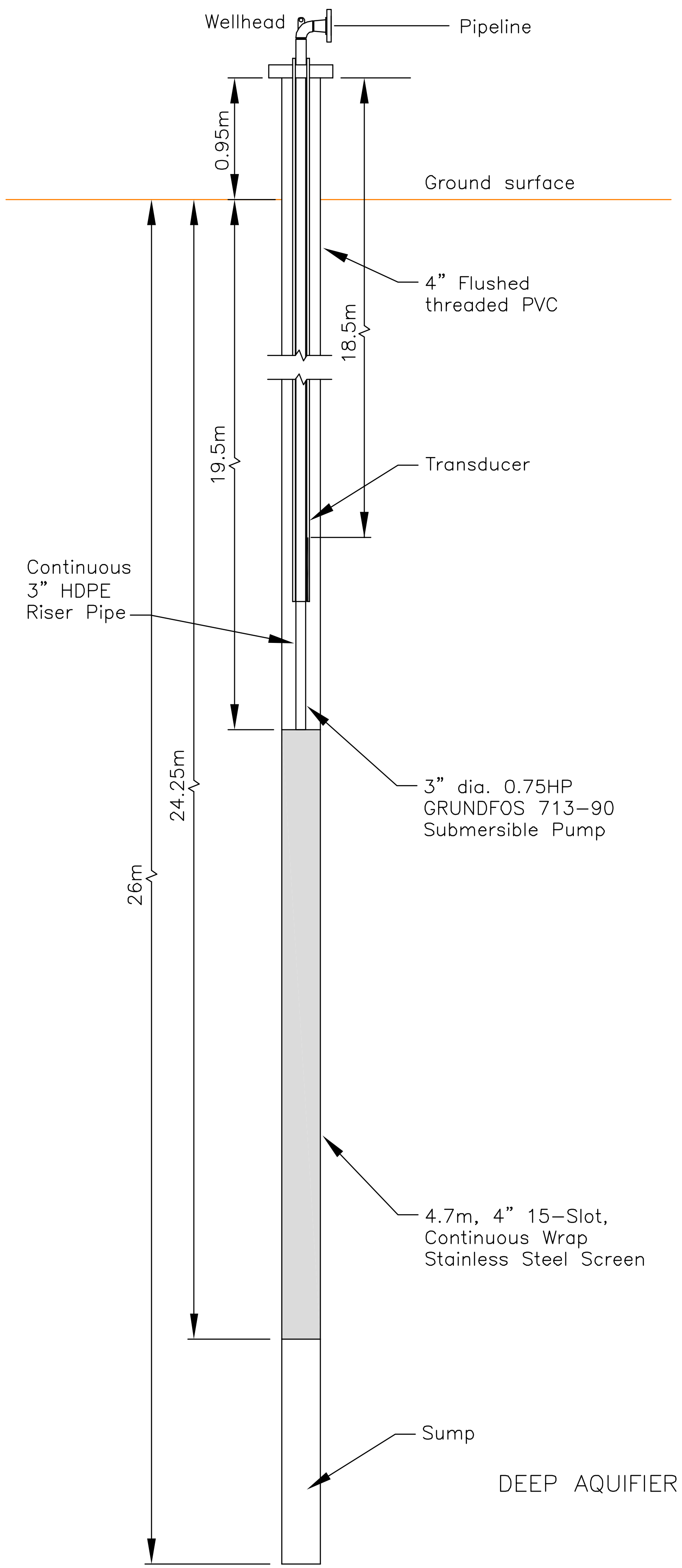
Pipe going into and leaving road crossing #3

Pipe and support over the hill

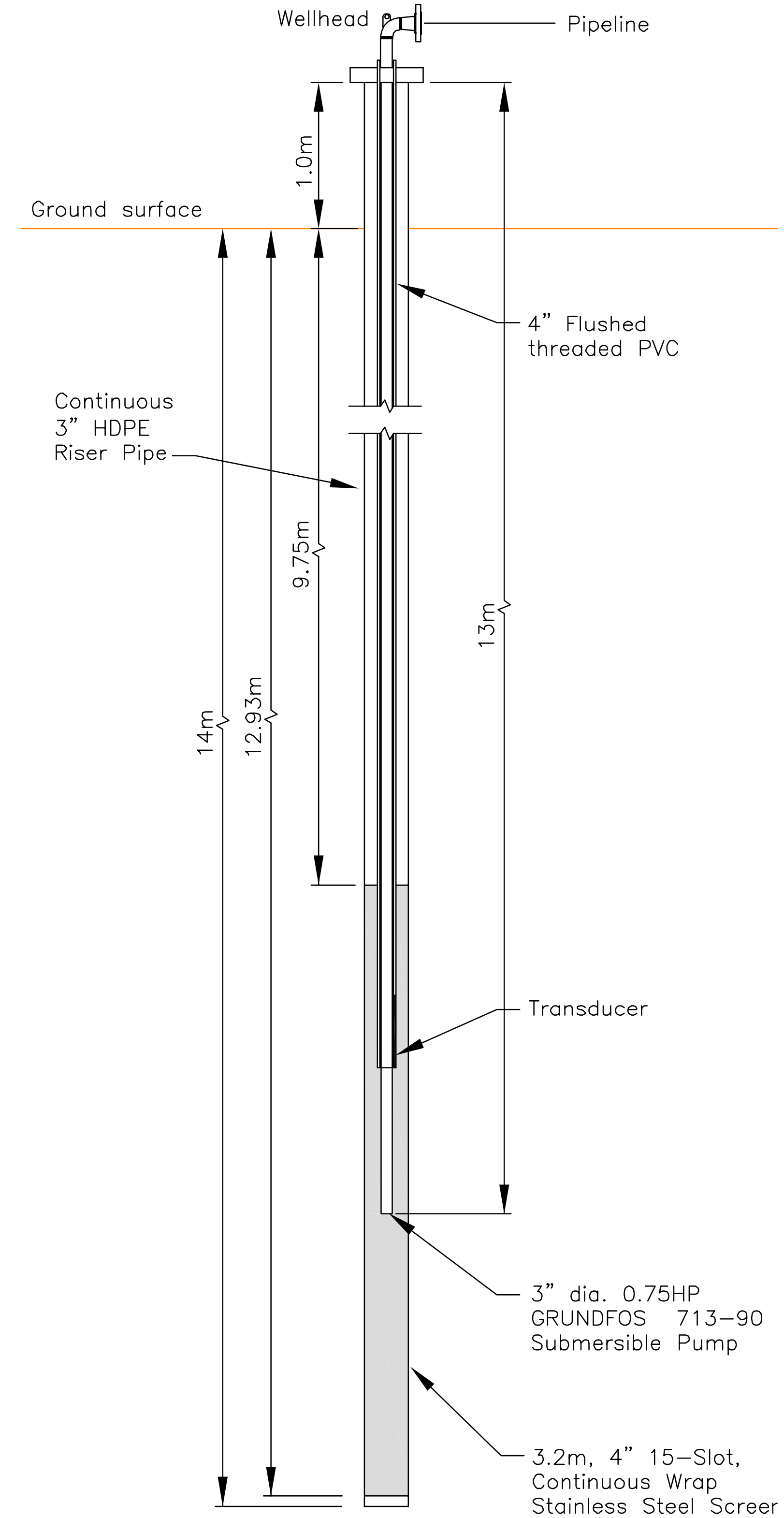
Power and control cable spliced, just before Controller #3. This was one thing that I wanted to avoid and made mention on drawings. Not the end of the world, still within code, but did ask to lift it off the ground two feet, and fastened it to a stand.

End of line, I believe two more sections of pipe were spliced beyond this point today still.

Appendix H.4
Sea-can Pumping System Technical Description and Operations Manual

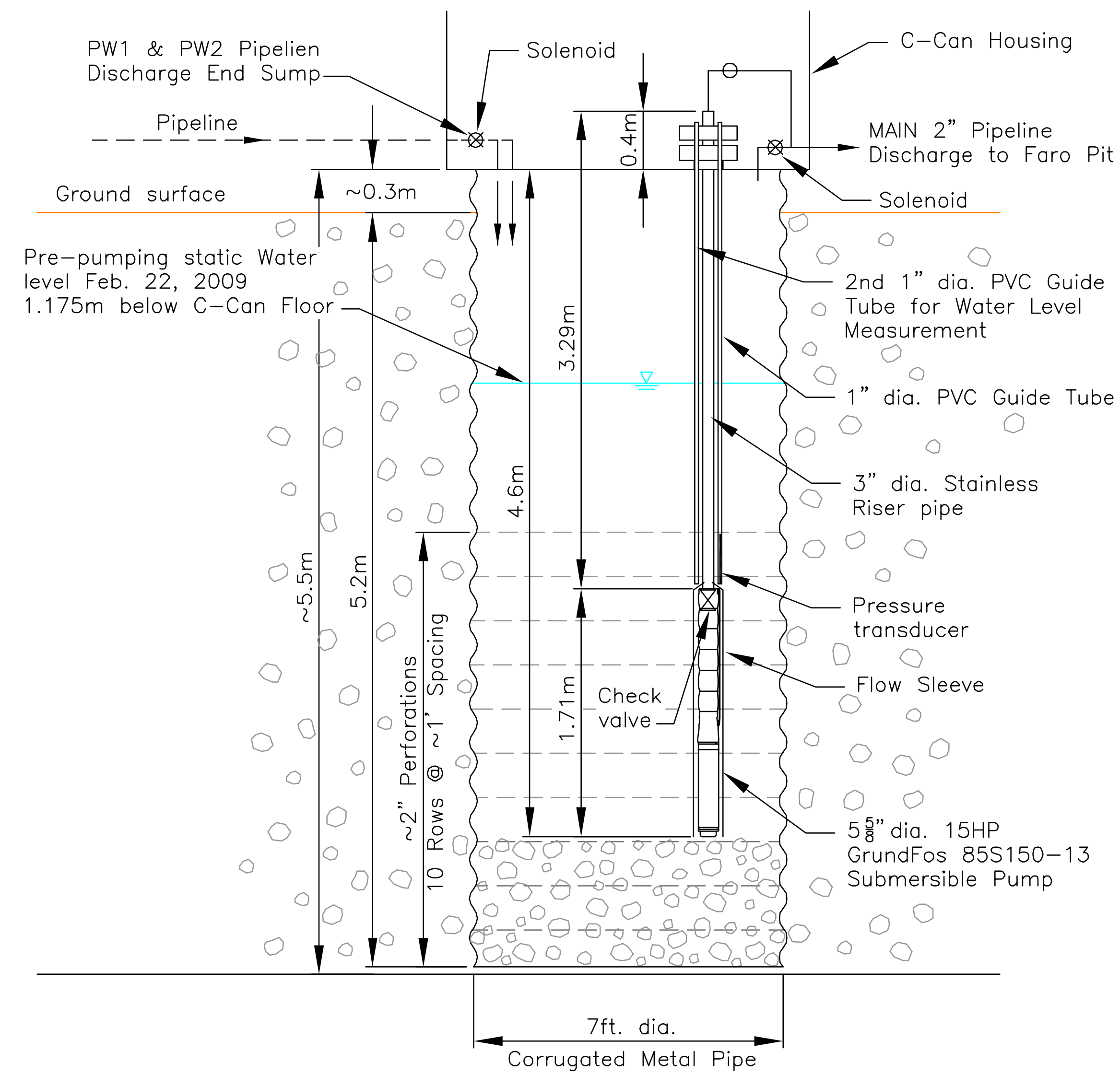


PW1



PW2

DEEP AQUIFER PUMPING WELL DETAIL
N.T.S.



SHALLOW AQUIFER INTERCEPTOR TENCH SUMP DETAIL

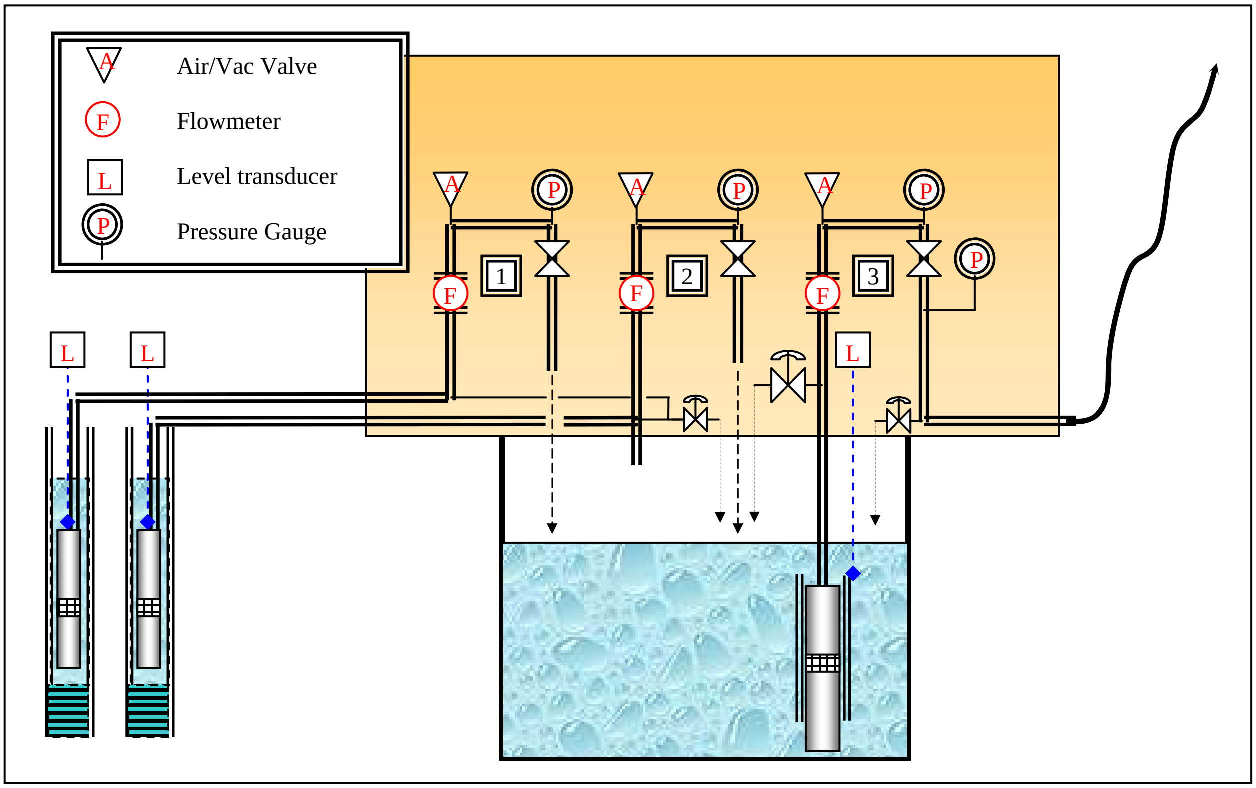
1:50 — 0 1 2 3 Meters

SRK Consulting, Engineers and Scientists, Vancouver B.C.	Deloitte & Touche	-
		-
SRK JOB NO.: 1CI003.120.0500	FARO MINE PROJECT	DATE: May 2009
FILE NAME: Well Details.dwg		APPROVED: -
		FIGURE: 1

J:\01_SITES\FARO\1000_Deloitte_from_GE_Projects\Acad-Faro\2009_Acad_Dwgs\Well Details.dwg

Shallow Aquifer Pumping System Operation

Introduction:
This system centers around the operation of the three submersible pumps in the area. Pump #1 is in well number SPW-1 and pump #2 is in SPW-2. These two pumps are both 1.5 horsepower, three inch diameter single phase systems. These both pump water into the sump formed by the corrugated metal pipe buried into the cut line. Pump #3 is hung into the sump to transfer water out and over the ridge to the Faro Pit. It is a 15 horse power, three phase, high head submersible water well pump operated off a Variable Frequency Drive. It is designed to operate at what-ever speed appropriate to hold a consistent level in the sump.



The design of the system is to maximize the cone of depression in the shallow aquifer thus producing a hydraulic gradient towards the pumping areas. Contamination should follow the gradient and be carried out with the water flow.

General:
The pumping system was designed around being reasonably self-sufficient and should not need extensive maintenance or monitoring.

The pumps are designed and programmed to regulate themselves within specific levels deemed safe for the pumps, motors and wells. Water flow and level variables are logged into memory that holds in excess of one year worth of data.

The water lines are insulated, heat-traced, and designed to self-drain in the event of a power failure. The lines leading into the sump are on a separate heat-trace system than the line leading out. Each heat-trace system is monitored and will shut down only the appropriate pumps in the event of a heat-trace failure alarm.

The pumping system is able to restart itself after a power interruption. Longer power interruptions require an operator to confirm the pump flows consistent with prior to shut down. This is due to the possibility of ice blockage through the flow control valve.

Interior and exterior temperatures are monitored (not recorded) and the pumps are shut down in the event of excessive cold. Manual re-start is required to ensure no damage to the system.

The building is monitored to ensure minimal oxygen levels are met. Visual and audible alarms warn of oxygen depleted atmosphere due to the contaminated water.

The control panel gives access to the most common functions of the system. The touch screen allows monitoring of the process. The collection of mechanical hand switches allow operation of components independent of the PLC (programmable logic controller) in case of problems.

Control Panel Operation

Pump #1;
This pump is operated by the Hand-Off-Auto switch marked SPW-1. In Automatic operation, the well is allowed to be pumped down to it corresponding Low Level Set Point (Default is 0.1 meters above the pump) where it is interrupted until the well recovers to its Low Level Reset Point (Default = 4.0 meters) when it starts again.

It is suggested that the most effective removal of contaminants would be centered on a consistent cone of depression. This requires the flow of the well to be reduced by use of the valve in order to stop repeated cycling of pump and its effects on the ground water table depression. The appropriate level & flow for this pump is beyond the scale of this manual and are a part of the overall environmental strategy. Changes to these settings are not to be done arbitrarily.

This pump is protected by an electronic “Motor Saver” relay that monitors supply voltage and amperage draw. This module will turn the pump off if it detects a problem, protecting the motor. Faults of this type will have to be re-set from the touch-screen.

If the pump is operated in the Hand (manual) position, the operation of the PLC is bypassed. The pump will not cycle based on the water well level, though the Motor Saver relay is still active. Increased risk to the pump and motor makes this operation suitable for temporary service only.

Pump #1 shares a solenoid drain valve(Solenoid Valve #1) with Pump #2. This valve will open automatically as the pumps are shut down in the event of a heat-trace failure or low temperature situation.

There is a marked motor switch on the upper left of the control panel that is suitable for use as a lock-out. A lock-out must be used if the pump is to be removed from the well.

Pump #2;
The operation of this pump is identical to Pump #1, thought the default settings are slightly different. Low level set-point = 0.1m, re-set point = 3.0m.

Note that the two pumps are completely independent of each other though they may trip into fault concurrently due to similar monitoring relays. Also, the pumps share the same heat-trace control monitoring resulting in the simultaneous shut-down in a heat-trace failure event.

Pump #3;
This pump is very different from the other two in operation and design. Pump #3 is hung in the sump and is supported by the 2" stainless steel discharge pipe. It is capable of pressures in excess of 300 psi and flows close to 100 gallons per minute.

There are two hand-switches that operate pump #3. The Hand-Off-Auto switch has slightly different operation modes based on the setting of the second switch that selects between Drive and Bypass.

> Switches in Drive and Auto – This is the normal operating mode. The frequency drive uses input from the water level sensor to vary the flow rate to keep the water at the programmed set point. Discharge valve should be kept at a fully open position to allow the drive to operate properly. Should the system over-pump the sump, the pump will stop until the sump recovers to a re-set point.
>
> Switches in Drive and Manual – This mode forces the drive to operate at a set speed. This speed is programmable at the drive. The drive will not stop and start according to the levels and will permit possible over-pumping of the sump. This mode would be used in the event of a PLC computer failure to allow continued pumping. The valve may be used to control the discharge flow.
>
> Switches in Bypass and Auto – This mode bypasses the frequency drive, forcing the motor to start across-the-line. In this mode, the PLC still has automatic control. The drive will still stop and start according to the levels programmed into the PLC as above. This mode would be used in the event of a VFD drive failure to allow continued pumping. The valve may be used to control the discharge flow and reduce start-stop cycles.
>
> Switches in Bypass and Manual – This mode bypasses the frequency drive, forcing the motor to start across-the-line. Manual mode over-rides all controls except the motor overload switch. The flow must be controlled by the valve to stop over-pumping the sump. The pump could run dry and damage would result. This mode would only be used in the case of a failure of both the (VFD) drive and the (PLC) computer. Frequent monitoring of water level and flow must be done to avoid damage to the pump.

The disconnect on the upper right of the panel serves as a lock-out point for the 600 volt service to pump #3. A lock-out must be used if the pump is to be removed.

IMPORTANT NOTE: The frequency drive may have dangerous voltage levels on the motor leads even when the motor is not running. The frequency drive has large capacitor storage. Dangerous voltages may exist after supply voltage is removed.

Solenoid Valves;
The solenoid valves used in this project are of a 'normally open' type, requiring voltage on the coil to hold them shut. During a power failure, they will fall open to allow the lines to drain.

Each of the four valves operate by an independent Hand-Off-Auto hand switch. In the Off position, the valves do not close at all. In Hand (Manual), the valve will not open under heat-trace or temperature faults. Keep the hand-switches in the Auto position to allow the full operation.

Solenoid Valve #1;
This ¼" valve drains both Pump #1 and Pump #2 through a common connection that is isolated with check valves.

Solenoid Valve #2;
Another ¼" valve that drains the low point of the 2" discharge line after the butterfly-valve.

Solenoid Valve #3;
This 1 ½" valve has the main purpose of draining all the 2" discharge line from its side of the pipe apex. This valve also operates as a pressure relief in case of discharge line blockage. In addition, the valve works off the computer to periodically open in order to agitate the sump. No adjustment should be made to this valve without consulting the manufacturers manual.

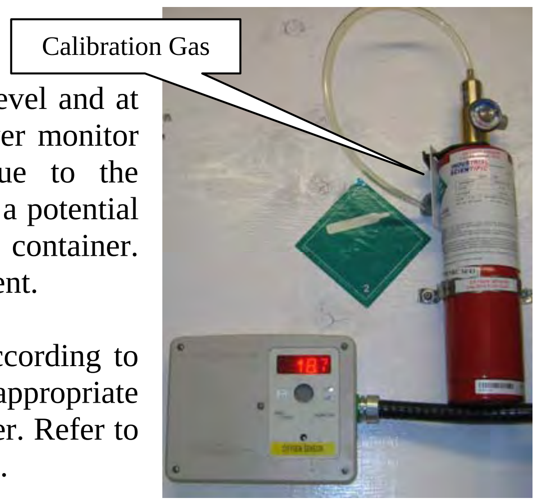
Solenoid Valve #4;
This valve was not implemented in the final design. The hand-switch was modified to another purpose. See below.

Heat-Trace Alarm Switch;
This switch has three positions but only two operational positions. The center (Off) position defeats the incoming heat-trace alarms. Either of the other positions activate the alarms. This

switch allows the heat-trace to be shut down for summer or for servicing without causing a shut-down Fault.

Blower Fan;
When in the Auto position, this hand-switch allows the blower fan (opposite wall) to operate during a low oxygen situation. Either O_2 monitor will cause the fan to start and it will continue to run after the alarm has passed. The reset button must be pressed to stop the fan.
The fan can be operated in Hand if the temperature in the container gets too hot. The VFD will operate more dependably if its temperature is kept low.

Additional Components



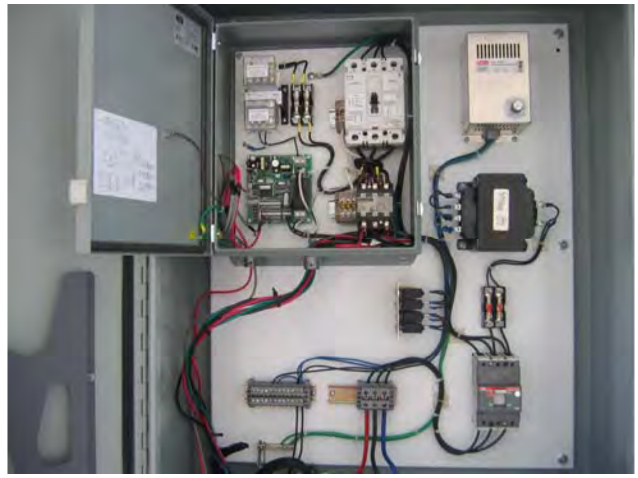
Oxygen monitors;
There are two oxygen (O_2) monitors, at floor level and at eye level. Air tends to layer itself and the lower monitor serves as an early warning of danger. Due to the contaminates and the process involved, there is a potential hazard that oxygen deficient air can enter the container. Alarms are set to trip below 19.5% oxygen content.

The monitors should be regularly calibrated according to the manufacturer's instructions. All the appropriate equipment is supplied and stored in the container. Refer to the manufacturer's manual for more information.

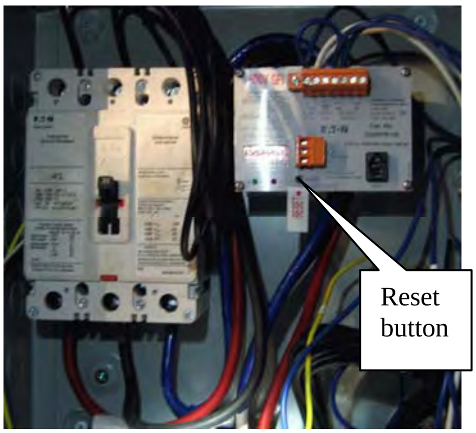
Heat-Trace;
There are two separate heat-trace system involved in this project. The 120 volt system protects the water line leading from the two wells to the container. A Fault on this system will shut down the well pumps. The 600 volt system protects the waterlines leading from the container to the Faro pit, a Fault will shut down the sump pump.

Failure on the heat-trace could be a number of different places. Note that each and every Urecon panel contains an independent ground-fault breaker that can signal a Fault. Refer to the Urecon manuals for more information.

The 600 volt system can also be tripped by the fuses in the disconnect or the ground-fault relay in the panel below the disconnect. The ground-fault relay trips the circuit breaker requiring both to be re-set.



The fused disconnect can be locked-out for service. The Heat-Trace Alarm switch can be placed in the Off position to allow pumping to continue while service is being done on the trace system.



Touch-Screen;

The touch screen offers a convenient and intuitive access to process variables. Touching the tabs at the top of screen flip to the various different functions. The Main screen is the default, and provides the most common information required. The screen should only be touched by fingers or rubber tipped stylus to avoid damage.

Main Screen;

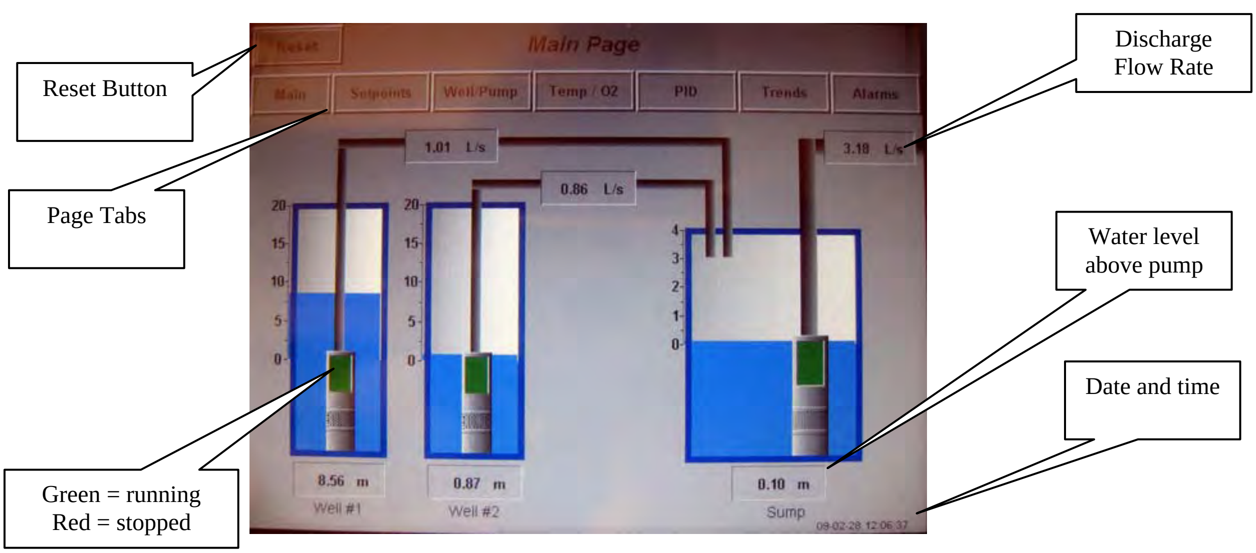
Main is view only, none of the values can be changed by direct entry. It is the best for general monitoring. The pump graphic turns from red to green to signify the motor is operating.

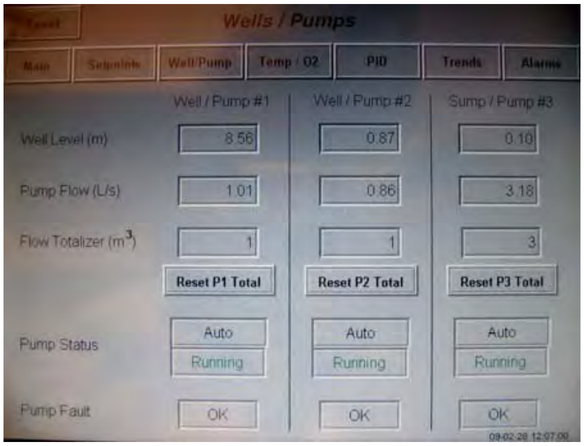
A bell graphic flashes in the top right of the screen indicates the presence of a Fault. Press the Alarm tab to flip to the appropriate screen.

Setpoints Screen;

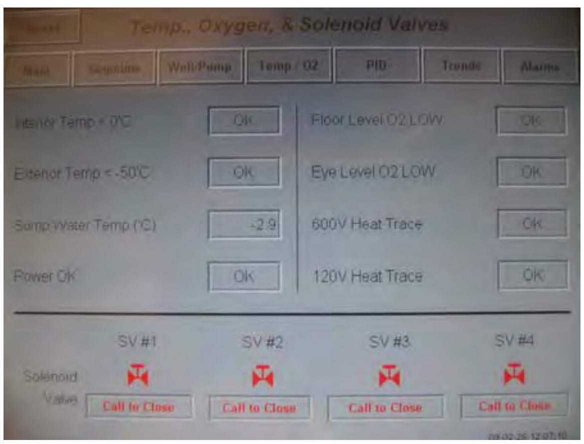
This screen records the trip (Low Set Level) and reset (Low Reset Level) of the three wells. These numbers are modifiable but should only be done as part of the overall groundwater strategy. Note that the settings may be difficult to adjust due to input filters. The sump level setpoint has similar difficulties.

The recirculation Timer is available from this screen. Tap to set the duration and interval of the recirculation valve. This is solenoid valve #3 that opens according to these settings to agitate the sump. Water moving through the recirculation valve does not pass through the flow meter and does not increment the Total Flow.

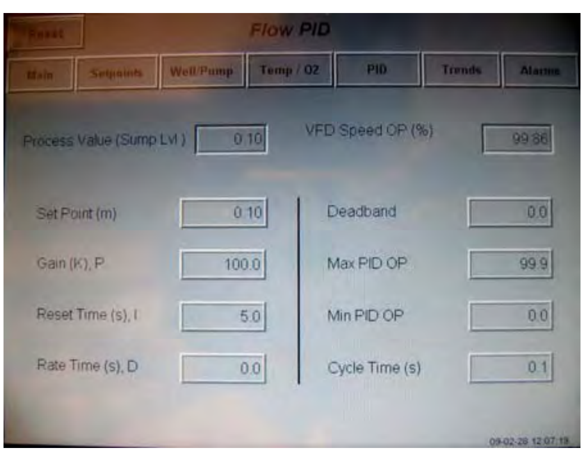




Wells/Pumps Screen;
This screen reports pertinent data regarding the three pumps including well level (meters of water above the pump), current flow and Total flow. Total flow may not agree with the flowmeters depending upon when each were reset. Resetting the totals requires a password (see below).
Status of the pumps can be seen in the lower section. Fault for the two well pumps would be produced by the SymCom Motor Savers located inside the panel. Refer to the SymCom manual for more information on faults.

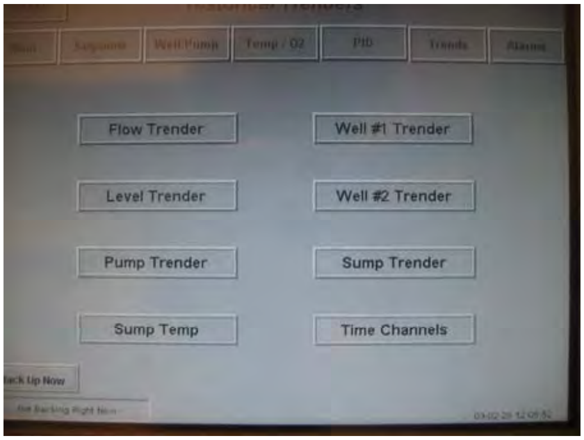


Temp/O_2 Screen;
This screen accesses the status of various alarm faults. Indoor and outdoor temperatures are monitored due to the possibility of extreme cold. In the case of a temperature fault, the pumps are shut down and the solenoid drain valves are opened to empty all lines. Indoor, the temperature is only allowed to go to freezing. Outside (exterior) temperatures are allowed to drop much lower before shut down. Status of the O_2 alarms are also viewed here. Settings for these alarms are set on the individual discrete components.
The sump water temperature is also displayed but is not subject to alarms. Heat Trace alarm status is also displayed. Failure of the 600V Heat-Trace will shut down Pump #3 and drain the line leading up the hill from the Control Building. Failure of the 120V Heat-Trace will shut down both Pump #1 and Pump #2 (in SLW #1 and SLW #2). The lines leading from the wells to the Control Building will also be drained.
The status of the solenoid valves is displayed but only to the extent of wether the PLC is calling for the valves to close.



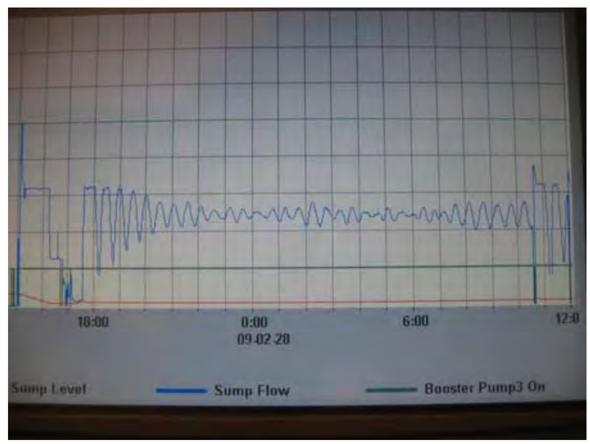
PID Screen;
The PID screen involves the settings that operate the Variable Frequency Drive as it attempts to adjust the flow of Pump #3 to match the influent water in the sump therefore holding a constant level in the sump. Changes in these settings is not recommended due to the nature of their importance. Any changes could cause very erratic operation of the system and could cause damage. The reaction of changes could take hours to become noticeable. These settings are password protected (see below). The VFD Speed Operation displays the current speed of the VFD control. Due to the nature of the electronics, the display will never reach 100% speed, though 99.99% pushes the drive to

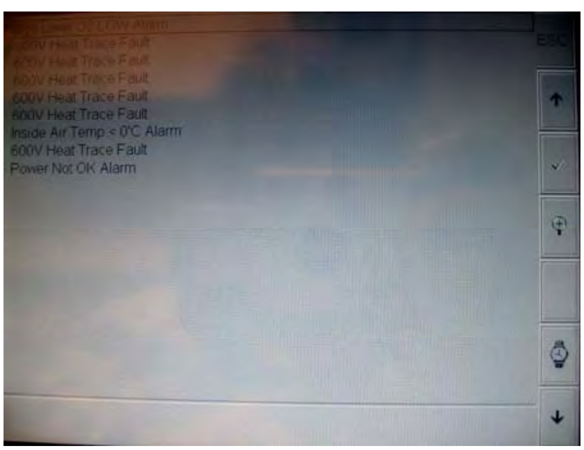
full speed. This display is the percent of the available speed band; zero percent is set to a minimum flow ensure motor cooling.



Trends Screen;
This screen activates a sub-menu with a selection of different graphing combinations.
The Flow Trender will graph the flow rates of all three pumps on the same screen. The Level Trender and Pump Trender will do a similar graph for the corresponding variable.
The Well #1 Trender will graph the Flow, Level and On/Off status of SLW#1 on the same screen. Well #2 Trender and Sump Trender do the same for their corresponding pump.
The Sump Temperature can be traced by graph individually. Time Channel tracks various alarm functions with their date and times.
Also available on this screen is the “Back Up Now” button. Use this before removing the memory drive for up to date data.

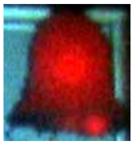
Trender Graph;
The different graphs are all easily manipulated by intuitive screen taps to zoom either the X or Y axis to view different sections of the data. Data can not be changed or damaged from the graphs. If one becomes lost in the graph, switch out of the Trender Screen. When returning to the graph, it will be back to its automatic graphing that shows all the data available.





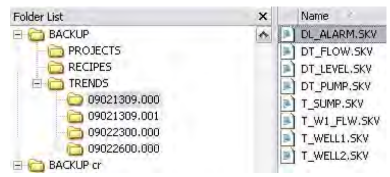
Alarm Screen;
Display shows the last ten alarms and faults. The tick mark icon allows the acknowledgement of the alarm. Use the up and down arrow to highlight an alarm to acknowledge. The RESET button on the Main Screen will have to be pressed to re-start the pumps.

The magnifying glass icon will zoom the text for easy reading. Repeatedly pressing the zoom will make text larger and larger before dropping back to the original size.
The wristwatch icon toggles on the time-stamp display.



Alarm Icon;
The alarm icon will appear in the top right coner of any screen to announce a fault. Flip to the Alarm screen to acknowledge the fault. An alarm that is still in fault condition may not be able to cancel. Escape to the main screen to find the RESET button in the top left.

Password Access:
Many of the settings available at the touch-screen are protected from accidental change by a password. The correct password is 1928. Once invoked, the password mode allows settings to be modified and the flowmeter totals reset. The mode will stay active as long as there is interaction with the touch-screen. The password mode will cancel itself after about a minute of inactivity.



Data Retrieval:
Information that has been logged can be loaded into a computer for viewing by removing the USB flash drive and copying its contents to your destination computer. Files are in .SKV format that can be imported into an Excel spreadsheet. A macro is included with the disk to assist the importing of data.
Ensure that the USB flash drive is returned to the panel immediately to avoid the loss of any data.

SymCom Model 77C MotorSaver Settings;
Refer to the manufacturer's manual for more information on these settings. Changes to these setting may result in erratic operation and poor pump protection. The settings of these relays should not be modified without consultation with Precision Service and Pumps Inc.

Parameter		Pump #1	Pump#2
LV	Low Voltage	190	190
HV	High Voltage	240	240
MULT	Multiplier	4	4
OC	Over Current	8.5	8.5
UC	Under Current	4.0	4.0
TC	Trip Class	10	10
UCTD	Under Current Time Delay	10	10
RD1	Re-Start Delay #1 – Rapid Cycle	0	0
RD2	Re-Start Delay #2 – Over Current	2	2
RD3	Re-Start Delay #3 – Under Current	2	2
#RU	Re-Start Attempts (Under Current)	A	A
#RO	Re-Start Attempts (Over Current)	A	A
ADDR	Address – RS-485	A01	A02
OPT1	Option #1 – Over Current Delay	10	10
OPT2	Option #2 – Re-Start Delay Range	3	3

Variable Frequency Drive (VFD)
TECO Westinghouse PA7300 AC Inverter

Frequency Command Parameters			
Parameter	Name	Setting	Unit
An-01	Frequency Command 1	0.01	Hertz
An-02	Frequency Command 2	0.01	Hertz
An-03	Frequency Command 3	0.01	Hertz
An-03	Frequency Command 4	0.01	Hertz
An-05	Frequency Command 5	0.01	Hertz
An-06	Frequency Command 6	0.01	Hertz
An-07	Frequency Command 7	0.01	Hertz
An-08	Frequency Command 8	0.01	Hertz
An-09	Jog Frequency Command	0.01	Hertz

Drive Mode Parameters			
Parameter	Name	Setting	Unit
Bn-01	Acceleration Time 1	0.1	Seconds
Bn-02	Deceleration Time 1	0.1	Seconds
Bn-03	Acceleration Time 2	0.1	Seconds
Bn-04	Deceleration Time 2	0.1	Seconds
Bn-05	Analog Frequency Command Gain	0.1	%
Bn-06	Analog Frequency Command Gain	0.1	%
Bn-07	Auto torque Boost Gain	0.1	-
Bn-08	Multi-Function Analog Output A01 Bias	0.1	%
Bn-09	Multi-Function Analog Output A02 Bias	0.1	%
Bn-10	Monitor No. after power ON	1	-
Bn-11	Multi-Function Analog Output A01 Gain	0.01	-
Bn-12	Multi-Function Analog Output A02 Gain	0.01	-
Bn-13	PID Detection Gain	0.01	-
Bn-14	PID Proportional Gain	0.1	-
Bn-15	PID Integral Gain	0.1	Seconds
Bn-16	PID Differential Time	0.01	Seconds
Bn-17	PID Bias	1	%
Bn-18	PID Sleep Frequency	0.01	Hertz
Bn-19	PID Sleep/Wake-Up Time Delay	0.1	Seconds
Bn-20	PID Wake-Up Frequency	0.01	Hertz
Bn-21	PID Detected Value Display Bias	0.001	-
Bn-22	PID Detected Value Display Gain	0.001	-
Bn-23	Frequency Command Upper-Bound Delay Time	1	Seconds
Bn-24	Frequency Command Lower-Bound Delay Time	1	Seconds
Bn-25	MC ON/OFF Delay Time	0.01	Seconds
Bn-26	Pump ON/OFF Detection Level	0.1	%

Control Parameters			
Parameter	Name	Setting	Unit
Cn-01	Input Voltage	575.0	Volts
Cn-02	Max. Output Frequency	60.0	Hertz
Cn-03	Max. Output voltage	575.0	Volts
Cn-04	Max. Voltage Frequency	60.0	Hertz
Cn-05	Middle Output Frequency	30.0	Hertz
Cn-06	Voltage at Middle Output Frequency	55.0	Volts
Cn-07	Min. Output Frequency	1.5	Hertz
Cn-08	Voltage at Minimum Frequency	8.0	Volts
Cn-09	Motor Rated current	18	Amps
Cn-10	DC Injection Braking Starting Frequency	1.5	Hertz
Cn-11	DC Braking Current	50	%
Cn-12	DC Injection Braking Time at Stop	0.0	Seconds
Cn-13	DC Injection Braking Time at Start	0.0	Seconds
Cn-14	Frequency Command Upper Bound	87.0	%
Cn-15	Frequency Command Lower Bound	64.0	%
Cn-16	Frequency Jump Point 1	0.0	Hertz
Cn-17	Frequency Jump Point 2	0.0	Hertz
Cn-18	Frequency Jump Point 3	0.0	Hertz
Cn-19	Jump Frequency Width	1.0	Hertz
Cn-20	Digital Operator Display Unit	0	-
Cn-21	Frequency Agree Detection Level	0.0	Hertz
Cn-22	Frequency Agree Detection Width	2.0	Hertz
Cn-23	Carrier Frequency Upper Limit	6.0	Hertz
Cn-24	Carrier Frequency Lower Limit	6.0	Hertz
Cn-25	Carrier Frequency Proportion Gain	0	-
Cn-26	Over-torque Detection Level	160	%
Cn-27	Over-torque Detection Time	0.1	Seconds
Cn-28	Stall Prevention Level during Acceleration	150	%
Cn-29	Not used	-	-
Cn-30	Stall Prevention During Running	130	%
Cn-31	Communication Fault Detection Time	1	Seconds
Cn-32	Frequency Detection 1 Level	0.0	Hertz
Cn-33	Frequency Detection 2 Level	0.0	Hertz
Cn-34	Not used	-	-
Cn-35	Not used	-	-
Cn-36	Number of Auto-Restart Attempts	0	-
Cn-37	Power Loss ride-thru Time	2.0	Seconds
Cn-38	Speed Search Detection Level	150	%
Cn-39	Speed Search Time	2.0	Seconds
Cn-40	Min. Baseblock Time	1.0	Seconds

Control Parameters (continued)			
Parameter	Name	Setting	Unit
Cn-41	V/F Curve in Speed Search	100	%
Cn-42	Voltage Recovery Time	0.3	Seconds
Cn-43	PID Integral Upper Bound	100	%
Cn-44	PID Primary Delay Time Constant	0.0	Seconds
Cn-45	Energy-Saving Voltage Upper Limit (60Hz)	120	%
Cn-46	Energy-Saving Voltage Upper Limit (6Hz)	16	%
Cn-47	Energy-Saving Voltage Lower Limit (60Hz)	50	%
Cn-48	Energy-Saving Voltage Lower Limit (6Hz)	12	%
Cn-49	Tuning Operation Voltage Limit	0	%
Cn-50	Tuning Operation Control Cycle	1.0	Seconds
Cn-51	Tuning Operation Voltage Step (100% Voltage)	0.5	%
Cn-52	Tuning Operation Voltage Step (5% Voltage)	0.2	%
Cn-53	Not used	-	-
Cn-54	Not used	-	-
Cn-55	Not used	-	-
Cn-56	Not used	-	-
Cn-57	Not used	-	-
Cn-58	Energy Saving Coefficient K2 (60Hz)	115.74	-
Cn-59	Energy Saving Coefficient Reduction Ratio	100	%
Cn-60	Motor Code	29	-
Cn-61	Not used	-	-
Cn-62	Auto Re-Start Time Interval	0	Seconds
Cn-63	Motor Over-Heat Protection Time	60	Seconds

For information on parameters, refer to the manufacturer’s instruction manual. Due to its size, this manual may be on disk only. Changes to any of these parameter may result in erratic operation and poor pump protection. The settings of the drive should not be modified without consultation with Precision Service and Pumps Inc.

System Parameters			
Parameter	Name	Setting	Unit
Sn-01	Inverter Capacity Selection	1	-
Sn-02	V/f Curve Selection	2	-
Sn-03	Operation Status	0000	-
Sn-04	Operation Mode Selection 1 – Run/Stop Selection	0011	-
Sn-05	Operation Mode Selection 2 – I/O Terminal Func.	0000	-
Sn-06	Operation Mode Selection 3 – S-Curve Command	0000	-
Sn-07	Operation Mode Selection 4 – Over-Torque Det.	0000	-
Sn-08	Operation Mode Selection 5 – RS-485 Comm.	0011	-
Sn-09	Operation Mode Selection 6 – Energy Saving	0000	-
Sn-10	Protective Characteristic Selection 1	0000	-
Sn-11	Protective Characteristic Selection 2	0000	-
Sn-12	Protective Characteristic Selection 3	0100	-
Sn-13	Protective Characteristic Selection 4	0000	-
Sn-14	Protective Characteristic Selection 5	0000	-
Sn-15	Terminal #5 Function	03	-
Sn-16	Terminal #6 Function	04	-
Sn-17	Terminal #7 Function	06	-
Sn-18	Terminal #8 Function	08	-
Sn-19	Terminal AUX Function	00	-
Sn-20	Terminal R2A Function	00	-
Sn-21	Terminal D01 Function	01	-
Sn-22	Terminal R1A Function	02	-
Sn-23	Inverter Address	01	-
Sn-24	RS-485 Communication Protocol	0011	-
Sn-25	Language Selection	1	-
Sn-26	Multi-Function Analog Output A01 Function	0	-
Sn-27	Multi-Function Analog Output A02 Function	1	-
Sn-28	Not Used	-	-
Sn-29	Not Used	-	-
Sn-30	Pump Operation Mode Select	0	-
Sn-31	PA-PID Card Relay 2 Control	0	-
Sn-32	PA-PID Card Relay 3 Control	0	-
Sn-33	PA-PID Card Relay 4 Control	0	-
Sn-34	PA-PID Card Relay 5 Control	0	-
Sn-35	PA-PID Card Relay 6 Control	0	-
Sn-36	PA-PID Card Relay 7 Control	0	-
Sn-37	PA-PID Card Relay 8 Control	0	-
Sn-38	Parameter Copy	0	-

For information on parameters, refer to the manufacturer’s instruction manual. Due to its size, this manual may be on disk only. Changes to any of these parameter may result in erratic operation and poor pump protection. The settings of the drive should not be modified without consultation with Precision Service and Pumps Inc.

Appendix I
Maxxam Water Quality Analytical Results

Maxxam Job #: A916592
Report Date: 2009/04/20

LOW LEVEL DISSOLVED METALS - WATER (WATER)

Maxxam ID		O41746	O41757	O41758	O41759	O41760	O41738		O41761		O41762	O41763	
Sampling Date		4/6/2009 14:15	4/6/2009 15:00	4/6/2009 16:00	4/6/2009 17:30	4/6/2009 18:30	4/6/2009 12:00		4/6/2009 8:20		4/6/2009 8:25	4/6/2009 8:30	
COC Number		F117519	F117519	F117519	F117519	F117519	F117519		F117519		F117519	F117519	
	Units	**NF2**	**SC-1**	**SC -2**	**SC-3**	**SC-4**	**X2**	**RDL**	**PW-1**	**RDL**	**PW-2**	**PW-3**	**RDL**
Misc. Inorganics													
Dissolved Hardness (CaCO3)	mg/L	142	142	143	145	150	163	0.5	680	0.5	4610	3460	0.5
Dissolved Metals by ICPMS													
Dissolved Aluminum (Al)	ug/L	2.3	2.0	2.8	2.1	2.5	1.9	0.2	27.1	0.2	21	16	10
Dissolved Antimony (Sb)	ug/L	0.07	0.08	0.10 (1)	0.08	0.10	0.09	0.02	0.06	0.02	<1	<1	1
Dissolved Arsenic (As)	ug/L	0.36	0.34	0.35	0.31	0.29	0.27	0.02	5.86	0.02	3	2	1
Dissolved Barium (Ba)	ug/L	71.9	70.5	71.8	70.4	69.6	70.7	0.02	26.3	0.02	16	19	1
Dissolved Beryllium (Be)	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	0.92	0.01	<0.5	<0.5	0.5
Dissolved Bismuth (Bi)	ug/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.005	<0.005	0.005	<0.3	<0.3	0.3
Dissolved Boron (B)	ug/L	<50	<50	<50	<50	<50	<50	50	<50	50	<3000	<3000	3000
Dissolved Cadmium (Cd)	ug/L	0.022	0.017	0.019	0.019	0.023	0.022	0.005	0.102	0.005	45.5	49.9	0.3
Dissolved Chromium (Cr)	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	0.1	<5	<5	5
Dissolved Cobalt (Co)	ug/L	0.101	0.102	0.120	0.113	0.222	0.245	0.005	12.4	0.005	86.1	98.9	0.3
Dissolved Copper (Cu)	ug/L	0.28	0.33	0.54 (1)	0.29	0.45 (1)	0.35	0.05	0.71	0.05	<3	<3	3
Dissolved Iron (Fe)	ug/L	23	40	66	49	63	59	1	28700	1	895	4780	50
Dissolved Lead (Pb)	ug/L	0.049	0.045	0.053	0.036	0.046	0.048	0.005	0.626	0.005	0.7	2.3	0.3
Dissolved Lithium (Li)	ug/L	9.2	8.6	8.8	8.6	8.9	10.0	0.5	65.6	0.5	144	124	30
Dissolved Manganese (Mn)	ug/L	16.4	26.1	29.4	39.6	120	142	0.05	1680	0.05	65800	54900	3
Dissolved Molybdenum (Mo)	ug/L	0.92	0.86	0.90	0.92	0.87	0.87	0.05	0.15	0.05	<3	<3	3
Dissolved Nickel (Ni)	ug/L	0.39	0.41	0.50	0.56	1.14	1.27	0.02	27.7	0.02	1710	1390	1
Dissolved Selenium (Se)	ug/L	0.49	0.47	0.46	0.48	0.47	0.48	0.04	<0.04	0.04	<2	<2	2
Dissolved Silicon (Si)	ug/L	5700	5830	6060	5950	5990	5760	100	15600	100	10200	12800	5000
Dissolved Silver (Ag)	ug/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.005	0.011	0.005	0.5	0.3	0.3
Dissolved Strontium (Sr)	ug/L	185	184	187	185	191	198	0.05	769	0.05	1870	1530	3
Dissolved Thallium (Tl)	ug/L	<0.002	0.002	0.002	0.002	0.002	<0.002	0.002	0.013	0.002	<0.1	0.1	0.1
Dissolved Tin (Sn)	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	0.01	<0.01	0.01	<0.5	<0.5	0.5
Dissolved Titanium (Ti)	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	<0.5	0.5	<30	<30	30
Dissolved Uranium (U)	ug/L	2.92	2.88	2.91	2.87	2.87	2.93	0.002	1.46	0.002	6.3	5.0	0.1
Dissolved Vanadium (V)	ug/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.2	<0.2	0.2	<10	<10	10
Dissolved Zinc (Zn)	ug/L	12.4	13.0	13.8	36.6	99.6	98.5	0.1	1340	0.1	280000	232000	5
Dissolved Zirconium (Zr)	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	0.1	<5	<5	5
Dissolved Calcium (Ca)	mg/L	41.7	41.7	42.0	42.3	42.9	46.2	0.05	169	0.05	442	361	0.5
Dissolved Magnesium (Mg)	mg/L	9.15	9.13	9.25	9.46	10.5	11.5	0.05	62.4	0.05	850	620	0.5
Dissolved Potassium (K)	mg/L	1.04	1.04	1.07	1.06	1.09	1.11	0.05	4.86	0.05	11.6	9.4	0.5
Dissolved Sodium (Na)	mg/L	3.24	3.22	3.29	3.30	3.33	3.48	0.05	10.5	0.05	37.2	26.4	0.5
Dissolved Sulphur (S)	mg/L	7	8	8	8	11	13	3	148	3	1790	1300	30

RDL = Reportable Detection Limit
(1) dissolved > total, reanalyzed & confirmed. Possible trace level of field-filtered contamination on dissolved metal bottle or there is a discrepancy between samples taken.