

Memorandum

To: Don Strickland, Jack Korppi.
From: Malcolm J.A. Swallow, Independent Consulting Engineer.
CC: Procon Management.
Date: July 29, 2011
Re: Formal Mine Inspection for 2011
File: 2011 Wolverine Mine Inpsection 1.doc

1) Introduction

The Author as an Independent Consultant Mining Engineer and a registered Professional Engineer (#1919,) in Yukon Territory, was requested by the General Manager at Wolverine Mine to inspect the Wolverine Mine of Yukon Zinc Corp. (YZC.) and report on the underground mine as a whole and its compliance with the Occupational Health and Safety Act; Yukon. (The “Act”.)

Throughout the preparation of this report, the Author was granted full access to all areas of the mine and total cooperation by all YZC and Procon Personnel. The Author has been present on the minesite on three occasions, from the 2nd to the 22nd of May 2011 and from the 20th to the 30th of June 2011 and from the 21st of July to-date of this document. During this period, the Author accompanied by a variety of YZC and Procon personnel has been underground on a number of occasions and also held numerous meetings with YZC and Procon personnel.

The Author is a Mining Industry Professional with 39 years of Mining Engineering operational and management experience and who is registered as a Professional Engineer in both BC and Yukon.

This report is split into three sections:

2. The general conditions underground.
3. Compliance with the Yukon Occupational Health and Safety Regulations.
4. Deficiencies in compliance with the Act and the Regulations.

This report was prepared at Wolverine minesite on the 29th of July by:

Malcolm J.A. Swallow

B.Sc. (Hons.) Min.Eng. ARSM, C.Eng. FIMMM. P.Eng. (BC #28013 & Yukon #1919)

2) General Conditions Underground

My latest visit underground was on the 25th of July 2011 accompanied by Mark Bates of Procon. Prior to this I have been underground at Wolverine on a number of occasions commencing in May of 2011. Access to the mine is via the Main Access Ramp. The Ramp goes from Surface (1355m elevation – Mine grid,) down to the 1209 metre level approximately and is driven at minus 15%. The Ramp is driven in hangingwall rocks from surface down to 1290 elevation. The first level – 1300 in the Lynx orebody, is accessed by the 1300 Strike Attack Drive, (1300 SA.) It was originally driven around 2005 as part of the trial mining program for the Wolverine Project.

The approximate size of the Ramp is 5m wide by 6 m high. The area within 50 meters of surface is fully supported with steel sets and is topped off with a full punch-plate culvert as the Ramp exits to daylight. The actual entrance to the culvert is currently approximately 25 meters down slope from the surface proper. The Ramp is fully supported throughout using shotcrete, rockbolts and mesh and has been re-supported over the last year as per guidelines provided by Dr. Khosrow Aref (Rockland Ltd.) as part of the 2010/11 approved Wolverine Mine Rehabilitation Plans. Visibly the Ramp is well supported with very few signs of deterioration in the support envelope.

From the 1290 to 1270 Strike Attacks, the Ramp has been driven in the Saddle Zone on the boundary between the Hangingwall (H/W) and the Footwall, (F/W,) with limited amounts of ore appearing in the back of the Ramp. Some problems were experienced with the Ramp at the 1280SA junction, where ground instability necessitated increased support. No significant problems are now observed in this area.

From the 1270SA to 1260SA, the Ramp again loops into the footwall of the orebodies. Again from 1260SA to 1250SA, the Ramp was driven in the contact of the F/W with Saddle Zone ore in the back of the drive. However, throughout this leg, a series of faults were intersected, which effectively stepped the orebody away from the original Ramp layout. This caused significant support problems, which resulted in a major re-hab program in 2010. Conditions here are now stable.

From 1250SA to 1240SA the Ramp was driven in footwall rocks. This part of the Ramp is in excellent condition, well supported and appears to be giving no problems.

From 1240SA to 1230SA once again the Ramp was driven in the Saddle Zone attempting to keep some ore in the back of the Ramp. Adjacent to the electrical bay at the intersection of the 1240SA problems were encountered close to and inside the footwall contact requiring increased support. Again, following the 2010 re-hab, no problems are observed in the Ramp to this time.

From 1230SA to 1220SA the Ramp is again back in the footwall without problem until the Substation 10 meters before the intersection with the 1220SA and the Saddle Zone. Here there was cracking in the Substation and the surrounding area. This was fully supported again as part of the re-hab program. One possible cause of this cracking is the Ramp cross over below this level at approximately 1215 elevation. At 1215 elevation, in the opposite leg of the Ramp crossing beneath the 1220SA Substation area, active cracks have been clearly observed in the shotcrete that was applied as part of the re-hab process. This cracking is thought to be caused by the very limited pillar between the two legs of the Ramp (8-11m between the Ramp legs vertically.) To further support this area the mine has installed a number of sets and has been operating a program of extensometer monitoring. The mine continues to monitor this area; no recent movement has been observed.

From 1215 elevation to 1210SA the Ramp had some small chimneys appearing wherever the Ramp touched the hanging wall contact. This was further exacerbated when the 1210SA and the fresh air raise in this area again contacted the H/W resulting in a chimney, which goes up around 10 meters. (This area was driven in early 2010.) This chimney area is barricaded off and the 1210SA is stopped at this time. A program of re-habilitation or bypass is currently being considered.

After 1215, the Ramp crosses into the hangingwall of the Saddle Zone. The base of Ramp is at around 1209 elevation. Since coming away from the 1210SA turnoff, the Ramp has been driven in very difficult ground, resulting in a program of spile or forepole development for the last 8 meters of Ramp development as it moves out through the H/W contact and into the H/W. Ground here is soft and not self-supporting. The face is wet, which compounds the problem and means that the Ramp has to be driven slowly with repeated applications of shotcrete, mesh and Super Swellex rockbolts for permanent support.

In general the Ramp is well supported and the support rules as outlined in Dr. Aref's guidelines and subsequently modified in the Wolverine Mine Ground Control Management Plan, (GCMP,) are well observed and effective. Dr. Woo Shin, the mine geotechnical engineer has a good understanding of the ground conditions in the mine, as do the other mine technical and geological staff and the Procon supervision. Refuge bays are correctly driven and sign posted and clean and free of obstructions.

The Ramp itself is clearly signposted, as are the two fresh air raises, which act as a second means of escape and egress to the mine. These raises are equipped with inclined ladders and are driven at between 32 and 45 degrees. The ladders within the raises have platforms and are connected by crossovers at each Strike Attack level, giving approximate overall elevations changes between platforms of around 9-10 meters. Access to the raises is via vent doors into the cross over or the raise itself.

Services and power cables in the Ramp are generally well hung. The section of the Ramp from Surface down to 1300SA needs the pipes consolidated and re-hung over the long-term as there are a number of redundant lines hanging off the same supports. The mine is aware of this and is considering the timing of this operation.

The 1300SA is driven down towards the 1300 level at 15% down, in the H/W. Poor ground conditions were encountered from approximately 60 metres down the SA as it approached the H/W of the Saddle Zone and crossed into and out of the orebody at this elevation. Subsequently the 1300SA continued in the F/W of the fringe of the Saddle Zone and the Lynx and finally levelled out in the Lynx footwall contact. Here the level was driven at 5*5 meters, with one tight spot, where the 1300SA Ramp flattens out onto the 1300 F/W drive. At some point it will be necessary to slash the floor here as equipment is repeatedly damaging the vent bag.

The 1300 F/W drive has successfully followed the contact of the ore and the F/W contact, despite repeated folding and faulting of the ore. A number of Primary drives have been created off this F/W drive out to the contact of the H/W on this level. As soon as the contact is reached, the Primary drive is stopped. The whole level is supported with a mixture of shotcrete, mesh and Swellex and Super Swellex Rockbolts, in accordance with the GCMP. Again the work is well done and appears to be effective. The F/W is driven under geological control and survey grade, because of the widespread definition drilling, leading to poor detailed orebody definition. This has resulted in some "hit and miss" direction changes, which are further hampered by the extensive folding and faulting in the area. The recent introduction of a "Bazooka", short distance, diamond drill, has aided the geologists in better defining the strike and thickness of the orebody.

The 1300 F/W drive is now out to the fringe ore of the Lynx orebody. As a consequence it will be the site of the first paste filling operations on the mine. Paste fences are currently being created and paste is expected to be deployed commencing in early August to fill the Primary or "P" drives. After this Secondary drives ("S" drives) will be driven alongside the heavily cemented P drives and subsequently also filled with cemented paste fill. Finally a series of Tertiary drives ("T" drives) will be developed to complete the stoping on this lift. The F/W drive is then filled along with the T drives with cemented paste and the back of the SA is then mined to allow access onto the top of the previous 1300 lift.

Here the process is repeated, first with an F/W drive, then P's, S's and T's etc. This process is then repeated again until the top of the stoping block is reached.

Ground conditions on the 1300 level of the Lynx are generally good, within the context of conditions at Wolverine mine. The miners have a good understanding of conditions on this level and the support work is well carried out and appears to be effective. Work on hanging the paste line is ongoing and again installation standards are good. Initial work on the paste fill fences appears well done. It is intended to carry out a program of detailed measurement on these paste fill fences and to carefully record and review their construction and operation for future reference.

The 1280SA goes some 60 meters down at 15% to the 1280 F/W drive in the Lynx orebody. Again, no significant problems with ground conditions on this level, in the context of the ground support operations at Wolverine mine. Ground support is well installed and the Wolverine GCMP has been followed in detail.

The 1270SA is driven approximately 60 meters at 15% to intersect the Wolverine orebody. Here it travels some 140 meters on the F/W contact and is currently still going beyond the fringe of the known ore! This part of the Wolverine orebody is generally narrow (approximately 4 meters thick,) and as such will be mined by driving to the end of the ore and then paste filling and retreating and slashing any residual ore outside the drive envelope. At the edge of the orebody the mineralisation has narrowed to approximately 2 meters thick, with reasonable grades, dipping at approximately 70 degrees. The F/W drive continues to follow this fringe ore.

In order to maintain good roof conditions, the drive size on this level has been reduced to 3.6*4.0 meters arched. The use of smaller drive size means that in ore, the use of shotcrete can be reduced. Also, the arched back at 4.0 metre height means that the Ro-Bolter and other equipment can still be effectively used. This has resulted in increased production by allowing the use of 3 metre rounds and thus decreased operating costs.

Ground conditions on the 1270, in the Wolverine ore body, were generally reasonable, but as the orebody narrows, it has become necessary to drill, blast, muck, then pre-shotcrete to immediately support the H/W contact prior to going back in and installing rockbolts and mesh, plus a further coat of fibre reinforced shotcrete over the bolts and mesh. Once again, the operators and technical staff have this procedure well in hand and are demonstrating good technique within the difficulties of the operation.

On the 1260 Level in the Lynx orebody, the orebody appears to be approximately 8 meters thick. Ideally one would develop this level by driving to the end of the orebody, filling the F/W drive and then slashing or driving a parallel drive along the edge of the current F/W drive. Ground conditions are variable, with reasonable roof conditions in the ore. However, multiple faulting along the drive results in development of blocks of ore, with the attendant risk of block failure in the roof of the drive. As a consequence staff have adopted a policy of caution, with installation of Swellex, Super Swellex, shotcrete and mesh along much of the drift. The F/W contact is graphitic and prone to failure and is therefore shotcreted as a matter of policy. H/W contact is again graphitic argillites. Here policy dictates that support is applied at the earliest opportunity. In general this policy is carried out with few exceptions.

The 1250 level in the Wolverine orebody has produced a significant number of problems, most particularly with the H/W contact. Any gouging of the H/W contact results in major wedge, or chimney failures of the H/W. This has resulted in sterilisation of approximately 15 meters of the F/W drive, due to chimneying of the H/W contact, plus sterilisation of the initial re-muck on the level; which also inadvertently hit the H/W of a displaced block of ore, which had been faulted well out into the predicted hanging wall of the 1250 level. This will mean that the mine has to drive around these chimney failures and subsequently plans to fill them with paste fill, or cemented foam from the planned adjacent bypass drift and the 1270 level above. This type of movement, faulting and rotation of ore blocks was not predicted from the original

surface drilling. The mine technical staff is now becoming reasonably familiar with these conditions and has developed techniques to deal with the difficulty of following and staying within the ore envelope.

Once again, areas where failure has taken place have been isolated and the mine continues to develop a program of immediate support of any exposed face or H/W intercept, by the use of shotcrete and mesh, plus rockbolts as appropriate. This has resulted in a policy of shotcreting and supporting of faces on this level immediately after blasting and mucking, generally within the 24-hour cycle.

The 1240 level in the Lynx ore body is approached by the 1240SA at minus 15%, with a length of approximately 60 meters. The 1240 F/W drive is being driven at 4.5*4.6m high arched. Ground conditions in the ore are very good. The F/W is however poor to extremely poor. Mining is currently restricted to advancing the footwall drive. Estimated ore thickness on the level is 8-10 meters true thickness.

1240SA leads to the 1250 elevation Refuge station off the 1240SA. The refuge station is fully equipped as per the Act – 15.15. It is provided with a fresh air connection to the vent raise, compressed air connections, phone, drinking water, emergency rations, fire clay for stopping and spare oxygen re-breather sets. The refuge is used as an underground lunchroom during the shift and is kept clean and tidy.

1230SA leads to the 1230 F/W drive in the Wolverine orebody. Here the ore is approximately 15-20 meters thick on the level. In order to maintain good roof conditions, the drive size on this level has been reduced to 3.6*4.0 meters arched. The use of smaller drive size means that in ore, the use of shotcrete can be reduced. Also, the arched back at 4.0 metre height means that the Ro-Bolter and other equipment can still be effectively used. This has resulted in increased production by allowing the use of 3 metre rounds and thus decreased operating costs.

Ground conditions on this level are good to very good in the context of the Wolverine mine. The footwall contact is however poor, with inter-bedded clays and chlorite alteration. This becomes more developed both in the Saddle Zone and with depth in the Wolverine and Lynx orebodies. Again, with experience, the operation has developed techniques to avoid wherever possible breaking this contact.

The 1220 level was the site of a sidewall failure and fall of ground leading to a fatality in April 2010. This level has been driven some 200 meters out into the fringes of the Lynx orebody. The bolter involved in the original fatality is almost completely buried at the end of the level. Generally the level is stable, with reasonable ground conditions up to the area of the Bolter, known as the Rockfall Zone. Here there is evidence of continued degradation of the H/W and Sidewalls beyond the current safety barriers in the vicinity of the bolter. Apart from a program of preliminary remediation, no work has been carried out on this level over the past 18 months. A separate report on remediation of the level, plus a plan of action for the support of the Rockfall zone and burying of the bolter, using paste fill has been submitted to the Mines Inspector for review and approval.

Attempts to drive the 1210SA have been hampered by the chimney failure as it passed through the hangingwall of the Saddle Zone towards the footwall. This has resulted in barricading off of the area and partial remediation of the access by the installation of three steel sets. This remediation work is ongoing and will likely consist of additional sets, followed by paste or cement foam injection into the cavity.

The primary Ramp is now at the 1209 elevation and is proceeding very slowly downwards using spiling techniques into the hangingwall of the Saddle Zone. Once again, the very soft hanging wall contact conditions, combined with a relatively wet face, are causing support problems, which have led to the decision to adopt spiling methods. While the spiling operation is proceeding safely, it is very slow; on completion of blasting, the face is mucked and then shotcreted immediately. The bolter then comes in and bolts and meshes the face. The shotcrete machine then returns and puts another coat over the bolts and mesh. The drill rig then comes in and drills 40 closely spaced holes into the back and half

way down the sidewalls. The drill rig then pulls out and the bolter comes back in and drives up to 40 closely drilled spiles, consisting of 4 metre lengths of 1 inch or 7/8th inch re-bar, into the drill holes. These spiles are then strapped and secured at the outside end. The bolter then pulls out and the rig comes back to drill off the blast holes. The round is then charged and fired at the end of the shift. After this the sequence is repeated, taking, in total, at least two days to complete the cycle.

It is apparent that this cycle will have to continue for a significant part of the current Ramp design to get the Ramp back around and into the Saddle Zone again. The Author questions the efficacy of this process and would prefer to see the Ramp re-located into better ground to allow faster and easier development of the various stopping levels.

2b.) General comments on conditions underground.

There has been a visible improvement in operational standards underground over the past 3 months. Levels of ground support are good, with close adherence to the Ground Control Management Plan. Housekeeping standards are also greatly improved. Operator safety and the general safety culture of the mine has greatly improved and a program of continuous safety improvement was observed.

Electrical installations are well done and observance of the Act is in general excellent. Pumping of nuisance water is handled by a cascading series of sumps and could be improved by the introduction of a single larger sump and pump set up at a lower level to save on pumping effort. This is an item for the future development of the mine. Ventilation air underground is also good, with excess air volume available. The two ventilation raises, which eventually connect with the single down casting fan installation are clean and well supported and more than adequate for the volume of air being moved.

Ventilation survey work is carried out weekly by a Procon employee and carefully recorded. Similarly gas testing of the mobile equipment is carried out weekly and after each major service. Equipment is well maintained despite the current lack of a decent workshop. The mine is in the last stages of completing the new workshop facilities and these will be available from the end of August. The underground equipment was recently fully inspected by independent engineers as part of a significant parking brake system modification, following a couple of park brake failures and is generally in good condition.

Underground magazines for detonators and caps are clean and tidy. They are secured and generally well kept. They have however been operating under a Variance from the Inspectorate as they are too close to the main Ramp. (Less than 60 meters.) Surface magazines were also inspected and found to be in good order, tidy and well kept with the books up to date.

Fire protection underground is provided by numerous fire extinguishers, all of which are noted on the appropriate maps, as per the Act; displayed in the offices at the Portal and kept up to date. (See Map section at the back of this report.)

Underground power is provided by high and low voltage distribution systems. These systems are shown on a Plan and prominently displayed at the electrician's shop at the portal. (See Map section at the back of this report.)

Portable offices at the Portal currently serve the mine. These offices are to be replaced over the next month by new permanent offices adjacent to the new workshops and close to the fresh air raise. Work is currently ongoing to clear up the Portal area to assist in this move.

Blasting is carried out twice daily at the end of each shift. The blasting circuits are well organised and the blasting procedure uses Nonel detonators and stick emulsion powder etc. plus b-line. The primary blasting cable is generally well hung, but there are a few places where this cable should be re-routed to gain greater separation from the leaky feeder cable and service pipes. The blasting operations are well and carefully carried out and surface collars of underground

boreholes are guarded at each blast. Problems were experienced with a sulphur blast in June 2011 and measures have been adopted to minimise the possibility of recurrence of this problem by the use of lime bags which are exploded just prior to the blast and washing down of drifts. A program of gas testing for SO₂ is in place prior to re-entry after blasting. The possibility of installing permanent SO₂ monitoring points in the main Ramp is being investigated.

All in all, the mine is being professionally operated under difficult ground conditions. Mining methods are evolving as the operators, management and technical staff become more familiar with the orebody. Operators are well trained and equipment quality is improving as the operation moves forward.

3) Compliance with the Yukon Occupational Safety and Health Regulations.

The Author assisted by the Technical and Operational Staff at the mine has reviewed the Yukon regulations pertaining to the underground operation and would comment as follows:

In general the mine is in compliance with the Regulations and also with the spirit of the Act. If there is no mention of a specific part of the Act or Regulations in the table below, it can generally be presumed that in the opinion of the Author, the operation is in compliance with this part of the Act.

In particular the following specific parts of the Regulations were checked in detail:

1.06 – Adequate Training	Procon personnel are generally well trained. A Copy of the Training Matrix for Procon personnel is provided at the end of this report.
PPE – Sections 1.08 to 1.33	Mine and Procon staff are provided with all necessary PPE and trained in their fit and use.
15.04 Plans and Sections to be available.	The mine keeps all its drawings, up to date daily, on a central server in AutoCAD and Surpac. For each development, an appropriate layout is provided to the development crew and the Procon supervisors on a weekly basis. Separate larger scale plans are provided of the basic underground development, plus the location of all items as per 15.04 (2) (Updated July 2011.) Vertical cross sections are available in the main mine administration office and detailed vertical sections can be generated on request from Surpac and the survey database.
15.05 Notices of ownership	Posted in both the Main office reception and the Portal Offices.
15.06 Design Report	The Mine Development and Operation Plan published July 8, 2010 and also the Wolverine Ground Control Management Plan dated May 18, 2011 and revised June 12, 2011, cover this. (GCMP) The latest version of the GCMP is dated June 12, 2011 and has been reviewed by the Author, plus a number of geo-technical experts, and found to be appropriate for the operations at Wolverine. A signed off copy of the Plan will be provided to the Inspector by the first week in August 2011. The draft report and all support drawings have been in use by all operators over the past three months and training courses in Ground Control management techniques at Wolverine have been held for all miners and operators of U/G support and development equipment.
15.11(2) Supervisors Certificates/Blasting Tickets.	While all of Procon's supervisors and a number of YZC's technical and supervisory staff hold Supervisors Tickets, very few of these are from Yukon. This problem has been identified to the Inspectorate. The same problem exists with Blasting Licence tickets.

	The Yukon Supervisors test is on the web site. It requires updated First Aid. The Mine is currently running courses to update the first aid certificates of a number of personnel. Because of the difficulties of moving a significant number of people to Whitehorse to sit the exams, a program of onsite testing for both Supervisors tickets and Blasting Certificates would be a great benefit in bringing this into compliance.
15.12 Log Books	Shift log books and geological and geo-technical hazard, support and instruction log books are maintained in the Portal Office and kept up to date on a daily basis.
15.13 (2) Extended hours of work.	Procon works 11-hour shifts underground. This is under a Variance to this section. As part of the temporary Variance granted to the Mine on Feb 12 2010, for this purpose the Mine has been carrying out a program of industrial Health and Hygiene checks and studies under the direction of Golder Associates. This program is ongoing. No abnormalities have so far been detected.
15.14 Fire Protection	Sections 1-4 fully complied with. Stench gas checks carried out in mid July 2011 on each shift successfully in accordance with sections (5) and (6). Interestingly during the test of the stench gas at the fan house, it tripped the CO monitor and shut down the fan! Despite this all workers could smell the gas and exited the mine. This resulted in the extension of the stench gas discharge line down the fan drift well beyond the CO monitor. A retest is due to be carried out on the next shift rotation to ensure all workers have been exposed to the stench gas. The secondary stench gas system was also tested on the Fan Duct with success. A third system also exists on the compressed air line. Reports of the tests are on record.
15.15 Refuge Station U/G	In excellent condition and in full compliance.
15.18 (1) Fire fighting Equipment	While the underground mine is in full compliance in terms of fire extinguishers etc, no portable fire fighting equipment such as a portable fire pump or portable foam generator exists on site. The operation should have a portable foam generator and portable fire pump for U/G and site wide use. Additionally no fire engine exists on site, although a heated fire main and water cannons on the fire main cover the site. The operation expects to receive a water truck, with a pressurised water system, which could be used for fire fighting later this year.
15.18 (2) plus 15.19	All fire extinguishers duly inspected. For 15.19 in compliance.
15.24 Hot Work	All procedures duly followed. Hot work certificates duly reviewed.
15.26 Separate means of Escape	Fully in compliance. Escapeway duly marked via both fresh air raises. Ladders installed and workers instructed. Escapeway inspected at least monthly. (Normally weekly as part of the Ventilation survey.)
15.26 (4) water to flow away from the entrance to a mine	The Current Portal design does not provide adequate protection against water ingress into the mine. The Punch plate cover over the decline needs to be extended up to level ground

	from its current position to ensure that equipment can reach surface and onto the flat before coming out of the portal. This is necessary to prevent the possibility of a runaway or sliding accident during winter operations on the Ramp and also to ensure water cannot easily enter the portal.
15.28 Procedures for Fires.	The mine has an Emergency Response Plan for both Surface and Underground. (Copy in Bundle.) In addition, the mine carries out regular training in the use of fire extinguishers etc with all workers and the procedures in the event of fire. The operation as a whole is training a number of personnel as mine rescue specialists and this training includes some fire suppression etc. A list of trained personnel is held at the Portal offices and also at the Main Safety office. The U/G mine does not have a specific plan to deal with incidents of fires underground and has been requested to produce one for discussion and follow up.
15.30 and 15.32 Fire doors.	The underground operation does not have fire doors on the main Ramp entrance. It also does not have closable louvers on the vent fan or vent drift. The operation needs to apply for a Variance in the short term and come up with a solution to this.
15.36 Mine Rescue Station	The Mine Rescue Station is at the main site offices. It appears to be adequately equipped with SCBA sets, recharge pumps, icemakers etc. plus a variety of other equipment. There is no significant reserve store of fire fighting equipment at the Portal location.
15.37 Training of Mine Rescue	A number of workers, both from surface and underground are trained in Mine Rescue techniques and a number of others are under training. Currently the mine has a duly appointed Training officer, but this individual is leaving the site in the near future. Training facilities are available for training in Mine Rescue.
15.39 Surface Pits	The operation currently uses a small rock quarry at kilometre 19 for the production of Cobble. In addition there are a number of borrow-pits on site, which are currently non operational, for road construction and production of sand. The appropriate personnel have been made aware of the requirements of this portion of the Act for future borrow-pit operations.
15.44 Dump areas and 15.45 dumping	Not examined as carried out by Surface Services. Relevant Surface Personnel made aware of regulations in Act.
15.46 and 15.47 U/G Water	Generally in compliance. U/G water not a significant problem and handled by a series of cascading sumps. Two pilot holes specified in top corners of jumbo drifts to be drilled to 4 meters on a 3 metre round.
15.48 (1), (2), (3). Ground Control.	Fully complied with and covered by the Wolverine Ground Control Management Plan and the relevant shift Ground control book. All faces examined on a shift-by-shift basis and also daily by a competent geo-technician or geologist.
15.49 Ladders and Platforms	In the Fresh air raises as part of the Escape way there are ladders set at between 20 and 45 degrees. While these ladders will comply with section (3) of this section, they do not

	comply with section (2) of the section. I presume that Section (2) should have said “inclined at less than 70 degrees, <i>but more than 50 degrees</i> ” otherwise this section does not make sense.
15.56 Haulage way clearances	The mine is in general compliance with this section. All travel ways and safety bays inspected during the last visit are in good order.
15.58, and 15.60 Diesel Equipment	The equipment currently in use at Wolverine is in general compliance with these sections. Ten separate items of equipment have recently undergone brake modification and sign off by an independent breaking system expert on a 60-day permit. 3 additional pieces of equipment have been similarly modified and are awaiting sign off.
15.61 Environment Also 16.08 (3) CSA Rating.	15.61(2) The surface fan provides a volume of air far greater than that required for ventilation, under a Variance issued by the Inspectorate on June 17, 2009 linked to the use of low sulphur fuels. However, in an unrelated complication, the air heaters, which are propane powered, still require partial CSA Approval. This work was partially carried out in November of 2010, however, one burner remains to be certified. This needs to be completed prior to the 2011 winter season. (A copy of the original CSA certification test is included in the bundle.)
15.61 (4) and (6) Underground Vent volumes and gas testing	The measurement of ventilation air volumes and quality is carried out by Procon’s safety officer on a weekly basis. Exhaust gas tests are run on mobile equipment weekly and after all major services. A program of testing in the vicinity of the equipment operator station as required by 15.61 (4) c, d and e. This has been discussed with Procon and will be put in place immediately.
Traffic Light Signals on the main Ramp.	There is currently no system of traffic light signals on the main Ramp. Installation of traffic lights from the 1280 level to surface would greatly aid haulage by truck up the Ramp and reduce the problems encountered in fog caused by warm moist air coming up the Ramp in winter.

4) Deficiencies that need to be addressed at Wolverine Mine, in order to bring it into full compliance with the Yukon Occupational Safety and Health Regulations.

The following list represents the major areas of deficiency that need to be addressed at the mine and details the measures proposed by mine management to meet these deficiencies:

- A. **15.11(2) Supervisors Certificates/Blasting Tickets.** – While the mine currently has enough ticket holders to operate, a number of additional personnel need to obtain these tickets for the Yukon, particularly at YZC. The initial steps such as first aid are currently being addressed and Supervisors tickets are being worked on.
- B. **15.13 (2) Extended hours of work.** – This is currently under a temporary Variance. Industrial Hygiene testing is underway with Golder Associates.
- C. **15.18 (1) Fire fighting Equipment.** – The mine lacks portable fire fighting equipment on surface to deal with an underground fire. Ideally it should have a Foam generator, a significant number of hoses and a portable fire

pump, plus spare fire extinguishers all in a dedicated ready trailer.

- D. **15.28 Procedures for Fires.** – Detailed fire fighting plans for underground needed. Being worked on by Procon.
- E. **15.30 and 15.32 Fire doors.** – The Mine has no fire doors. This will require a temporary Variance and will then require a solution developing. Extending the Portal punch plate to surface would allow the hanging of a fire rated roll up door on the end of the punch plate. A similar solution can be developed for the Vent Fan. Extending the punch plate to surface also removes another hazard with the formation of ice on the portal floor and also the potential for inrush.
- F. **16.08 (3) CSA Rating for Mine Fan.** – This needs to be re-certified to bring into compliance with CSA before the heaters are used this winter.
- G. **15.61 (6) Gas testing at the operator station on the mobile U/G equipment.** – Not completed. Program started as of August 1st 2011.
- H. **Traffic Light Signals on the main Ramp.** – Necessary to provide safe operation of mobile equipment on the ramp.
- I. **Installation of Remote SO₂ CO and O₂ underground.** – While currently in compliance on this item, it would be much easier and cheaper to install remote gas monitoring on the Ramp for the pre-entry gas checks.

Respectfully submitted

Malcolm J.A. Swallow
B.Sc. (Hons.) Min.Eng. ARSM. C.Eng. FIMMM. P.Eng. (BC & Yukon)
Independent Mining Consultant
Swallow Services Ltd.