NANISIVIK MINE
NANISIVIK, NU
X0A 0X0

FACSIMILE TRANSMITTAL SHEET

TO:	FROM:
Bill Tilleman	Bill Heath
COMPANY:	DATE:
Nunavut Water Board	08/07/02
FAX NUMBER:	TOTAL NO. OF PAGES INCLUDING COVER:
867-873-8708	27
PHONE NUMBER:	SENDER'S REFERENCE NUMBER:
c/o Fraser Towers	
RE:	YOUR REFERENCE NUMBER:
Response Document	

☐ URGENT ☐ FOR REVIEW ☐ PLEASE COMMENT ☐ PLEASE REPLY ☐ PLEASE RECYCLE

Bill:

In response to the letter from the Nunavut Water Board dated June 20, 2002 we submit the following. The letter itself is quite self-explanatory and deals with the comments made in your letter on an individual basis.

With respect to our attachments, you will find the following.

1. A two page memorandum from Gartner Lee that addresses comments #3 and #15 asking about the status of the Phase 2 ESA.

2. A three page table prepared for the Chief Inspector of Mines describing the various openings to surface and explaining, in each instance, our plans to close the opening. This should address the issue raised at item #7.

3. A four page compilation of maps and drawings, the first three of which deal with regional and local geology. The fourth page shows the outline of the main ore zone and satellite ore zones. That addresses the information requested at item #8.

4. A four page report prepared by Mr. Guy Lauzier P. Eng. (our Manager of Technical Services) which should satisfy the issue raised at #9.

5. A one page inventory of PCB's currently on site which should satisfy item #12.

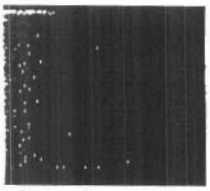
6. A four page letter sent by Mr. Steve Keenan (our Environmental Superintendent) to Dionne Filiatrault dated November 15, 2001. This should satisfy issue #17B.

7. A one page map showing the various exploration drill holes, drilled over the life of the operation. Given the number of drill holes drilled over a protracted period of time, you can appreciate that there are a great number of holes and this map, at this scale, may prove to be meaningless. However, it will provide you with a general context of the areas where drilling has been carried out and when you are at site we can provide you with a larger map, which should better serve your purposes. This should satisfy issue #19.

On a closing note, we would like to confirm to you that our letter will be translated this week, provided that we have access to our regular translator in Arctic Bay. As soon as the letter has been interpreted we will pass it along. If we encounter any difficulties because our interpreter is not available, we will get in touch with you.

We look forward to seeing you in a couple of weeks.

Bill Heath



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July 08, 2002

Mr. Philippe di Pizzo
Executive Director
Nunavut Water Board
P. O. Box 119
Gjoa Haven, NU
X0B 1J0

SENT ELECTRONICALLY TO pdipizzo@polarnet.ca

Dear Philippe:

Following the close of regular business hours on June 24, 2002 I received your letter dated June 20, 2002 outlining comments the Nunavut Water Board (NWB) has made with respect to our Closure and Reclamation Plan, filed on February 28, 2002. Although the receipt of the letter was somewhat outside the time frame you indicated during the public meeting held in Arctic Bay on June 06, 2002, you have our assurance that we will make our best efforts to deal with each of the issues identified in a timely fashion, within the guidelines established below.

However, given the scope and complexity of the information to be provided, the size of the files to be transferred and also taking into consideration the delay in receiving your list of comments, we formally request that the information not contained in or appended to this letter, be permitted to be submitted to you by no later than 3:00 MT on July 12, 2002. This will give us the balance of this workweek to compile and transfer the information to you. There are some requests, though, such as the requests for photographs where such an extended deadline still does not make it practical to ship the requested information prior to the scheduled hearings.

I am sure you can also appreciate that our efforts are being further hampered by the vintage of some of the information being requested. While we have no difficulty in sharing items such as the BC Research baseline investigations, geochemical mapping and the like, such information is not available electronically. The best we can offer is to have our copies of such information shipped south, most likely to our office in Bathurst, New Brunswick, have it copied there on their equipment and shipped back to site in sufficient numbers to satisfy all of the parties involved. We are confident that if we are permitted to do this, we will have all of the information available in sufficient quantities by the time of the commencement of the public hearing on July 22, 2002.

With respect to the comments made, we believe that the best way to approach our response is to work through the points on an individual basis, as they were presented by Dionne Filiatrault in her June 20th letter.

1. PRE AND POST CLOSURE MONITORING DATA

Immediately above you have our assurance that once copies are made in sufficient quantity, the pre closure monitoring data including baseline information and geochemical mapping will be made available to you at the time of the hearing. These documents once provided will augment the copies provided to you at the time of the water licence renewal. In addition, we draw your attention to Volume Two of the Closure and Reclamation Plan wherein a complete inventory and summary of the studies carried out, commencing with the 1974 studies, is provided.

On a related note, in case it is not clear from the Plan that was filed, this is our assurance that any closure activities will include a comparison / reconciliation of pre and post closure data and a further assurance that all such testing data will be incorporated into our annual environmental progress report as contemplated at Section 8.1.2 of the Plan.

2. PHASE 2 ESA – TANK FARM AREA

As you may already know, Gartner Lee will commence the Phase 2 work on July 13, 2002 and we have confirmed with them that the study must include the tank farm area. A memorandum from Eric Denholm of Gartner Lee is attached confirming these, and other arrangements.

This may also be the opportune time to address the general topic of the Phase 2 ESA. At the public meeting on June 06th there was a general consensus that there was a hierarchy of wishes in this area. The ideal situation would be that the Phase 2 ESA had been completed by the time of the public hearing and you had a final report in your possession. Alternatively, if the work had been completed but only a draft report was available, it was agreed that this would have to suffice. The least favoured option was that no report (either final or draft) was tabled, but we did make available to you Eric Denholm who would speak to the work on the Phase 2 ESA that had been completed to that point and the work still outstanding. Unfortunately, the window of opportunity to carry out the work and the hearing dates will dictate that the third option be selected.

3. HYDROLOGICAL STUDY OF WEST TWIN LAKES TAILINGS MANAGEMENT AREA

Much like the situation facing the Phase 2 ESA, the window of opportunity to carry out this work is in conflict with the hearing dates, although the work is scheduled for completion this summer. However, as an alternative, we are again able to commit to make available our independent expert in this area, who will be prepared to answer all technical questions. Jim Cassie of BGC will be in attendance at the hearings and will respond to any questions raised by the Board or any other interested parties on this subject.

4. WASTE ROCK BALANCE SHEET

Much of the information has already been provided to the Board at Tables 1, 2 and 3 of the 2001 Annual Water Report. However, we recognize that the material presented as part of that report may have some deficiencies, including not projecting 2003 activities. These deficiencies, for the most part, are brought about by the fluid nature of our waste rock recovery program. However, in an effort to put at ease the mind of the Water Board, we would suggest that we append to the monthly Surveillance Network Program (SNP) Report a complete summary of waste rock activities for the previous month. We would be receptive at the time of the public hearing to discuss with the Board, the format that this report will take and the information to be included.

5 / 6. DETAILED SCHEDULE OF ACTIVITIES / DEADLINES OR MILESTONES

We have found it impossible to address this issue in any meaningful fashion without some clear definition of how large or small the reclamation project is likely to be. As the Board knows, discussions are currently underway with the Government of Nunavut to explore all opportunities to transfer the assets located at Nanisivik to the Government or some other interested third party. Those discussions have been ongoing and continue as this letter is being prepared. The Board must realize and appreciate that it is not as simple as picking between one of two options to determine the amount of work to be completed, establishing the timeframe to have the work completed and also establishing the likely costs of reclamation. The outcome of those discussions is most likely going to be some compromise that will find some buildings being salvaged and put to alternative uses and other buildings being destroyed. At this point, we are not able to identify which of the buildings will fall into which category.

We must all be sensitive to the fact that these discussions may not take place quickly as alternatives may only present themselves over a period of time. In the interim, though, we feel strongly that the infrastructure at Nanisivik must be properly maintained in the best interests of the people of Arctic Bay in particular and the residents of Nunavut in general. A number of optional uses for Nanisivik are currently being explored which may come to fruition, and will possibly cause the closure of Nanisivik to take place over a longer period than originally contemplated.

The best undertaking that we can make to the Board is that at the public hearing a representative of the Company will be present and in a position to address the topic of the ongoing discussions. It is also hoped that a representative of the Government of Nunavut will also be in attendance who will also be in a position to speak to the matter to confirm (or debate, as the case may be) the status of the discussions.

7. LOCATION OF MINE SURFACE OPENINGS

A similar request was made by the Chief Inspector of Mines and a summary table was prepared in response to that request. The table prepared for the Chief Inspector is attached identifying each of the mine openings to surface, the location of the openings and a brief explanation of the efforts that will be undertaken to secure the various openings.

8. MINE PLANS AND SECTIONS

Please find attached a summary document outlining the geological mapping of the Nanisivik ore body. It should be noted that a comprehensive library of plans and sections covering the term of the Nanisivik Mine operation exists and if the Board wishes to view the reference library maintained on site, they may do so at the time of the public hearing. Given the size of the library, we would have to conclude that making copies of the entire library is simply not possible or practical.

9. STABILITY OF THE UNDERGROUND MINING AREAS

In response to this request, our Manager of Technical Services (Mr. Guy Lauzier, P. Eng.) has prepared the attached summary report.

10. CLOSURE COST ESTIMATE

Following the advice and counsel provided to the Company by representatives of the Board present at the public meeting in Arctic Bay on June 06, 2002, but prior to receiving your letter dated June 20th we had contacted SRK Consulting and engaged them to fit our anticipated closure costs into the RECLAIM model. This work is ongoing and we have been assured that the findings of SRK will be available on or about July 12, 2002. You have our assurance that as soon as the information is provided to us, we will pass it along to you for your review and comments.

11. SEISMIC SLOPE STABILITY ANALYSIS FOR WEST TWIN DYKES

Jim Cassie of BGC will be in attendance at the public hearing as committed at Item Three, above. In addition to being in a position to respond to any technical questions in that regard, Mr. Cassie will also address any technical questions the Board or other parties may have with respect to seismic slope stability, and more importantly the long-term stability of the West Twin Dyke.

12. PCB STORAGE / DISPOSAL

The inventory of PCB's on site is appended to this letter. With respect to the disposal of the PCB's an outside contractor, expert in this field, has been engaged to ensure that such disposal takes place in the prescribed fashion. This inventory has, for a long time, been on file with Environment Canada, who carry out annual inspections of our PCB storage facility.

13. DECONTAMINATION FLUIDS / CLEANING WATER DISPOSAL

The existing system of sumps and pipelines will continue to be utilized to transport cleaning water laden with zinc and lead to the West Twin Disposal Area. In areas such as the concentrate storage shed where decontamination may be deemed necessary, temporary sumps and water collection systems are planned to be constructed and collected water brought to the West Twin Disposal Area. Degreasers and lubricating oils will continue to be collected for incineration in the waste oil burner located at the Carpenter Shop.

14. EXISTING AND OLD QUARRIES / BORROW AREAS

The caution raised by the Board to keep borrow areas to an absolute minimum size is noted and will be heeded. As well, we confirm our commitment to reshape and regrade these areas when our reclamation project is completed.

15. AVAILABILITY OF THE PHASE 2 ESA REPORT FOR REVIEW

We can reconfirm for the Board that a representative of Gartner Lee will be in attendance at the public hearing and will be available to answer relevant questions. At that time, Gartner Lee will be in a better position to address questions with respect to the timing of draft and complete reports.

16. ACID BASE ACCOUNTING TEST RESULTS

We note the Board's conclusion that no further kinetic testing to determine acid generating potential is necessary.

17. TECHNICAL REPORTS

(A) **TAILINGS DISPOSAL PLAN 2002** – Another copy of this plan can be easily made available to the Board, if such a need exists. With respect to the other issue raised, though, there is a concern dealing with the request made by the Board that photographic evidence be included. Our library of photographs in support of this plan numbers greater than 1,000 and providing them at this time is simply not practical. We are more than pleased to share them with Board members in advance of or during the public hearing, but getting them distributed within the next two weeks or so is just not possible. If possible, at the time of the public hearing the pictures can be made available electronically, which we trust will suffice.

(B) **TEST CELL EVALUATION 2001** – There appears to be some confusion in this area as Steve Keenan responded to the October 25, 2001 letter presented by Mr. Ramli Halim. Mr. Keenan's response letter should put to rest all of the issues raised at this item. A copy of that correspondence is attached.

(C) **WASTE ROCK DISPOSAL (WRD) PLAN** – There is some confusion as to what is being requested. As a general statement, we wonder if it would be beneficial to the Board if we reassert our commitment that all waste rock material that we can physically access in a safe and prudent fashion will be retrieved and disposed of underground.

18. BRIDGE NEAR DUMP POND

As a point of clarification, the structure in question is a causeway and not a bridge. Irrespective of its classification, the area has now been filled with a culvert and the longer-term plan is to remove the culvert when mining / milling operations come to a close. In any event, it is our position that the matter is dealt with sufficiently at Section 6.5.3 of our Plan dealing with site roadbeds.

19. EXPLORATION DRILLING

Exploration programs have occurred on almost an annual basis since the mine commenced operation. Most drilling has been done in the spring or fall when the land is frozen. The clean up of exploration sites has been done at the end of every exploration project. The attached site map depicts the surface drill holes in the vicinity of the mine from the Deb Claim to Kuhulu Lake.

20. DRAWINGS AND DOCUMENTS

We note the concern raised by the Board that construction drawings and other related documents must be prepared by a licensed Professional Engineer. Where it is prudent to do so or where we are required to do so by statute, we will certainly heed that advice and such work will be carried out and stamped by a qualified engineer and the work will be completed in a manner consistent with sound engineering practices. For other areas, for instance demolishing buildings (and especially houses if we are required to do that) it is the position of the Company that no such consultation is required and we will proceed in a safe and common sense fashion.

21. PHOTO LIBRARY AND REFERENCES

As noted above, our library of photographs is quite extensive and providing it as an appendix to this letter is not possible nor even practical. However, you should know that in the past we have been diligent about taking photographs as work has progressed and will continue with this commitment as the reclamation work continues. We agree with the position set out in your letter that such photographic support may prove to be beneficial to all parties involved.

Philippe, we believe that this addresses all of the comments that you raised in your letter. We have made our best efforts to address all of your comments within the timeframe that was established. In a few instances, however, you will note that we are not able to accommodate your time constraints but we have offered what we believe to be reasonable alternatives. Not to put too fine a point on it, but if we had received your list of issues for clarification at the time you indicated at the June 06th public meeting, we would have been much better situated to honour your time constraints.

If you have any questions or comments with respect to any of the information set out above or any of the appendices to this document, please feel free to call upon me.

Yours truly,

CANZINCO LTD.

Bill Heath
Vice President

MEMORANDUM

To:	Bob Carreau, Steve Keenan	Date:	2002 07 03
CC:	Eric Denholm, Gartner Lee Limited		
From:	Arlene Laudrum, Gartner, Lee Limited	Ref:	21957
Subject:	Sampling Plan for Nanisivik Phase II ESA		

The following areas of interest are to be investigated in the upcoming Phase II Environmental Site Assessment at Nanisivik and they will be sampled in the priority order listed:

1. **Town Site** (1.5 days)
   - The condition of all accessible day tanks present is to be visually documented. 10% of the day tanks are to be investigated by test pitting (assuming 50 tanks = 5 test pits). Samples are to be collected at varying depths to enable documention of the vertical extent of any suspected contamination. It is anticipated that seven samples will be submitted for analytical hydrocarbon analysis, including QA/QC
   - 20 test pits are proposed to investigate additional areas of concern (fuel handling areas, areas where snow has been piled over winter, areas where airborne dust may have accumulated, etc.) with locations tied to the initial surficial sampling, where practical. It is anticipated that 20 samples will be submitted to the on-site laboratory for metal analysis and that 20% of those samples will be collected as duplicates and submitted to an outside laboratory. An excavator will be required for one full day to excavate and backfill test pits. The actual number of test pits may vary depending on the productivity achieved by the excavator.
   - Dust samples will be collected at random from inside buildings and analyzed for metal concentrations as a means of demonstrating interior metal concentrations. It is anticipated that up to 10 samples may be collected for on-site analysis with approximately three duplicate samples sent to an off site laboratory for analysis to the lowest practical detection limits.
2. **Carpenter Shop** (0.5 days)
   - 10 test pits is recommended to investigate the area of the past fuel spill. Two samples will be collected per test pit and samples with high hydrocarbon vapour concentrations will be submitted for analysis – approximately 6 samples are anticipated including one QA/QC sample.
3. **Landfill** (1 day)
   - 10 test pits is anticipated to be required to investigate the landfill area. Soil samples will be collected and where feasible standpipes will be installed to collect groundwater. It is anticipated that 6 soil samples will be submitted for analysis of hydrocarbons and leachate. Three groundwater samples will be collected if possible.
4. **Dock Area**, Concentrate Storage Shed, Tank Farm, Chemical Storage Area (1.5 days)
   - 20 test pits are proposed for this area plus hand sampling within the tank farm containment berm
   - dust samples from interior of concentrate storage shed (possible 5 samples) will be collected for on site analysis

5. **Mill Yard and Warehouse Yard** (2 days)
   - 30 test pits are anticipated for these areas. Four samples are to be anticipated from each test pit. Approximately 50% of samples will be analyzed for metals on site with 20% shipped off site for external QA/QC analysis. An additonal 15 samples are expected to be submitted for hydrocarbon analyisis.
6. **Surface downwind of Tailings Pond and Industrial Complex** (1 day)
   - open ground to be sampled for metals analyses by hand at two or three depths.
   - down wind of Tailings Pond possible 5 samples.
   - flat north of town site collecting about 5 samples
   - Twin Lakes Creek catchment north of industrial complex (possible 5 samples)
7. **Tailings Pipeline Route** (1 day)
   - Three test pits are anticipated to be excavated (likely by hand) downgradient of each dump pond plus test pits in other areas of potential contamination. Samples collected withing the upper 20 cm will be analyzed for metals on site. Samples collected below 20cm depth at areas of concern and duplicates of anomalous results will be analyzed at the external laboratory.
8. **Roadways and East Adit Treatment Facility** (2 days)
   - sampled from test pits at various depths for metals and possible ABA analyses
   - need for ABA analysis will be determined in the field based on a visual determination of rock/soil type
   - anticipate 5 test pits (possible 15 samples) for road from industrial complex to concentrate storage shed with locations tied to initial surficial sampling where practical (1 day)
   - anticipate 10 test pits on "other"roads (possible 30 samples) (1 day, assuming availability of float truck)
   - sampling of sediment from retention ponds (East Adit treatment facility) to be undertaken to characterize the sediment for closure. Test pitting in the area may be undertaken depending on visual examination of surface soil conditions (i.e. indications of historical treatment sediments downgradient of the ponds)

Samples for external analysis will be shipped off site on the Saturday and Wednesday flights. The external laboratory that is inteneded to be used is Accutest, located in the Ottawa area. ABA (acid base accounting) analyses will be conducted at the Breakwater Resources Caribou Mine laboratory.

The timeframes provided here are estimates that may vary with equipment availability, weather and other unforeseen events. The timeframe also assumes the provision of a field assistant from Arctic Bay on a daily basis for the duration of the sampling program.

We trust that this information meets your needs at this time. The sampling program is scheduled to commence on July 14, 2002 and we look forward to undertaking this work.

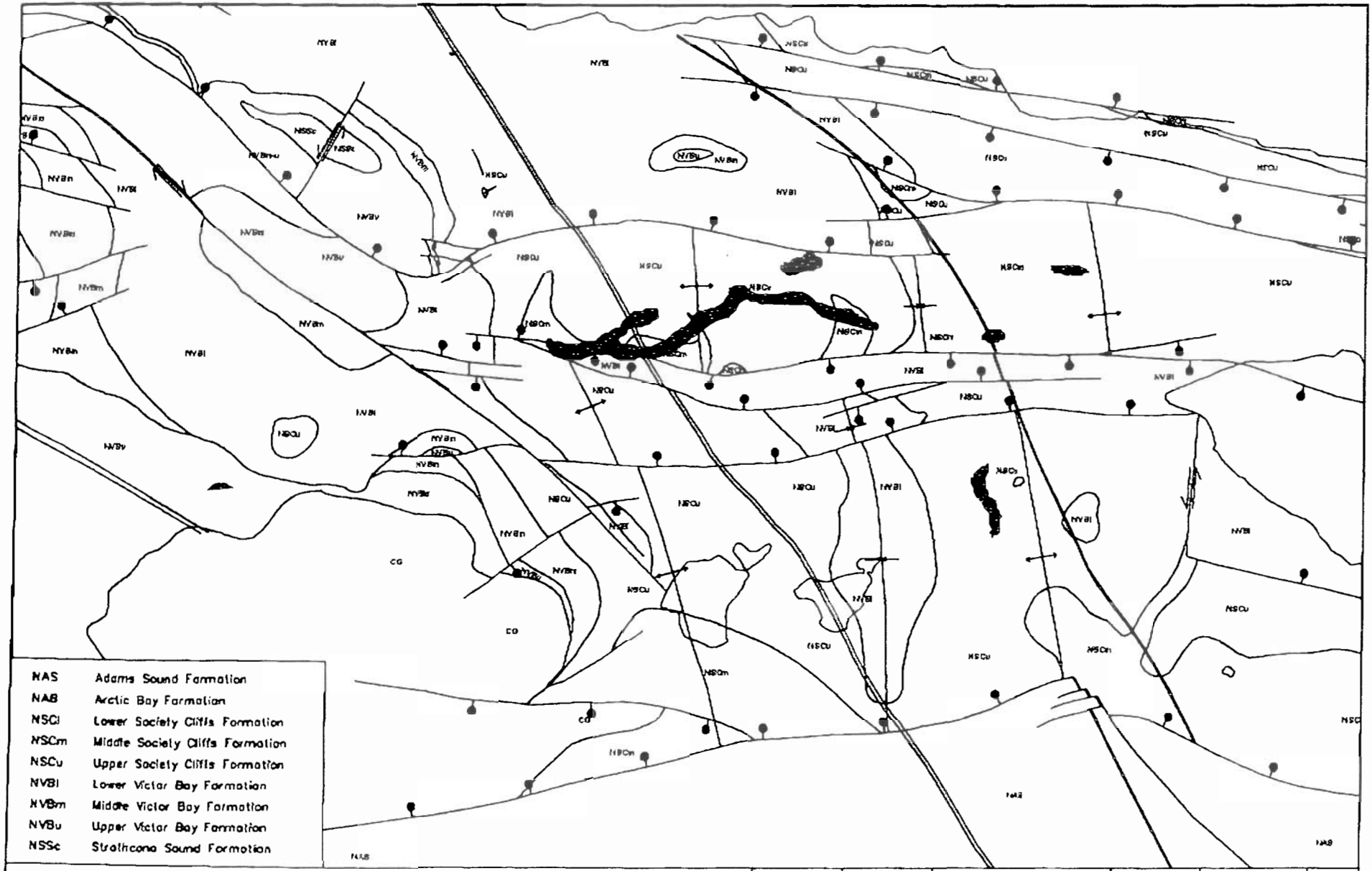
Arlene Laudrum

MINE ACCESS CLOSURE PLAN

ENTRANCE LOCATION / NAME	DESCRIPTION OF ENTRANCE	RECOMMENDED REMEDIAL ACTION
The **Lower Adit** is the main access to the underground crusher and fine ore bin as well as a secondary access to the main mine.	The adit was originally cut at 3.0m by 5.5 m and contains the feed belt from the fine ore bin to the DMS plant and mill in a covered galley way. The collar of the adit was cemented resulting in a 5.0m by 3.0m opening with a 1.0m thick cover of cement and 0.25m thick walls inside the solid rock and up to 0.5m thick outside the solid rock. The cement roof outside of the solid rock is supported with steel beams fixed to the walls. The area above the cement will subsequently filled with fine, non-acid generating material.	❑ Removal of all exterior fine ore transporting infrastructure and galley way. ❑ Filling the adit to 2.25m above the opening to prevent entry (non-acid generating material).
The **00 Portal** is the principal access at the western extremity of the mine.	The portal measures 5.0m by 5.0m in cross-section and currently has an automatic roll-up rubber door installed for ventilation control. As a further safety measure, a fenced, catch-berm was installed 4.0m above the opening.	❑ Backfilling to 1.0m above the opening. ❑ Removal of the fence above the portal. ❑ Final contouring, filling & general clean-up (1.25m cap).
The **01 Portal** houses the main ventilation fans.	The four 75hp fans are mounted in a steel bulkhead on a pad approximately 18m wide and 12m high and extending 10m into the underground side of the opening. The frozen pad is constructed of mine waste and shale and the size of the bulkhead is 22m by 4m. A 4m fenced, catch-berm is located above the opening for further safety.	❑ Removal of the ventilation fans. ❑ Backfilling the area under the brow with waste material. ❑ Final filling and contouring (1.25m cap).
The **09 Portal** is a culverted entryway giving access to the main mine on the south side of 09 Block.	The culvert is round with a diameter of 5m and a length of 28m. The bottom of the culvert is filled to provide a smooth floor. The culvert extends 13m inside the solid shale of 09 south drift, leaving 15m exposed on surface.	❑ Crush the culvert and backfill with waste to 1m above the top of the opening. ❑ Final contouring with 1.25m of non-acid generating material to prevent entry. ❑ Removal of all trash and unused materials.
The **17 North Portal** is a culverted entryway giving access to the main mine and the former compressor room on the north side of 16 block.	The 17 North Decline is 5m by 5m in cross-section and the culvert is half round with a diameter of 5m and a length of 28m. The culvert is supported by a concrete retaining wall (0.25m thick by 2m high) on either side and extends 5m inside the solid dolostone of the drift. A 23m section remains exposed to the surface.	❑ Crush the culvert and backfill with waste to 1m above the opening. ❑ Final contouring with 1.25m of non-acid generating material. ❑ Removal of all trash, outbuildings and scrap steel.

The **39 Portal** was the main access into the east end of the main mine for much of the mine life.	The removal of material in the rib between the mine and the East Open Pit has resulted in an opening of 50m wide by 12m to 15m high. The brow varies from 3m to 8m in height and is partially fenced. The opening is currently backfilled with mine waste in order to seal the opening.	❑ Backfilling with waste to 1.0m above the opening. ❑ Removal of all trash, outbuildings, fencing and scrap steel. ❑ Final filling and contouring (1.25m cap).
The **88 Portal** is the travelway at the east end of the lower lenses of the mine.	The 88 Portal has a cross-section of 5m by 5m and the 3.5m brow over the portal is fenced for additional safety.	❑ Backfilling with waste to 1.0m above the opening. ❑ Final contouring with a 1.25m cap of non-acid generating material. ❑ Removal of all trash, fencing and scrap steel.
The **K Baseline Portal** is a culverted entryway formally used to access the K Baseline orebody.	The K Baseline decline is 5m by 5m in cross-section and the culvert is half round with a diameter of 5m and a length of 28m. The culvert is supported by a retaining wall (1m wide by 2.4m high) on either side and extends 3m inside the solid dolostone of the drift. Of the remaining 25m, all but approximately 5m have been covered with waste material. The portal has been inactive for a period of nearly 10 years and ice has completely filled the access to a point 20m inside the culvert.	❑ Crush the portion of the culvert that is still accessible. ❑ Backfilling with waste to 1.0m above the high spot in the culvert. ❑ Final contouring with a 1.25m cap of non-acid generating material. ❑ Removal of all trash, fencing and scrap steel.
The **Ocean View Portal** is a bare rock entrance into the north side of the Ocean View underground workings.	The Ocean View Portal has a cross section of 5m by 5m. The 5m brow above the portal is fenced for additional safety. The portal has been inactive for a period of over seven years and has completely filled with ice.	❑ Backfilling with waste to 1.0m above the opening. ❑ Final contouring with a 1.25m cap of non-acid generating material. ❑ Removal of all trash, outbuildings, fencing and scrap steel.
The **Area 14 Portal** provided access to Area 14 underground workings.	Mining activities in Area 14 ceased 15 years ago and the portal was backfilled with waste then and covered and contoured with shale in 1987 and 1988.	❑ No further remedial measures are required in this area.
The **Shale Hill Raise** – this raise to surface from the underground workings of the Shale Hill Zone provided ventilation for the area.	The top of the 3m diameter by 47m raise is sealed with an old steel tank (2.5m diameter) with its bottom cut out and with two adapters for 36" ventilation fans. The tank was fixed to a cemented collar at the top of the raise. The steel tank is in place, but the fans have been removed. The last work done in this area was in the mid 1990's and the raise remains open its entire length. Heavy frost build-up does occur in the tank during the winter but melts in the summer.	❑ Removal of the steel tank (summer months only). ❑ Backfilling with dolomite and / or shale to the original surface elevation. ❑ Cover the raise with a further layer of 3m of non-acid generating waste.
The **Ocean View West Raise** is located near the west end of the Ocean View underground workings.	The 3m-diameter raise is 26m deep and provided ventilation for the Ocean View workings. The raise is covered by a steel enclosure with a locked wooden cover. Due to the long period of inactivity, ice has filled the raise to just below the surface level.	❑ Removal of the steel enclosure and backfilling of the remaining opening with waste rock to the original surface elevation (summer months only). ❑ Non-acid generating waste (3m) will be put over the raise.

The Ocean View East Raise is located at the extreme east end of the Ocean View underground workings.	The 4m by 4m raise is 10m deep and provided ventilation for the workings. The raise is currently covered with a wooden wind deflector with a locked door. Access was blocked by snow at the time this summary was prepared, but it is anticipated that due to the length of inactivity this raise will be filled with ice.	❑ Removal of the wooden wind deflector. ❑ Backfiling of the remaining opening with dolomite and / or shale to the original surface elevation (summer months only). ❑ Cover the raise with a further layer of 3m of non-acid generating waste.
The Area 14 Raise.	The Area 14 Raise has a cross-section of 5m by 5m and depth of 8m. Mining ceased in this area 15 years ago and the raise was completely backfilled to the floor of the underground workings with waste and then covered and contoured with shale in the summers of 1987 and 1988.	❑ No further remedial measures are required in this area.
The West Pit Highwall is the surface expression of the limits of open pit mining carried out over the years.	The West Pit highwall has a total extent of 188m and varies in height. The area between 00 Portal and 01 Portal has been backfilled to within 2m to 4m of the brow above. A safety berm (average width of 3m) exists on the longer, uphill side of the high wall.	❑ Filling along the highwall is currently underway. ❑ The remaining backfilling operations will be completed with waste, approved solid refuse and reject material from the DMS plant. ❑ Final filling and contouring will be carried out using a 1.25m cap of non-acid generating material. This will be done to limit any vertical face to a maximum of 5m.
The East Pit Highwall is the surface expression of the limits of open pit mining carried out over the years.	The East Pit highwall has a total lateral extent of 163m and varies in height. The top of the highwall is fenced for additional safety. The bottom of the pit has been silled out to the East Lower Lens underground workings.	❑ Backfilling of the highwall is currently underway. ❑ The East Lower Lens sill area in the center of the pit will be filled with waste material to the ultimate pit elevation. ❑ Filling and final contouring against the highwall and the mine openings will be done at the natural angle of repose (35^{0}) and to a height that will limit any vertical face to a maximum of 5m., using a cap of 1.25m.
The East Trench Highwall.	The East Trench highwall is 24m wide by 75m long and 20m deep at the west end.	❑ Backfilling of the opening will be carried out using reclaimed rock from around the pit. ❑ Final contouring and filling will be done with a 1.25m cap of non-acid generating material. This will be done to limit any vertical face to a maximum of 5m.
The Ocean View Pit Highwall.	The Ocean View Pit highwall is the surface expression of the limits of open pit mining carried out recently to the east of the Ocean View underground workings. The highwall has a total lateral extent of 300m and averages 4m in height. There is an additional wide cut (4m deep by 5m wide) within the limits of the overall pit.	❑ Backfilled with mine waste and final contouring will be done with overburden material removed from the pit. ❑ Given the gentle slope of the local topography and the shallow nature of the pit, no vertical drops from the highwall will remain.



Planning Checklist

Services: Power Cables ___ Ground Control ___ Structural Geology ___ Special Instructions ___

Air / Ventilation ___ Non-Entry Boundaries ___ Excavation Dimensions ___ North Arrow / Grid Lines ___

GMM Locations ___ Sill Pillar Thickness ___ Post Pillar Layout ___ Stope & Pillar Names ___

Designed by	Checked by	Approved by - date	Filename	Date	Scale
NB					NTS

Owner: NANISIVIK MINE, A Division of Cominco Ltd., NANISIVIK, NT

Title/Name: Nanisivik Geology -Figure 1

Drawing number | Edition | Sheet

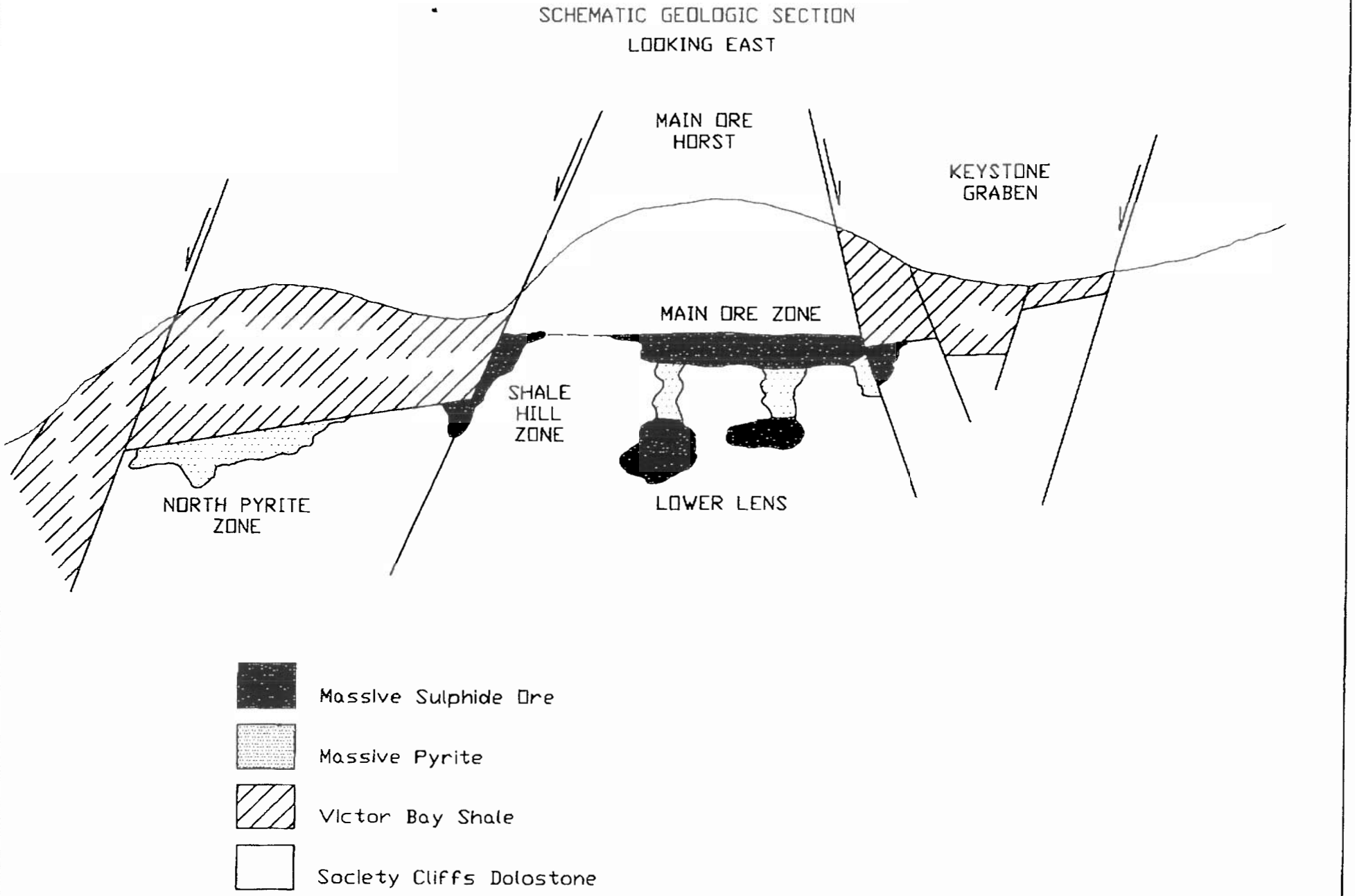

SCHEMATIC GEOLOGIC SECTION
LOOKING EAST
MAIN ORE HORST
KEYSTONE GRABEN
MAIN ORE ZONE
SHALE HILL ZONE
NORTH PYRITE ZONE
LOWER LENS
Massive Sulphide Ore
Massive Pyrite
Victor Bay Shale
Society Cliffs Dolostone

Figure 2

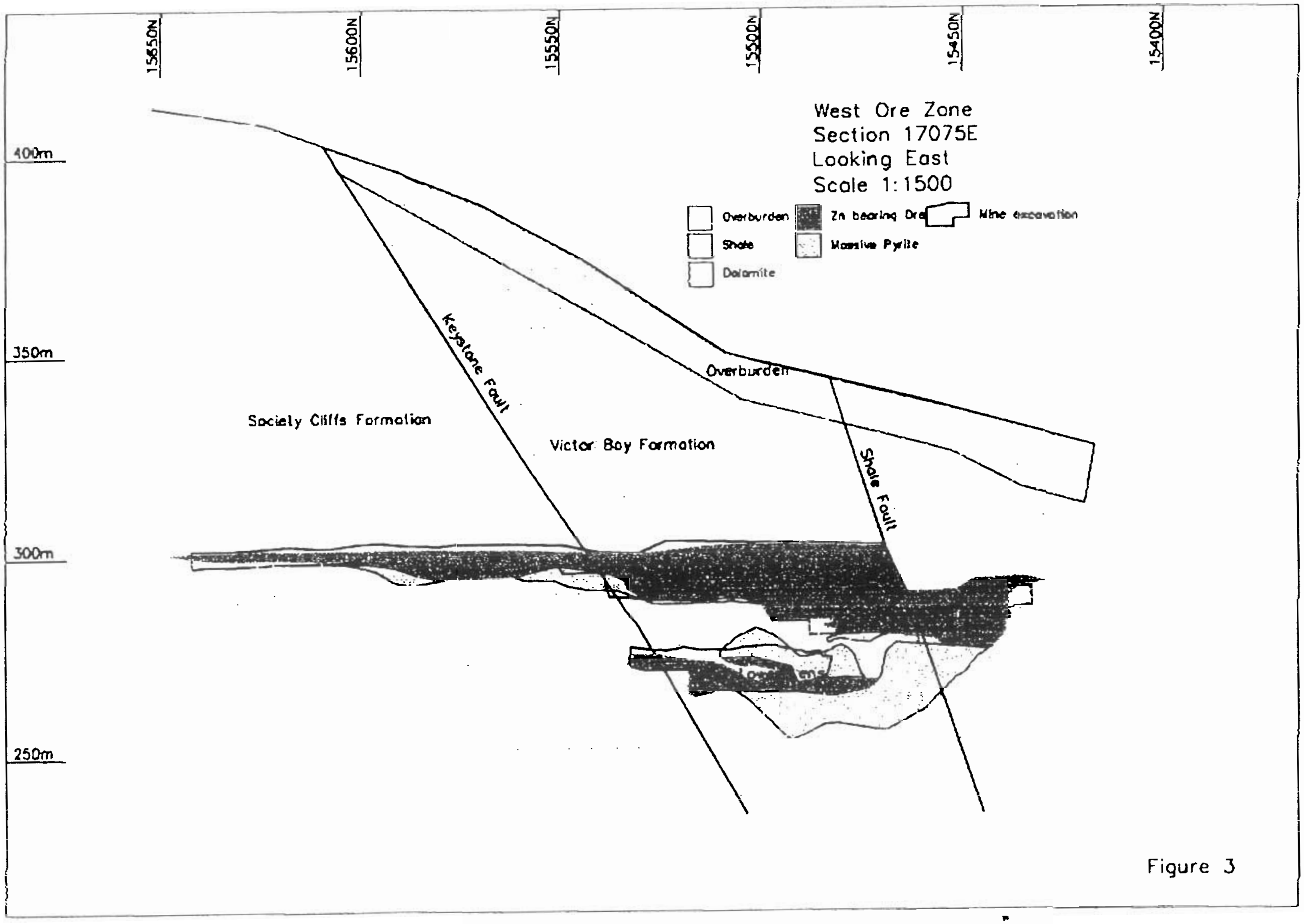
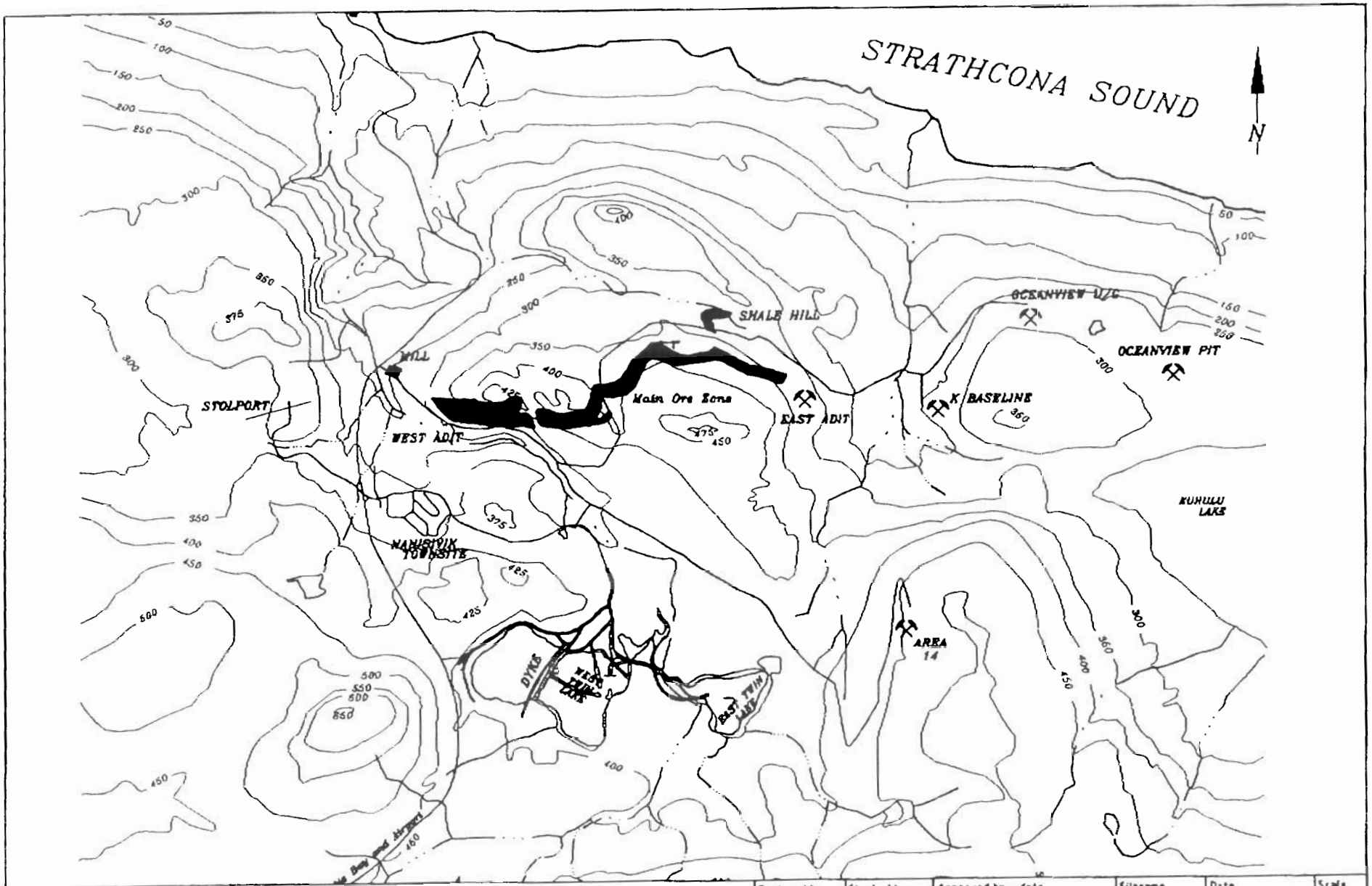

West Ore Zone
Section 17075E
Looking East
Scale 1:1500
Overburden
Shale
Dolomite
Zn bearing Ore
Massive Pyrite
Mine excavation
15650N
15600N
15550N
15500N
15450N
15400N
400m
350m
300m
250m
Keystone Fault
Shale Fault
Overburden
Society Cliffs Formation
Victor Bay Formation

Figure 3



Planning Checklist

Services: Power Cables ___ Air / Ventilation ___ CMM Locations ___

Ground Control ___ Main-Entry Boundaries ___ Sill Pillar Thickness ___

Structural Geology ___ Excavation Dimensions ___ Post Pillar Layout ___

Special Instructions ___ North Arrow / Grid Lines ___ Slope & Pillar Names ___

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A Division of Cominco Ltd.
Nanisivik, NT

Title/Name: Nanisivik Orebodies – Figure 4

Drawing number | Edition | Sheet

Nanisivik Mines Limited

Crown Pillar Stability Analysis

Prepared by Guy Lauzier
July 4, 2002

Introduction

The permanent closure of the Nanisivik mine raises the issue of the potential subsidence of the ground surface above the abandoned mine openings. The report focuses on the areas where subsidence could occur and the remedial work that has been planned in order to ensure long-term stability of the zones.

Near Surface Exposure

Areas where spans are greater than 75 metres, ground cover is less than 35 metres and the height of the excavation is greater than 14m may cause to subsidence. The only two zones that could potentially create subsidence are the West Open Pit Area and East Open Pit area that connect directly to the underground and have a cover of less than 35 metres. These areas are completed open pits that were the surface exposed portion of the main lens. Both areas are have competent dolostone backs. As part of the remedial action plan, the areas along the walls of these areas will be filled with waste rock in order to seal the access to the underground portion of the orebody. The waste rock is reclaimed rock from the dumps that were generated during the mining operations.

Failure Mechanisms

Two basic failure mechanisms come into play in determining the subsidence of the surface.

1) Adequate cover – The repeated ground failure in a specific area will gradually fill the void created during the mining activities and thereafter, subsidence can no longer proceed and the ground auto-supports. The average height of the underground openings at the East and West Pit is 14 metres. This also assumes that the support is inadequate to sustain the back for long-term stability. The West Zone will be supported by an adequate number of pillars to ensure long-term stability of the zone. In the East Open Pit area the clear unsupported span is 75 metres.
2) Rock Strength – In areas where inadequate cover is provided, the rock strength must be adequate to support the ground for extended periods of time. For this study the following rock dolostone strength characteristics were used: 140 Mpa (intact rock), 45 Mpa (design value based on previous studies) and 65 Gpa

modulus of elasticity. Based on a simple beam model without assuming end constraints or the effect of the frozen abutment, a minimum brow of 5 metres gave a maximum bending stress of 35 Mpa at the roof or the opening. All brows either at the West Pit or the East Pit areas have more than 5 metres sills, thereby, satisfying the stability condition to long-term stability. No significant faulting exists in the East Pit Area. In the West Pit Area, pillars have been left along the brow and on a regular pattern in order to maintain the structural integrity of the zone as this area will be used for the disposal of waste rock and other approved refuse. The West Zone Area does have two major faults that run east – west. These faults were taken into account when determining the remnant pillar configuration.

Other Stability Factors

The permafrost present within the mine workings will help in maintaining the stability of the openings for longer periods of time than a comparable mining operation where no permafrost exists.

Factors that will increase the stability of the areas with less than 35 metres of ground cover are:

1) The surface water will infiltrate into the opening, gradually filling the entrances with ice. This will eliminate the void and eliminate the possibility of downward displacement of the blocks. It is expected that over several years, even though the structural integrity of the rock may decrease over time, it will be compensated by the introduction of the water into the mine.
2) The placement of waste fill in order to block the entrances will create a horizontal constraint to the possible movement of the block. The surface water will gradually filter through the fill and increase the strength of the pile. The active layer of the pile is not expected to be more than 1.5 metres.

Conclusion

1) The Main Mine and Satellite Orebodies at Nanisivik have been designed for long-term stability and it is not contemplated that there will be any subsidence issues.
2) The West Pit and East Pit areas, once properly filled will be stable in the long-term. The surface water will gradually fill these areas and increase their stability.

Guy Lauzier
Friday, July 05, 2002

CONTENTS OF PCB STORAGE FACILITY

New Label	#PN 00901	#PN 00902
Old Label	NR20734	NR84561
Serial Number	2-119801	2-161552
Manufacturer	Ferranti	Ferranti
Capacity	712.80 L	712.80 L
PCB Concentration	626000 µg/g	600000 µg/g

Transformers in use

Label #	Contents (litres)	Location	Manufacturer	Serial #
NR20561	1,089.6	MCC room – mill	Wooden (1975)	114828
WN10347	712.8	MCC room – crusher	Ferranti	2-161551
NR20736	1,089.6	MCC room – mill	Wooden (1975)	114827
WN00498	783.0	Standby generating stn.	Wooden (1975)	114830
WN00499	675.0	Standby generating stn.	Wooden (1975)	114829

NANISIVIK MINE
A division of CanZinco Ltd.
P.O. Box 225
Nanisivik, NU
X0A 0X0

Phone: (867) 436-8000
Fax: (867) 436-7435

November 15, 2001

Dionne Filiatrault
Technical Advisor
Nunavut Water Board
P.O. Box 119
Gjoa Haven, NU X0E 1J0

Dear Ms. Filiatrault:

RE: WATER LICENSE NO: NWB1NAN9702 NANISIVIK MINE
TEST CELL EVALUATION

We are in receipt of your letter of October 25, 2001 and the attached comments by Mr. Ramli Halim (Acres International). At the outset, we would like to point out that Mr. Halim's questions and comments are dated July 3, 2001, which is prior to his July 22-25 visit to Nanisivik and indeed the Test Cell area. Understandably, many of his questions and comments were addressed during his visit and in fact were included in his *Site Visit* report to the NWB (which we were copied).

Rather than reiterating information which has already been exchanged (and is on file) we have focused our response on the missing information. Mr. Halim's comments are presented in italics with our response following.

> *It is essential that raw data should be presented in the report and updated every year.*

Our past practice has been to present the data in graphical format to provide visually comprehensible trends for all readers. We can appreciate however that some reviewers may wish to investigate other correlations than those presented. With this in mind we are amalgamating project-to-date data into one file and will circulate this on completion. (Electronic copies will also be available on request.)

Thermocouple data shows that over the year the average yearly temperature within the test cell has decreased. However, has the temperature over the summer months managed to reduce the active thaw zones in the test cells? How does this reduction differ between the test pads?

Evaluations of temporal trends other than the annual data, which has been presented in the report, will be possible by the reviewer when the raw data is distributed.

...is there any difference in the physical conditions among the different techniques and materials used for the cover materials, such as settlements, developments of cracks, etc? Do the compacted pads stand better against erosion from thawing and snow melts in the spring than uncompacted pads?

A description of the test pad construction methodologies was included in previous annual updates but was not reiterated in the 2000 report. A more descriptive commentary on the construction of the individual test pads follows:

Test Pad #1: Bordering on the north shore of the test cell area this pad has a surface area that is approximately 30 * 30 metres square and has a thermocouple string installed to a depth of 5 metres and four frost gauges installed to a depth of approximately 2 metres. The thermocouple (TC3) is installed in the approximate centre of the pad while the frost gauges (#'s 3 – 6) are installed in the centre of the four quadrants of this pad having a centre line between each of about 15 metres. The materials used in the construction are chiefly shale at a depth of 2.0 m with a minor cover of light coloured Airport Road Sand on the western half of the pad at a depth of 5 – 10 centimetres. Neither compaction nor saturation were carried out on this pad during the construction phase.

Test Pad #2: Bordering on the north shore of the test cell area this pad has a surface area that is approximately 16 * 16 metres square and has a frost gauge installed to a depth of approximately 2 metres. The frost gauge (# 7) is located in the centre of the test pad. The construction materials used were shale at a depth of 1.7 m with Twin Lakes Sand and Gravel cover at a depth of 0.3 m. Both compaction and saturation were conducted in 20 – 30 centimetre lifts during construction on this pad.

Test Pad #3: Bordering on the eastern shore of the test cell area and on the western edge of an incomplete causeway this pad has a surface area that is approximately 16 * 16 metres square and has a frost gauge installed to a depth of approximately 2 metres. The frost gauge (# 8) is located in the centre of the test pad. The construction material used was shale at a depth of 1.0 m. Compaction was completed in 20 – 30 centimetre lifts during construction on this pad but because of the mild temperatures (0 to –5 °C) saturation of the pad could not be attained.

Test Pad #4: Bordering on the eastern shore of the test cell area and on the western edge of an incomplete causeway this pad has a surface area that is approximately 16 * 16 metres square and has a frost gauge installed to a depth of approximately 2 metres. The frost gauge (# 9) is located in the centre of the test pad. The construction materials used were shale at a depth of 1.0 m, 0.3 m of Glacial Till (compacted), 0.4 m of shale and 0.3 m of Twin Lake Sand and Gravel. Because of the ambient air temperature during the construction phase saturation could not be attained.

Test Pad #5: Bordering on the eastern shore of the test cell area and on the western edge of an incomplete causeway this pad has a surface area that is approximately 16 * 16 metres square. A frost gauge was installed to a depth of approximately 2 metres along with a thermocouple string installation to a depth of 13.2 m. The frost gauge (# 10) and thermocouple string (TC5) are located in the approximate centre of the test pad. The construction materials used were shale at a depth of 1.0 m, 0.3 m of Airport Road Sand (compacted), 0.4 m of shale and 0.3 m of Twin Lake Sand and Gravel. Because of the ambient air temperature during the construction phase saturation could not be attained.

We have not observed significant changes in the physical condition of the test pads from 1993 – 2001. Visual inspection of the test cell area was normally included as part of regular geotechnical inspections conducted by SNC Lavalin (1990 – 1997) Golder Associates (1998 – 1999) and BGC Engineering (2000 – present). No observations of deteriorating conditions of any of the test cells were noted.

> *Was the construction of the 2 m shale dyke part of the raising of the test cell dikes, and did it occur in 2000?*

Yes.

> *Dr. Elberling recently presented a paper in the Mining Symposium in Greenland. I do not have a copy of the paper, and would be interested to know if there are any findings which related to the abandonment cover strategy for the Nanisivik mining.*

We are not aware of which paper Dr. Elberling may have presented at the mining symposium. If however, a paper was presented that contains information pertinent to our operation, we would be equally interested in reviewing it.

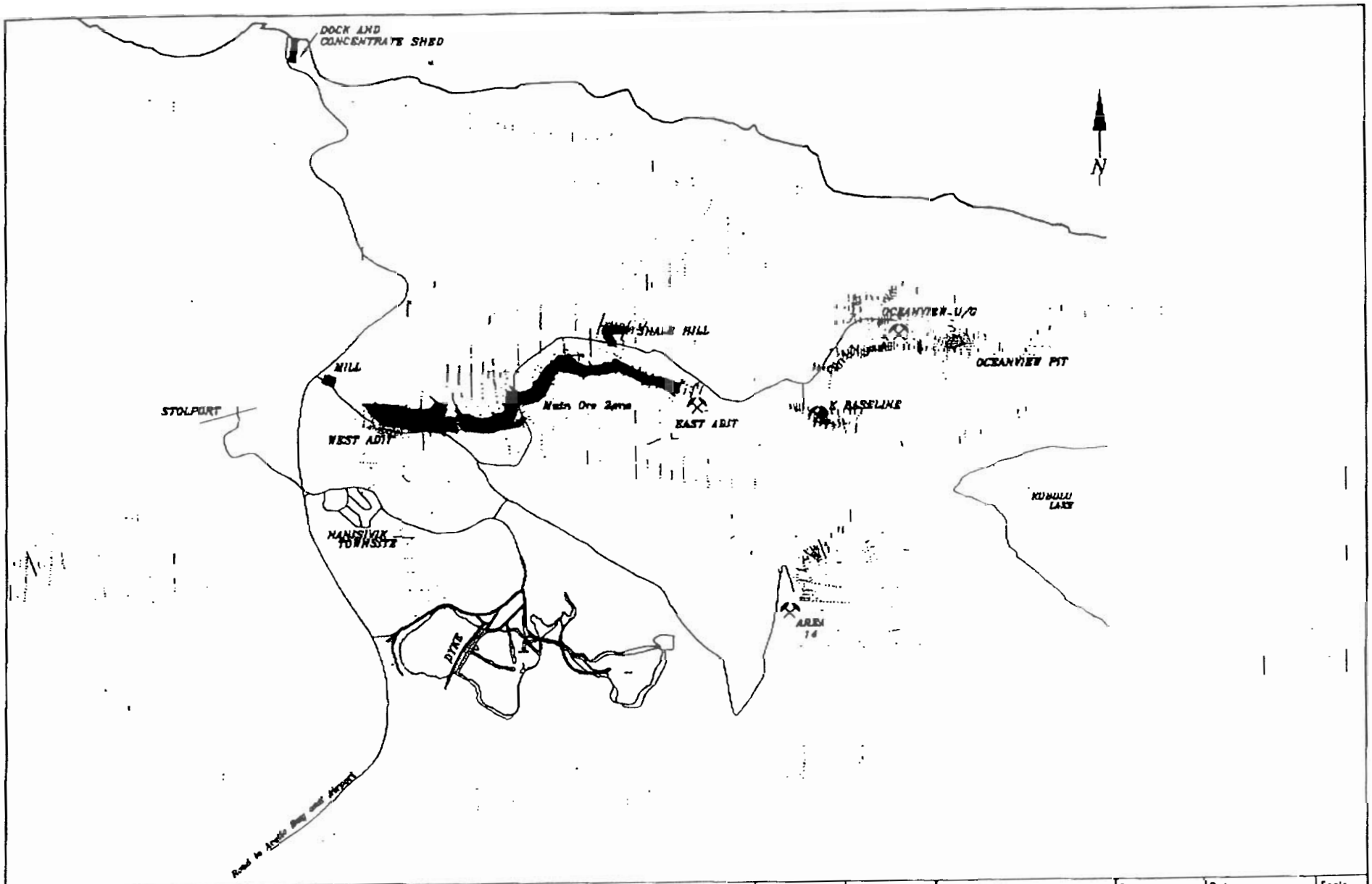
I hope this clarifies your questions and concerns. If you would like to discuss any of this further, please do not hesitate to contact me.

Regards,

Steven C. Keenan
Environmental Superintendent

Phone: (867) 436-7401
email: skeenan@nu.breakwater.ca

c.c. B. Carreau P. Moreau
B. Heath File



Planning Checklist

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Owner: NANISIVIK MINE
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Title/Name: Surface Drillholes -Figure 5

Drawing number | Edition | Sheet